

GENESIS SOLAR ENERGY PROJECT

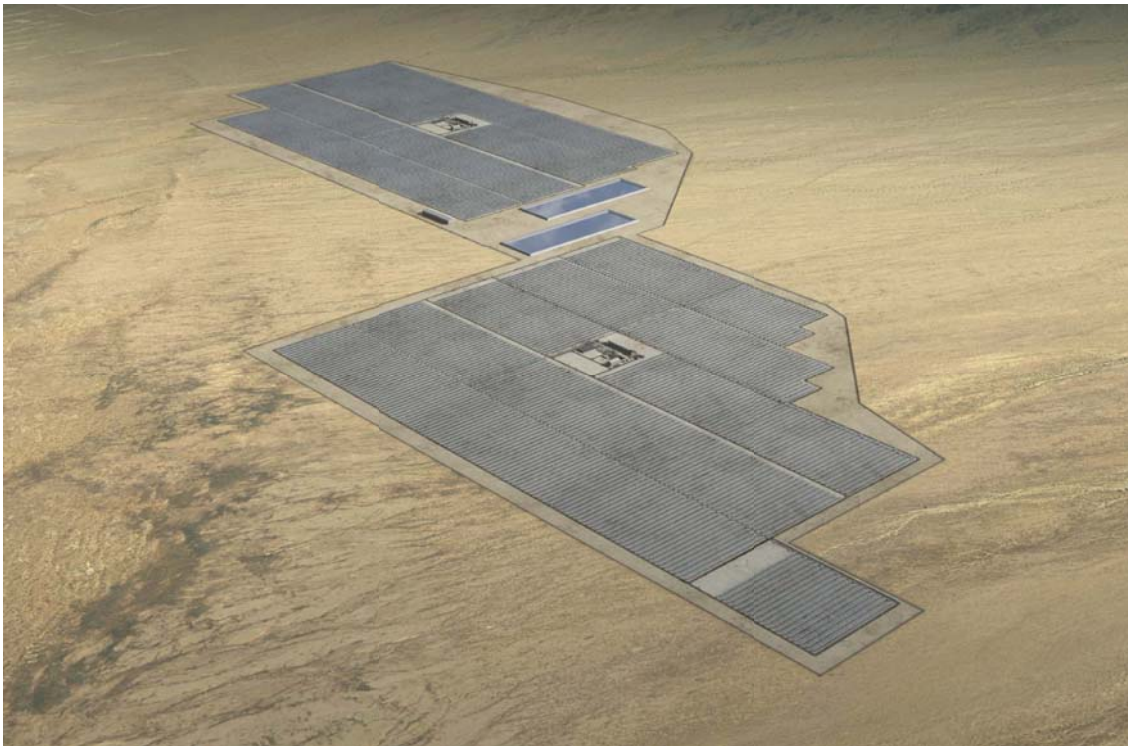
Revised Staff Assessment

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09-AFC-8

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When considering a project for licensing, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR. In support of its certification process, the Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable local, state, and federal laws, ordinances, regulations and standards (LORS). Energy Commission staff also recommend measures to mitigate potential significant adverse environmental effects, which take the form of conditions of certification for construction, operation, maintenance and eventual decommissioning of the project, if approved by the Energy Commission.

This RSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements. The RSA will serve as staff's testimony in evidentiary hearings to be held by a Committee of two Commissioners who are overseeing this case. The Committee will hold evidentiary hearings and will consider the recommendations presented by staff, the applicant, intervenors, additional parties, government agencies and the public prior to proposing its decision. The Energy Commission will make a final decision, including findings, after the Committee's publication of the Presiding Member's Proposed Decision.

PROPOSED PROJECT LOCATION AND DESCRIPTION

The GSEP is located approximately 25 miles west of the city of Blythe, California, on BLM-administered lands. The project area is south of the Palen/McCoy Wilderness Area and north of Ford Dry Lake and Interstate 10, and can be viewed in **Project Description Figures 1 and 2**. The applicant is seeking a Right-of-Way grant with BLM for approximately 4,640 acres of lands. (The ROW application for the GSEP was originally 19,000 acres when filed in 2007). Construction and operation of the project would disturb a total of about 1,800 acres. As such, any difference between the total acreage listed in the Right-of-Way application (4,640) and the total acreage required for project construction and operation (approx. 1,800) would not be part of the ROW grant, if BLM decides to approve the project.

The Project area is located in east central Riverside County, where land use is characterized predominantly by open space and conservation and wilderness areas. The western portion of the county accounts for most of the developed area of the county, including urban areas and agricultural areas. The southeastern corner of the county to the east of the Project also contains limited agricultural areas and rural development (Riverside County, 2003).

The area designated within the Palo Verde Valley Area Plan occurs to the east of the Project and encompasses the developed and agricultural area in eastern Riverside County. The portion of the Palo Verde Valley Area Plan in the vicinity of the Project consists mainly of sparsely populated desert and mountain areas. The more populated and agricultural areas occur farther east of the GSEP in the vicinity of Blythe.

A - INTRODUCTION

Mike Monasmith

This Revised Staff Assessment (RSA) is being published by the staff of the California Energy Commission (Energy Commission). The predecessor to this report was a March 26, 2010 Staff Assessment /Draft Environmental Impact Statement (SA/DEIS), which was a joint document published by both the Energy Commission and the U.S. Bureau of Land Management (BLM).

On April 7, 2010 both the Energy Commission and BLM determined that they would develop and publish a separate final document. The BLM's document will be called a Final Environmental Impact Statement (FEIS). Although the Energy Commission and BLM are no longer publishing a joint document, the Energy Commission and the BLM continue to share staff expertise, information and documentation in order to promote intergovernmental coordination at the local, state, and federal levels.

In the interests of producing a clear, comprehensive, and thorough report that addresses the same issues that were included in the Genesis SA/DEIS, the Energy Commission, in consultation with BLM, determined that the RSA would retain the joint document format and language used in the SA/DEIS. As such, specific language that mentions either the BLM or the National Environmental Policy Act (NEPA) is referenced for informational purposes only.

This RSA contains staff's independent evaluation of the Genesis Solar LLC (applicant) Genesis Solar Energy Project (GSEP) application, which was filed with the Energy Commission on August 31, 2009 (09-AFC-8). The RSA examines engineering, environmental, public health, and safety aspects of the GSEP, based on the information provided by the applicant and other sources available at the time the RSA was prepared, and includes analyses normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA).

In support of its CEQA certification process, the Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and conditions of certification for construction, operation, maintenance and eventual decommissioning of the project, if approved by the Energy Commission. This RSA is not the decision document for these proceedings nor does it contain findings of the Energy Commission related to environmental impacts or the project's compliance with local/state/federal legal requirements.

The RSA will serve as staff's testimony in evidentiary hearings to be held by the Committee of two Commissioners who are overseeing this case. The Committee will hold evidentiary hearings on July 12 and 13, 2010, and will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The Energy Commission will make a final decision, including findings, after the Committee's publication of its proposed decision.

- To locate the project in an area with high solar insolation (i.e., high intensity of solar energy);
- To fulfill Governor Schwarzenegger's and Secretary Salazar's Memorandum of Understanding to expedite renewable energy development in California.

The specific objectives and purpose of GSEP as identified by the applicant are:

- To develop a utility-scale solar energy project utilizing parabolic trough technology;
- To construct and operate an environmentally friendly, economically sound, and operationally reliable solar power generation facility that will contribute to the State of California's renewable energy goals;
- To locate the project in an area with high solar insolation (i.e., high intensity of solar energy);
- To interconnect directly to the CAISO Grid through the SCE electrical transmission system; and
- To commence construction in 2010 to qualify for the American Recovery and Reinvestment Act (ARRA) of 2009's Renewable Energy Grant Program.

The applicant has proposed this project in light of the recently enacted State of California legislation and goals, which includes Senate Bill 1078, passed in 2002, establishing the California Renewable Portfolio Standard (RPS). It requires utilities to increase their sale of electricity produced by renewable energy sources, including solar facilities, by a minimum of one percent per year with a goal of 20 percent of their total sales by 2017.

However, the California Public Utilities Commission, Energy Commission and the California Power Authority adopted the Energy Action Plan (EAP), which pledged that the agencies would meet an accelerated goal of 20% by the year 2010. The California Senate then passed Senate Bill 107 to be consistent with the EAP and accelerated the implementation of RPS, requiring utilities to meet the goal of 20 percent renewable energy generation by 2010. In November 2008, California's Governor instituted Executive Order S-14-08, which establishes an updated RPS goal that all retail sellers of electricity shall serve 33% of their load with renewable energy by 2020.

GSEP would be built in an area with high potential for solar resource development. The project would allow California utilities to increase the percentage of renewable resources in their energy portfolio and aid the utilities in reaching the goals set forth by the RPS.

A.5 BLM PURPOSE AND NEED

The BLM's purpose and need for the GSEP is to respond to the applicant's application under Title V of the FLPMA (43 USC 1761) for a Right-Of-Way (ROW) Grant to construct, operate and decommission a concentrated solar thermal electric generating facility, and associated infrastructure, in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to approve,

Permanent closure is a cessation of facility operations with no intent to restart. Permanent closure may result from a combination of facility age and economic considerations, or from damage considered beyond repair or other reasons. Temporary and permanent facility closures are both discussed in detail in the **General Conditions** section of this Revised Staff Assessment.

Temporary Closure - In the case of a temporary closure, security for the GSEP facilities will be maintained on a 24-hour basis and the Energy Commission and other responsible agencies will be notified. The course of action that will be followed will depend on whether or not the temporary closure involves a release of hazardous materials.

If there is no actual or threatened release of hazardous materials, a contingency plan will be implemented for the temporary halting of facility operations. The purpose of this contingency plan, to be developed prior to the beginning of operations, is to ensure compliance with all applicable Laws, Ordinances, Regulations, and Standards (LORS) and appropriate protection of public health, safety, and the environment. Depending on the expected duration of the temporary shutdown, the contingency plan may include the draining and proper disposal of chemicals from storage tanks and other facility equipment, the safe shutdown of all plant equipment, and various other measures to protect onsite workers, the public, and the environment.

If the temporary closure involves an actual or threatened release of hazardous materials to the environment, procedures will be implemented as provided in the **Hazardous Materials** section of this Revised Staff Assessment. Procedures will include, but not be limited to, the following:

- Measures to control the release of hazardous materials;
- Requirements for notifying the appropriate agencies and the public;
- Emergency response procedures; and,
- Training requirements for Project personnel in hazardous materials release response and control.

Once the hazardous materials release has been resolved, temporary closure will proceed as described above for temporary closure without a hazardous materials release.

Permanent Closure - The planned operational life of the GSEP is 30 years, but the Project facility conceivably could operate for a longer or shorter period depending upon economic considerations or other circumstances. For example, if the Project facility remains economically viable, it could operate for more than 30 years, which would defer environmental impacts associated with closure and with the development of replacement power generating facilities. However, if the facility were to become economically non-viable before 30 years of operation, it could be closed permanently at an earlier time.

Regardless of when permanent closure occurs, a decommissioning plan specifying the appropriate closure procedures will be developed and implemented. As in the case of a

temporary closure, security for the Project facility will be maintained on a 24-hour basis. During permanent closure, the Energy Commission and other responsible agencies will be notified of the decommissioning schedule and plans.

The procedures provided in the decommissioning plan will be designed to ensure public health and safety, environmental protection, and compliance with applicable LORS. Prior to the beginning of permanent closure activities, the decommissioning plan will be submitted to the Energy Commission's Compliance Project Manager for review and approval.

Depending on conditions at the time of closure, the closure measures may range from extensive "mothballing" to the complete removal of Project equipment and other structures. Proposed decommissioning measures for the power plant and all associated facilities constructed as part of the Project, designation of equipment and appurtenances to be removed or that may remain in place, as applicable.

- Activities necessary for site reclamation;
- Provisions for recycling facility components, collection and disposal of wastes, and resale of unused chemicals back to suppliers or other parties;
- Decommissioning alternatives other than full restoration of the site;
- Costs associated with the proposed decommissioning and reclamation activities and the source of funds to implement these activities; and,
- Conformance with applicable LORS and with local/regional plans.

As it is not possible to predict at present the conditions that will exist at the time decommissioning decisions must be made, decommissioning details will be developed and provided to the Energy Commission when the time for permanent closure is closer and more information is available. Please see the **General Conditions** section of this Revised Staff Assessment for more details on this process.

If the evaporation ponds or LTU require temporary closure, the Closure and Post-Closure Maintenance Plan shall be implemented. A Preliminary Closure and Post-Closure Maintenance Plan for both waste management units will be submitted to the Colorado River Regional Water Quality Control Board with the application for a Report of Waste Discharge (RoWD) (please see the **Waste Management** section of this RSA for a more detailed discussion).

ALTERNATIVES RETAINED FOR ANALYSIS

Three alternatives are retained for analysis within each discipline's section:

- Reduced Acreage Alternative
- Dry Cooling Alternative
- No Project/No Action Alternative

renewable energy generation. Both of these Secretarial Orders will be considered in responding to the NextEra application for the proposed GSEP.

NextEra has filed an application with BLM for a right-of-way (ROW) grant pursuant to the Federal Land Policy and Management Act (FLPMA, 43 USC 1761). Under FLPMA Title V Section 501 (a)(4) (Rights-of-Way), the United States Secretary of the Interior, as delegated to the BLM, is authorized to grant ROW on lands administered by the BLM for the purpose of allowing systems for generation, transmission, and distribution of electric energy.

The **BLM's Purpose and Need** for the GSEP is to respond to the NextEra application under Title V of FLPMA for a ROW grant to construct, operate and decommission a solar thermal facility and associated infrastructure in compliance with FLPMA, BLM ROW regulations, and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to NextEra for the proposed GSEP. A land use plan amendment to the California Desert Conservation Area (CDCA) Plan of 1980 would be required before BLM could issue the ROW grant. The decision the BLM will make is whether or not to grant a ROW and, if so, under what terms and conditions, and whether or not to amend the land use plan.

BLM Plan Amendment. As discussed in Section A, solar power facilities are an allowable use of lands designated as Multiple Use Class (MUC) L (limited use) areas (CDCA). Since the site for the proposed GSEP is currently classified within an MUC L area, solar power facilities are generally allowed. However, Chapter 3, the “Energy Production and Utility Corridors Element” of the CDCA Plan requires that newly proposed sites associated with power generation or transmission facilities not already identified in the Plan will be considered through the plan amendment process. The proposed GSEP site is not currently identified in the proposed power facility and transmission line element within the Plan. As such, a plan amendment is required in order to approve the site location consistent with the CDCA Plan. The plan would have to be amended prior to the approval of the proposed project. The result of the plan amendment may be that the Multiple Use Class would change from MUC L (limited use) to MUC I.

Department of Energy. NextEra has also applied to the United States (US) Department of Energy (DOE) for a loan guarantee pursuant to Title XVII of the EAct. Title XVII of EAct authorizes the United States Secretary of Energy to make loan guarantees for a variety of types of projects, including those that “avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued.” The two principal goals of the loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits. The purpose and need for action by DOE is to comply with their mandate under EAct by selecting eligible projects that meet the goals of the Act.

American Recovery and Reinvestment Funds. NextEra has also applied for American Recovery and Reinvestment Funds (ARRA) Renewable Energy Grant Program. Two goals of the ARRA Renewable Energy Grant Program are to enhance

Applicable LORS	Description
Rule 1306 Electric Energy Generating Facilities	Describes actions to be taken for permitting of power plants that are within the jurisdiction of the Energy Commission.

C.1.3.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff assesses four kinds of primary and secondary³ impacts: construction, operation, closure and decommissioning, and cumulative. Construction impacts result from the onsite and offsite emissions occurring during site preparation and construction of the proposed project. Operational impacts result from the emissions of the proposed project during operation, which includes all of the onsite auxiliary equipment emissions (boilers, cooling towers, emergency engines, etc.), the onsite maintenance vehicle emissions, and the offsite employee and material delivery trip emissions. Closure and decommissioning impacts occur from the onsite and offsite emissions that would result from dismantling the facility and restoring the site. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time, together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355.)

C.1.3.3 METHOD AND THRESHOLD FOR DETERMINING CEQA SIGNIFICANCE

CEC staff evaluates potential impacts per Appendix G of the CEQA Guidelines (CCR 2006) as appropriate for the project. A CEQA significant adverse impact is determined to occur if potentially significant CEQA impacts cannot be mitigated appropriately through the adoption of Conditions of Certification. Specifically, Energy Commission staff uses health-based ambient air quality standards (AAQS) established by the ARB and the U.S.EPA as a basis for determining whether a project's emissions will cause a significant adverse impact under CEQA. The standards are set at levels that include a margin of safety and are designed to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants. Staff evaluates the potential for significant adverse air quality impacts by assessing whether the project's emissions of criteria pollutants and their precursors (NO_x, VOC, PM₁₀ and SO₂) could create a new AAQS exceedance (emission concentrations above the standard), or substantially contributes to an existing AAQS exceedance.

Staff evaluates both direct and cumulative impacts. Staff will find that a project or activity will create a direct adverse impact when it causes an exceedance of an AAQS. Staff will find that a project's effects are cumulatively considerable when the project emissions in conjunction with ambient background, or in conjunction with reasonably

³ Primary impacts potentially result from facility emissions of NO_x, SO_x, CO and PM_{10/2.5}. Secondary impacts result from air contaminants that are not directly emitted by the facility but formed through reactions in the atmosphere that result in ozone, and sulfate and nitrate PM_{10/PM2.5}.

foreseeable future projects, substantially contribute to ongoing exceedances of an AAQS. Factors considered in determining whether contributions to ongoing exceedances are substantial include:

1. the duration of the activity causing adverse air quality impacts;
2. the magnitude of the project emissions, and their contribution to the air basin's emission inventory and future emission budgets established to maintain or attain compliance with AAQS;
3. the location of the project site, i.e., whether it is located in an area with generally good air quality where non-attainment of any ambient air quality standard is primarily or solely due to pollutant transport from other air basins;
4. the meteorological conditions and timing of the project impacts, i.e., do the project's maximum modeled pollutant impacts occur when ambient concentrations are high (such as during high wind periods, or seasonally);
5. the modeling methods, and how refined or conservative the impact analysis modeling methods and assumptions were and how that may affect the determined adverse impacts;
6. the project site location and nearest receptor locations; and whether the identified adverse impacts would also occur at the maximum impacted receptor location; and,
7. potential for future cumulative impacts; and whether appropriate mitigation is being recommended to address the potential for impacts associated with likely future projects.

C.1.3.4 IMPACTS FROM CLOSURE AND DECOMMISSIONING

Impacts from closure and decommissioning, as a one-time limited duration event, are evaluated with the same methods as construction emissions as discussed above.

C.1.4 PROPOSED PROJECT

C.1.4.1 SETTING AND EXISTING CONDITIONS

Climate and Meteorology

The project site is located 25 miles to the west of Blythe, California within the eastern portion of Riverside County in the Mojave Desert Air Basin (MDAB). This area surrounding the project site has a typical desert climate characterized by low precipitation, hot summers, mild winters, low humidity, and strong temperature inversions. Total rainfall in Blythe averages just less than four inches per year with about 50 percent of the total rainfall occurring during the December through March winter rainy season, and about 30 percent occurring during the August/September summer monsoon season (WC 2009).

The highest monthly average high temperature in Blythe is 109°F in July and the lowest average monthly low temperature is 39°F in December (WC 2009). The applicant provided wind roses from the Blythe Airport Automated Surface Observing System (ASOS) for the years 2002 to 2006. This wind data indicates the highest annual wind direction frequencies are from the south through the southwest. Quarterly tables show prevailing winds from the south for spring and summer and from the northwest for fall and winter. Calm conditions occur approximately 16 percent of the time, and the annual average wind speed is approximately 7.6 miles per hour (mph). Due to the topography of the particular site, staff would expect a more westerly wind direction.

Sensitive Receptors

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. There are no sensitive receptors within a two mile radius of the site center. The Ironwood and Chuckwalla State Prisons (adjacent to each other) are located approximately nine miles to the south of the Project site.

Existing Ambient Air Quality

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called ambient air quality standards (AAQS). The state AAQS, established by the California Air Resources Board, are typically lower (more protective) than the federal AAQS, which are established by the United States Environmental Protection Agency (U.S.EPA). The state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various air quality standards, the times over which they are measured, range from one-hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu\text{g}/\text{m}^3$, respectively).

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O ₃)	8 Hour	0.075 ppm ^a (147 µg/m ³)	0.070 ppm (137 µg/m ³)
	1 Hour	—	0.09 ppm (180 µg/m ³)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m ³)	9.0 ppm (10 mg/m ³)
	1 Hour	35 ppm (40 mg/m ³)	20 ppm (23 mg/m ³)
Nitrogen Dioxide (NO ₂)	Annual	0.053 ppm (100 µg/m ³)	0.03 ppm (57 µg/m ³)
	1 Hour	0.100 ppm ^b	0.18 ppm (339 µg/m ³)
Sulfur Dioxide (SO ₂)	Annual	0.030 ppm (80 µg/m ³)	—
	24 Hour	0.14 ppm (365 µg/m ³)	0.04 ppm (105 µg/m ³)
	3 Hour	0.5 ppm (1300 µg/m ³)	—
	1 Hour	—	0.25 ppm (655 µg/m ³)
Particulate Matter (PM ₁₀)	Annual	—	20 µg/m ³
	24 Hour	150 µg/m ³	50 µg/m ³
Fine Particulate Matter (PM _{2.5})	Annual	15 µg/m ³	12 µg/m ³
	24 Hour	35 µg/m ³	—
Sulfates (SO ₄)	24 Hour	—	25 µg/m ³
Lead	30 Day Average	—	1.5 µg/m ³
	Calendar Quarter	1.5 µg/m ³	—
Hydrogen Sulfide (H ₂ S)	1 Hour	—	0.03 ppm (42 µg/m ³)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m ³)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Source: ARB 2009a.

Notes:

^a The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.

^b – The U.S. EPA is in the process of implementing this new standard, which became effective April 12, 2010. This standard is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. In circumstances where there is not enough ambient data available to support designation as either attainment or non-attainment, the area can be designated as unclassified. The unclassified area is normally treated the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

The project site is located in the Mojave Desert Air Basin (MDAB) and is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The Riverside County portion of the MDAB is designated as non-attainment for the state ozone and PM10 standards. This area is designated as attainment or unclassified for all federal criteria pollutant ambient air quality standards and the state CO, NO₂, SO₂, and PM2.5 standards. **Air Quality Table 3** summarizes the project site area's attainment status for various applicable state and federal standards.

**Air Quality Table 3
Federal and State Attainment Status
Project Site Area within Riverside County**

Pollutant	Attainment Status ^a	
	Federal	State
Ozone	Attainment ^b	Moderate Nonattainment
CO	Attainment	Attainment
NO ₂	Attainment ^c	Attainment
SO ₂	Attainment	Attainment
PM10	Attainment ^b	Nonattainment
PM2.5	Attainment	Attainment

Source: ARB 2009b, U.S.EPA 2009a.

^a Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.

^b Attainment status for the site area only, not the entire MDAB.

^c Nitrogen dioxide attainment status for the new federal 1-hour NO₂ standard is scheduled to be determined by January 2012.

Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO₂, and SO₂, compared to most restrictive applicable standards for the years between 2004 through 2009 at the most representative monitoring stations for each pollutant are shown in **Air Quality Table 4**, and the 1-hour and 8-hour ozone, and 24-hour PM10 and PM2.5 data for the years 1999 through 2008 are shown in **Air Quality Figure 1**. Ozone data are from the Blythe-445 West Murphy Street monitoring station, PM10, PM2.5, NO₂, and CO data are from the Palm Springs-Fire Station monitoring station and SO₂ data are from the Victorville-14306 Park Avenue monitoring station.

Air Quality Table 4
Criteria Pollutant Summary
Maximum Ambient Concentrations (ppm or µg/m³)

Pollutant	Averaging Period	Units	2004	2005	2006	2007	2008	2009	Limiting AAQS ^c
Ozone	1 hour	ppm	0.078	0.084	0.078	0.092	0.074	0.072	0.09
Ozone	8 hours	ppm	0.067	0.072	0.059	0.075	0.071	0.066	0.07
PM10 ^{a,b}	24 hours	µg/m ³	79	66	73	83	75	--	50
PM10 ^{a,b}	Annual	µg/m ³	26.4	25.9	24.5	30.5	23.2	--	20
PM2.5 ^a	24 hours	µg/m ³	23.3	25	15.9	20.5	17.1	--	35
PM2.5 ^a	Annual	µg/m ³	9.0	8.4	7.7	8.7	7.2	--	12
CO	1 hour	ppm	2.1	2.1	2.3	1.5	1.3	2.3	20
CO	8 hours	ppm	0.8	0.8	0.85	0.79	0.54	0.67	9.0
NO ₂	1 hour	ppm	0.066	0.059	0.093	0.063	0.049	0.048	0.18
NO ₂	Annual	ppm	0.013	0.012	0.01	0.01	0.009	0.008	0.03
SO ₂	1 hour	ppm	0.011	0.012	0.018	0.009	0.006	0.028	0.25
SO ₂	3 hour	ppm	0.007	0.008	0.012	0.005	0.006	0.006	0.5
SO ₂	24 hours	ppm	0.003	0.003	0.005	0.005	0.002	0.005	0.04
SO ₂	Annual	ppm	0.0013	0.0013	0.0015	0.0013	0.0011	0.000	0.03

Source: ARB 2009c, U.S.EPA 2009b, SCAQMD 2009

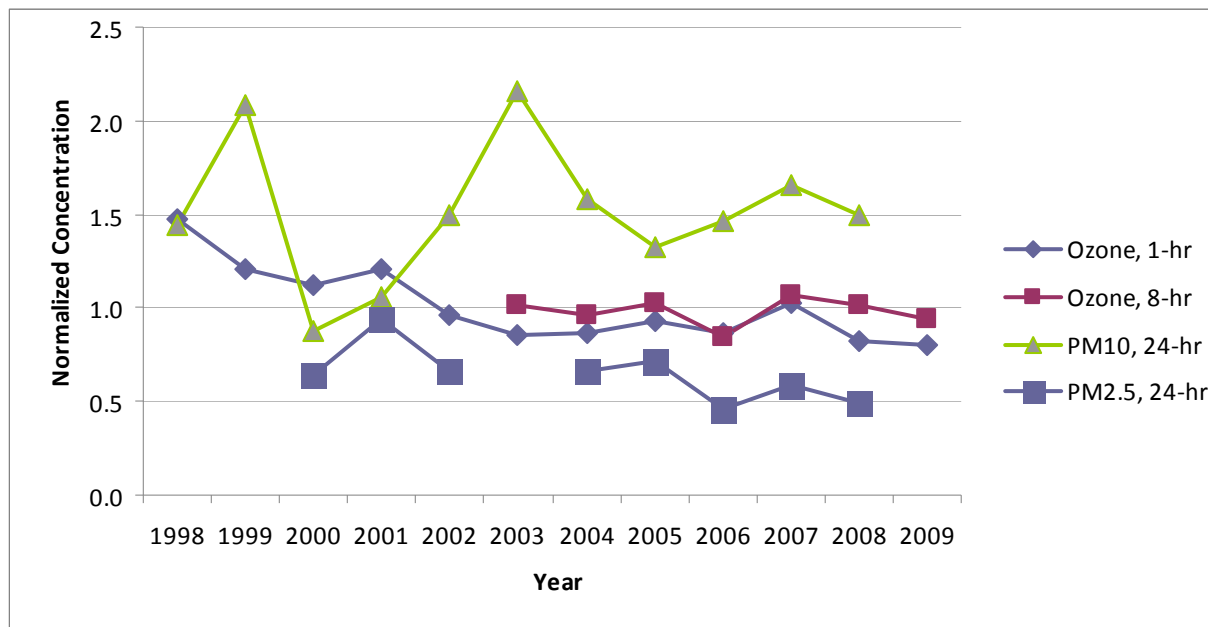
Notes:

^a Exceptional PM concentration events, such as those caused by wind storms are not shown where excluded by U.S.EPA; however, some exceptions events may still be included in the data presented.

^b The PM10 data source is in the Coachella Valley that is classified as a serious PM10 nonattainment area.

^c The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

Air Quality Figure 1
1998-2009 Historical Ozone and PM Air Quality Data
Blythe and Palm Springs Monitoring Stations, Riverside County^{a-c}



Source: ARB 2009c, U.S.EPA 2009b, SCAQMD 2009.

Notes:

^a The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceeded the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 24-hour PM10 concentration in 2008 is $75 \mu\text{g}/\text{m}^3 / 50 \mu\text{g}/\text{m}^3$ standard = 1.5.

^b All ozone data are from Blythe-445 West Murphy Street monitoring station. 8-hr ozone data was not available for this station before 2003.

^c All PM data are from Palm Springs monitoring station. 24-hr PM2.5 data was not available for this station before 2000.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOCs]) in the presence of sunlight to form ozone. Pollutant transport from the South Coast Air Basin (Los Angeles Area) is one source of the of the pollution experienced in the eastern Riverside County portion of the MDAB (SCAQMD 2007, p. 1-2).

As **Air Quality Table 4** and **Air Quality Figure 1** indicate, the 1-hour and 8-hour ozone concentrations measured at the eastern border of Riverside County have been very slowly decreasing and remaining nearly constant over time, respectively. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot periods typical during May through September.

Nitrogen Dioxide

The entire air basin is classified as attainment for the state 1-hour and annual and federal annual NO₂ standards. The nitrogen dioxide attainment standard could change due to the new federal 1-hour standard, although a review of the air basin wide monitoring data suggest this would not occur for the MDAB.

Approximately 90% of the NO_x emitted from combustion sources is nitric oxide (NO), while the balance is NO₂. NO is oxidized in the atmosphere to NO₂, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO₂ typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking substantial photochemical activity (sun light), NO₂ levels are relatively low. In the summer the conversion rates of NO to NO₂ are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of NO₂. The NO₂ concentrations in the project area are well below the state and federal ambient air quality standards.

Carbon Monoxide

The area is classified as attainment for the state and federal 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. The project area has a lack of significant mobile source emissions and has CO concentrations that are well below the state and federal ambient air quality standards.

Particulate Matter (PM₁₀) and Fine Particulate Matter (PM_{2.5})

PM₁₀ can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere.

The area is non-attainment for state PM₁₀ standards and unclassified for the federal PM₁₀ standard. **Air Quality Table 4** and **Air Quality Figure 1** shows recent PM₁₀/PM_{2.5} concentrations. The figure shows fluctuating concentrations patterns, and shows clear exceedances of the state 24-hour PM₁₀ standard. It should be noted that exceedance does not necessarily mean violation or nonattainment, as exceptional events do occur and some of those events, which do not count as violations, may be included in the data. The MDAB is designated as nonattainment for the state PM₁₀ standard.

Fine particulate matter, or PM_{2.5}, is derived mainly from either the combustion of materials, or from precursor gases (SO_x, NO_x, and VOC) through complex reactions in the atmosphere. PM_{2.5} consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

The entire MDAB is classified as attainment for the federal standard and, in the project area, is designated unclassified for the state PM_{2.5} standards. This divergence in the PM₁₀ and PM_{2.5} concentration levels and attainment status indicates that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust⁴.

⁴ Fugitive dust, unlike combustion source particulate and secondary particulate, is composed of a much higher fraction of larger particles than smaller particles, so the PM_{2.5} fraction of fugitive dust is much smaller than the PM₁₀ fraction. Therefore, when PM₁₀ ambient concentrations are significantly higher than PM_{2.5} ambient concentrations this tends to indicate that a large proportion of the PM₁₀ are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources.

Sulfur Dioxide

The entire air basin is classified as attainment for the state and federal SO₂ standards. Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Sources of SO₂ emissions within the MDAB come from a wide variety of fuels: gaseous, liquid and solid; however, the total SO₂ emissions within the eastern MDAB are limited due to the limited number of major stationary sources and California's and U.S. EPA's substantial reduction in motor vehicle fuel sulfur content. The project area's SO₂ concentrations are well below the state and federal ambient air quality standards.

Summary

In summary, staff recommends the background ambient air concentrations in **Air Quality Table 5** for use in the modeling and impacts analysis. The recommended background concentrations are based on the maximum criteria pollutant concentrations from the past three years of available data collected at the most representative monitoring stations surrounding the project site.

Air Quality Table 5
Staff Recommended Background Concentrations (µg/m³)⁵

Pollutant	Averaging Time	Recommended Background	Limiting AAQS ^b	Percent of Standard
NO ₂	1 hour	119	339	35%
	Annual	19	57	33%
CO	1 hour	2,645	23,000	12%
	8 hour	878	10,000	9%
PM10	24 hour	83	50	166%
	Annual	30.5	20	153%
PM2.5	24 hour ^a	20.5	35	59%
	Annual	8.7	12	73%
SO ₂	1 hour	23.6	655	4%
	3 hour	15.6	1,300	1%
	24 hour	13.1	105	12%
	Annual	3.5	80	4%

Source: ARB 2009c, U.S.EPA 2009b and Energy Commission Staff Analysis

Note:

^a PM2.5 24-hour data shown in **Air Quality Table 4** are 98th percentile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.

^b The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

Where possible, staff prefers that the recommended background concentration measurements come from nearby monitoring stations with similar characteristics. For this proposed project the Blythe monitoring station (ozone), at approximately 35 miles east of the project site, is the closest monitoring station. The Palm Springs monitoring station (PM10, PM2.5, NO₂, and CO) is located approximately 90 miles west of the project site. The Victorville monitoring station (SO₂) is located approximately 145 miles

⁵ This table has been updated since the publication of the SA/DEIS to use peak values from 2007 to 2009 background data, for gaseous pollutants, where 2009 data was not available prior to publication of the Staff Assessment/Draft Environmental Impact Study, which shows an improvement in worst-case background concentrations for many of the criteria pollutants included in the air dispersion modeling analysis.

west northwest of the project site. In general, the Palm Springs and Victorville monitoring stations are considered to provide conservative estimates of the worst case background concentrations due to their proximity to the South Coast Air Basin (Metropolitan Los Angeles). Monitoring stations located in Imperial County were not selected or considered as representative due to the predominant air flow patterns and due to air pollution from Mexico that creates a significant local influence for the worst-case pollutant concentration readings within Imperial County.

The background concentrations for PM10 are well above the most restrictive existing ambient air quality standards, while the background concentrations for the other pollutants are all below the most restrictive existing ambient air quality standards.

The pollutant modeling analysis was limited to the pollutants listed above in **Air Quality Table 5**; therefore, recommended background concentrations were not determined for the other criteria pollutants (ozone, lead, visibility, etc.).

C.1.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff provided a number of data requests regarding the construction and operations emission estimates and air dispersion modeling analysis (CEC 2009d), which the applicant responded to by providing revised emissions estimates and substantially revised and more robust dispersion modeling analysis (GSEP 2009f, TTEC 2010h). Staff has reviewed the revised emission estimates and air dispersion modeling analysis⁶ and finds them to be generally reasonable considering the level of emissions mitigation now stipulated to by the applicant.

Project Description

The Genesis Solar Energy Project (GSEP or proposed project) would consist of two independent concentrated solar electric generating facilities (aka power plants or units) with a nominal net electrical output of 125 megawatts (MW) each, for a total net electrical output of 250 MW. The proposed project would use well-established parabolic trough solar thermal technology to produce electrical power using steam turbine

⁶ This includes a review of the emission source inputs, including the type of source (point, volume, area) and the variables used to describe each source (emissions, height, location, temperature, etc. as appropriate). Staff does not agree with certain assumptions regarding the onsite fugitive dust calculations or the one way delivery trip assumptions.

Staff does not believe that there are backhauling opportunities at this remote site for the regional trucking necessary to deliver materials from Phoenix, where the applicant assumed they are only responsible for one way delivery trips, which would underestimate the project's offsite emissions. However, this underestimate does not impact the onsite impact modeling analysis or other impact finding for this project, so staff has not made any corrections to the delivery vehicle offsite emission estimates.

Staff did not perform a separate construction emission estimate for this project due to the lack of sensitive receptors near the site and the fact that an underestimation of the fugitive dust or off-site emissions would not impact staff's findings or recommended mitigation measures. Staff did complete such an analysis for the Abengoa Mojave site (CEC 2010i) that had fence line residential receptors and found that a more specific activity based fugitive dust emission estimate did increase the emission estimate for PM10 and PM2.5 by more than a factor of two. This emission potential underscores the need for the fugitive dust controls being recommended by staff.

generators (STG) fed from solar steam generators (SSG) which transfers energy from the solar heated HTF to the steam that drives the STG.

Each plant would use one natural gas-fueled auxiliary boiler to reduce start-up time and provide HTF freeze protection. Freeze protection would maintain the HTF at a minimum temperature of 100 degrees Fahrenheit (°F).

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

Project cooling water blowdown would be piped to lined, on-site evaporation ponds. The ponds would be sized to retain approximately seven years' worth of solids and would be cleaned out periodically during the life of the plant to ensure the solids do not reach a depth greater than approximately three feet. Dewatered residues from the ponds would be sent to an appropriate off-site landfill as non-hazardous waste.

Other construction elements of the project include the access road, the natural gas pipeline connection, and the transmission line tie-in connection. The proposed project's access road from the I-10 would be approximately 6.5 miles long. Natural gas would be supplied via an 8-inch, 6 mile long pipeline that would be connected with the Southern California Gas Company pipeline located just north of the I-10. The transmission line connection would include the construction of an approximately 7 mile long (including the construction of 60 transmission line poles) 230 kV transmission line that would meet the Blythe Energy Project Transmission Line (currently in construction) which it would share, requiring new line cables be strung to the Colorado River Substation. The new transmission line, access road, and natural gas pipeline would be co-located in one linear corridor to serve the main project facility.

Project Emissions

Project Construction

The total duration of project construction for GSEP is estimated to be approximately 37 months. Different areas within the project site and the construction laydown areas would be disturbed at different times over the construction period. Total construction disturbance area would be approximately 1,800 acres, and the permanent disturbance area of the project operations would be approximately 1,360 acres. The maximum acreage disturbed on any one day during construction is estimated by the applicant to be 160 acres. Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structures, and water and soil binder spray trucks used to control construction dust emissions. Fuel combustion emissions also would result from exhaust from on-road construction vehicles, including heavy duty diesel trucks used to deliver materials, other diesel trucks used during construction, and worker personal

vehicles and pickup trucks used to transport workers to and from and around the construction site. Fugitive dust emissions would result from site grading/excavation activities, installation of new transmission lines, water and gas pipelines, construction of power plant facilities, roads, and substations, and vehicle travel on paved/unpaved roads.

The shorter duration offsite construction activities are based on the following construction durations and construction period timeframes:

- Access Road Construction – 3 months (Months 1-3)
- Gas Pipeline Construction – 5 months (Months 15-19)
- Transmission Line Construction – 6 months (Months 4-9)

The applicant's maximum daily and total construction period emission estimates, that include the applicant's fugitive dust mitigation assumptions but fleet average off-road equipment emission factors, are provided below in **Air Quality Tables 6** and **7**.

Air Quality Table 6
GSEP Construction - Maximum Daily Emissions (lbs/day)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Construction Emissions						
Onsite Combustion Emissions	445.8	0.5	220.3	71.2	25.4	25.1
Onsite Fugitive Dust Emissions	--	--	--	--	48.5	10.2
Subtotal of Onsite Emissions	445.8	0.5	220.3	71.2	73.9	35.3
Offsite Emissions						
Access Road Equipment Exhaust	97.3	0.1	48.5	14.4	6.5	6.5
Gas Line Equipment Exhaust	110.9	0.1	63.9	18.8	6.8	6.7
Transmission Line Equipment Exhaust	73.7	0.1	38.6	11.7	4.3	4.3
Delivery Hauling Exhaust	74.97	0.094	26.4	5.72	3.41	3.42
Worker Travel Exhaust	71.8	0.65	716.5	59.5	5.82	5.81
Access Road Fugitive Dust	--	--	--	--	0.9	0.2
Gas Line Fugitive Dust	--	--	--	--	1.2	0.2
Transmission Line Fugitive Dust	--	--	--	--	1.2	0.2
Paved Road Fugitive Dust	--	--	--	--	10.2	1.7
Unpaved Road Fugitive Dust	--	--	--	--	197.1	19.6
Track Out Fugitive Dust	--	--	--	--	4.2	0.7

Source: TTEC 2010a, Tables 2 and 3.

Note: Emissions that were not added may not be additive due to occurring at different times during the construction schedule.

Air Quality Table 7
GSEP Construction – Total Construction Period Emissions (tons)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Construction Emissions						
Onsite Combustion Emissions	109.7	0.12	54.2	17.5	6.24	6.19
Onsite Fugitive Dust Emissions	--	--	--	--	18.6	3.9
Subtotal of Onsite Emissions	109.7	0.12	54.2	17.5	24.84	10.09
Offsite Emissions						
Access Road Equipment Exhaust	2.5	0.003	1.3	0.4	0.17	0.17
Gas Line Equipment Exhaust	5.8	0.007	3.3	1.0	0.36	0.35
Transmission Line Equipment Exhaust	4.5	0.005	2.4	0.7	0.27	0.27
Delivery Hauling Exhaust	30.5	0.037	10.74	2.33	1.39	1.39
Worker Travel Exhaust	29.2	0.3	291.6	24.2	2.4	2.4
Access Road Fugitive Dust	--	--	--	--	0.031	0.01
Gas Line Fugitive Dust	--	--	--	--	0.06	0.01
Transmission Line Fugitive Dust	--	--	--	--	0.07	0.02
Paved Road Fugitive Dust	--	--	--	--	3.82	0.65
Unpaved Road Fugitive Dust	--	--	--	--	6.5	0.65
Track Out Fugitive Dust	--	--	--	--	1.58	0.27
Subtotal of Offsite Emissions	72.5	0.352	309.34	28.63	16.65	6.19
Total Emissions	182.2	0.472	363.54	46.13	41.49	16.28

Source: TTEC 2010h, Table 2.

The applicant used an oversimplified fugitive dust emission calculation method that staff does not consider appropriate for a project with the construction complexity and requirements of GSEP. Staff believes this oversimplified calculation method underestimates the fugitive dust emissions during construction. Additionally, the applicant did not provide a maximum annual emission estimate, and the air dispersion modeling analysis used a 12-month average value which understates the maximum annual emissions and impacts. Staff may create a separate emission estimate, and if necessary modeling analysis, to cover these deficiencies and if performed the results of this separate analysis will be provided in the SA Addendum/FEIS document.

Project Operation

The GSEP facility would be a nominal 250 Megawatt (MW) solar electrical generating facility. The direct air pollutant emissions from power generation are negligible; however, there are auxiliary equipment and maintenance activities necessary to operate and maintain the facility.

The following are the stationary and mobile emission source operating assumptions that were used to develop the operation emissions estimates for the GSEP:

Stationary emission sources⁷:

GSEP would consist of two 125 MW power plant units at the facility, each of which consists of the following equipment and emission estimate bases:

- Auxiliary Boiler: 30.0 MMBtu/hr, fired on natural gas. Emissions estimate is based on 14 hr/day, and 1,000 hr/year of full load operation each.
- Cooling tower: seven cell wet cooling tower unit that provides steam cycle and auxiliary plant cooling. Water recirculation rate of 94,623 gallons/minute, maximum recirculating water total dissolved solids content of 5,000 ppm, and mist eliminator efficiency of 0.0005 percent. Emissions are based on 15 hr/day and 3,200 hr/year of operation each.
- HTF Vent Control System: Venting emission rate based on project specific HTF decomposition rate and decomposition product assumptions. Venting carbon adsorption control system would reduce emissions by 99 percent.
- HTF Piping System: 2,500 valves in service 16 hr/day, 10 pump seals in service 16 hr/day, 6,250 connectors⁸ in service 16 hr/day and 10 pressure relief valves in service 8 hr/day. The HTF piping system fugitive emissions have been recalculated by staff, consistent with the procedures developed by Kern County Air Pollution Control District. Those procedures consider the properties of the HTF during the daily operation cycle, where it is assumed that for 16 hours per day the HTF in the piping system is consistent with the properties of a light liquid and for 8 hours per day the HTF in the piping system is consistent with the properties of a heavy liquid. The specific emission factors used are as follows:

<u>Piping Component</u>	Light Liquid Emission Factor (lb/hr/source)	U.S.EPA Reference Table	Heavy Liquid Emission Factor (lb/hr/source)	U.S.EPA Reference Table
Valves	5.55E-04	Table 2-9 (100 ppm)	1.90E-05	Table 2-4 (Heavy Oil)
Pump Seals	1.86E-03	Table 2-9 (100 ppm)	5.30E-05	Table 2-12 (Zero Factor)
Flanges/Connectors	1.65E-05	Table 2-12 (Zero Factor)	1.65E-05	Table 2-12 (Zero Factor)
Pressure Relief Valves	9.85E-02	Table 2-5 (<10,000 ppm)	1.90E-05	Table 2-4 (Heavy Oil)

Source: USEPA 1995.

Note: for pressure relief valves the in service emission factors are for gas service, rather than light liquid service.

These emission factors may not assume appropriate control efficiencies for the inspection and maintenance program that will be required by MDAQMD or recommended by staff. Staff will update this emission estimate, if necessary, after receipt of the MDAQMD Final Determination of Compliance for this project and further consideration of the effectiveness of the inspection and maintenance program.

⁷ In addition to the list of equipment below the applicant included emission estimates for a diesel tank and HTF waste load out. Staff has not included these emission sources due to: 1) their negligible emissions potential; 2) their exempt permitting status; and 3) to be consistent with other recent thermal solar project assessments.

⁸ Staff increased the number of flanges/connectors to a value of 6,250 per unit to be consistent with the component count ratios of other currently analyzed projects using HTF piping systems. This revision has a very minor effect on the emission estimate for the HTF piping system.

- Fire pump engine: 315 horsepower (hp) diesel-fired engine. One hour per day and 52 hours per year maximum operation.
- Emergency generator engine: 1341 hp (1000 kW) diesel-fired engine. One hour per day and 52 hours per year maximum operation.
- Gasoline tank: 2,000 gallon tank: Phase 1 vapor recovery, no Phase 2 vapor recovery. Tank annual 10,768 gallons. Daily emissions based on annual emissions divided by 365 days/year.

Mobile emissions source:

- Mobile emissions sources required for operation and maintenance and employee trips are estimated based on vehicle miles traveled (VMT) and operating hours. Each mobile source has different basis for emissions estimates as provided in the applicant's revised emission estimate spreadsheets (TTEC 2010h). The round trip distance used for these vehicle trips was not considered reasonable for this remote site, so the trip distances and the offsite emission estimates, using updated emission factors from the SCAQMD CEQA website, were revised by staff.

The GSEP onsite stationary and onsite and offsite mobile source emissions, totaled or both power units, are estimated and summarized in **Air Quality Tables 8** and **9**.

Air Quality Table 8
GSEP Operations - Maximum Daily Emissions (lbs/day)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
HTF Auxiliary Heaters	9.25	0.224	15.8	2.46	4.19	4.19
Cooling Towers	--	--	--	--	35.47	35.47
HTF Venting/Control System	--	--	--	2.95	--	--
HTF Components Fugitive	--	--	--	82.25	--	--
Emergency Fire Pump Systems	3.73	0.01	0.62	0.08	0.08	0.08
Emergency Electrical Generators	29.12	0.03	0.77	0.59	0.11	0.11
Gasoline Storage Tank	--	--	--	0.38	--	--
Onsite Operations Vehicle	0.08	0.00	0.05	0.01	0.01	0.01
Operations Fugitive Dust	--	--	--	--	85.4	18.1
Subtotal of Onsite Emissions	42.18	0.26	17.24	88.72	125.26	57.96
Offsite Emissions						
Delivery Vehicles	21.94	0.03	7.45	1.81	1.07	0.92
Employee Vehicles	3.52	0.05	35.11	3.69	0.45	0.29
Offsite Vehicle Fugitive Dust	--	--	--	--	8.20	0
Subtotal of Offsite Emissions	25.46	0.08	42.56	5.50	9.72	1.21
Total Maximum Daily Emissions	67.64	0.34	59.8	94.22	134.98	59.17

Source: TTEC 2010h, with the HTF component emissions and offsite emissions revised by staff.

Air Quality Table 9
GSEP Operations - Maximum Annual Emissions (tons/yr)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
HTF Auxiliary Heaters	0.17	0.00	0.28	0.04	0.08	0.08
Cooling Towers	--	--	--	--	3.78	3.78
HTF Venting/Control System	--	--	--	0.54	--	--
HTF Components Fugitive	--	--	--	15.01	--	--
Emergency Fire Pump Systems	0.10	0.00	0.02	0.00	0.00	0.00
Emergency Electrical Generators	0.76	0.00	0.02	0.02	0.00	0.00
Gasoline Storage Tank	--	--	--	0.07	--	--
Onsite Operations Vehicle	0.35	0.00	0.24	0.05	0.03	0.03
Operations Fugitive Dust	--	--	--	--	15.60	3.30
Subtotal of Onsite Emissions	1.38	0.01	0.56	15.73	19.49	7.19
Offsite Emissions						
Delivery Vehicles	1.21	0.00	0.41	0.10	0.06	0.05
Employee Vehicles	0.64	0.01	6.41	0.67	0.08	0.05
Offsite Vehicle Fugitive Dust	--	--	--	--	1.31	0.00
Subtotal of Offsite Emissions	1.85	0.01	6.82	0.77	1.45	0.10
Total Maximum Daily Emissions	3.23	0.02	7.38	16.5	20.94	7.29

Source: TTEC 2010h, with the HTF component emissions and offsite emissions revised by staff.

Project Construction and Operation Overlapping

Units #1 and #2 would be developed in phases with construction for Unit #2 scheduled to begin twelve months after construction of Unit #1. Each unit would take approximately twenty five months to construct before beginning commercial operation. Unit #1 would be expected to begin commercial operation in the twenty fifth month of construction and Unit #2 would be expected to begin commercial operation after the thirty seventh month of construction. Although there would be an overlap of construction and commercial operation of twelve months, staff does not anticipate this overlap to be the maximum worst case scenario. Construction emissions are considerably higher than operating emissions and the maximum construction emissions occur early in the overall construction process (months 2 through 13), so any overlap after the maximum construction period is assumed not to create a new maximum emissions scenario. Therefore, staff concludes that the overlapping emissions and impacts during this overlapping period would be no worse than the worst-case construction impacts and has not performed any additional impact assessment of the construction/operation overlapping period.

Initial Commissioning

Initial commissioning refers to a period prior to beginning commercial operation when the equipment undergoes initial tests. Because of this proposed project's use of a non-fuel fired generating technology, staff does not expect major changes in emissions from the facility commissioning activities compared to that of normal operation.

Dispersion Modeling Assessment

While the emissions are the actual mass of pollutants emitted from the proposed project, the impacts are the concentration of pollutants from the proposed project that reach the ground level. When emissions are expelled at a high temperature and velocity

through a relatively tall stack, the pollutants would be greatly diluted by the time they reach ground level. For this proposed project there are no very tall emission stacks, but the construction and maintenance vehicles and emergency engine do have high temperature and velocity exhausts; and the boilers also have relatively high exhaust temperatures and velocities. The emissions from the proposed project, both stationary source and onsite mobile source emissions, are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations short-term (1-hour, 3-hour, 8-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

The applicant used the U.S.EPA guideline ARMS/EPA Regulatory Model (AERMOD) model to estimate ambient impacts from project construction and operation. The construction emission sources for the site were grouped into two categories: equipment (off-road equipment); and vehicles (on-road equipment), where the exhaust and fugitive dust emissions for each type were calculated for particulate matter modeling. Emissions from onsite equipment engines during construction were modeled as point sources and fugitive emission sources were modeled as area sources. For operation the stationary sources were modeled as point sources and the maintenance vehicle emissions, tailpipe and fugitive dust emissions, were modeled as area sources.

The inputs for the air dispersion models include stack information (exhaust flow rate, temperature, and stack dimensions), specific fire pump engine, emergency generator, auxiliary boiler, cooling tower, and vehicle emission data; and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Blythe Airport Automated Surface Observing Systems (ASOS) monitoring station during 2002 through 2006.

NO_x emissions from internal combustion sources, such as diesel engines, are primarily in the form of nitric oxide (NO) rather than NO₂. The NO converts into NO₂ in the atmosphere, primarily through the reaction with ambient ozone. The applicant used the U.S.EPA ambient ratio method (ARM) default multiplier of 0.75 as the worst-case downwind annual NO₂/NO_x ratio for the determination of the annual NO₂ concentration for construction. However, the applicant did not use any modeling procedures to consider the short-term NO₂/NO_x ratio for construction or operation, which would be lower than the annual ARM value, or apply the ARM multiplier to determine the annual NO₂ impacts determined for operation. Therefore, the modeling method is very conservative and will over predict actual worst-case 1-hour NO₂ concentrations.

The U.S. Environmental Protection Agency (U.S. EPA) is implementing a new, 1-hour NO₂ standard that became effective April 12, 2010. This new standard is expressed as a 3-year average of the 98th percentile of the *daily maximum* 1-hour concentration (i.e., the 8th highest of daily highest 1-hour concentrations). The new standard requires "first

tier” ambient NO₂ monitoring near major roadways as defined in the implementing language and “second tier” monitoring for regional NO₂ concentrations. Although U.S. EPA has specified NO₂ monitoring requirements and a schedule for determining attainment status relative to this new standard, it has not yet developed modeling software to generate the statistics in a form that can be used in a compliance demonstration. Therefore, while the applicant is working on completing a modeling analysis to determine compliance with this new standard, the analyses described below do not yet include an analysis of this project’s compliance with the new federal 1-hour NO₂ standard. The results of the applicant’s federal 1-hour NO₂ modeling analysis will be provided in the Supplemental Staff Assessment. Based on similar modeling analyses completed for several other current thermal solar projects, staff expects that the applicant will be able to show compliance with this new ambient air quality standard.

Staff reviewed the background concentrations provided by the applicant, replacing them where appropriate with the available highest ambient background concentrations from the last three years at the most representative monitoring stations as show in **Air Quality Table 5**. Staff added the modeled impacts to these background concentrations, and then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the proposed project’s emission impacts would cause a new exceedance of an ambient air quality standard or would contribute to an existing exceedance.

The following sections discuss the proposed project’s short-term direct construction and operation ambient air quality impacts, as estimated by the applicant, and describes appropriate mitigation measures.

Construction Impacts

Using estimated peak onsite hourly, daily and annual construction equipment exhaust emissions, the applicant modeled the proposed project’s construction emissions to determine impacts (GSEP 2009f). To determine the construction impacts on ambient standards (i.e. 1-hour through annual) it was assumed that the emissions would occur during a daily construction schedule of 10 hour days (8 am to 6 pm). The predicted proposed project concentration levels were added to a conservatively estimated background of existing emission concentration levels (**Air Quality Table 5**) to determine the cumulative effect. The results of the applicant’s modeling analysis are presented in **Air Quality Table 10**. The construction modeling analysis includes both the onsite fugitive dust and vehicle tailpipe emission sources estimated by the applicant (with applicant-proposed control measures) and summarized in **Air Quality Tables 6 and 7**.

Air Quality Table 10
Maximum Project Construction Impacts

Pollutants	Avg. Period	Project Impact ^a (µg/m ³)	Background (µg/m ³)	Total Impact (µg/m ³)	Standard (µg/m ³)	Percent of Standard
NO ₂	1-hr.	84.1	119	203.1	339	60%
	Annual	0.34	19.0	19.3	57	34%
CO	1-hr	41.6	2,645	2,687	23,000	12%
	8-hr	10.8	878	889	10,000	9%
PM10	24-hr	45.0	83	128	50	256%
	Annual	0.47	30.5	31.0	20	155%
PM2.5	24-hr	9.5	20.5	30.0	35	86%
	Annual	0.11	8.7	8.8	12	73%
SO ₂	1-hr	0.09	23.6	23.7	665	4%
	3-hr	0.06	15.6	15.7	1,300	1%
	24-hr	0.02	13.1	13.1	105	12%
	Annual	<0.001	3.5	3.5	80	4%

Source: GSEP 2009f, DR 19.

Note:

^a – These results do not include the fugitive dust emission revision performed by the applicant in the revised data responses (TTEC 2010h).

This modeling analysis indicates, with the exception of PM10 that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. As noted previously, the applicant's construction emissions estimate may not be conservative, specifically for particulate emissions. The applicant's air dispersion modeling procedures for particulate emissions were very conservative and would significantly over predict emission impacts at the fence line. Specifically, the use of area sources for the fugitive dust emissions, and the input assumptions of a release height of 0.5 meters with an initial vertical dimension of zero meters, will over predict impacts. Staff did not have the time to perform a revised emissions and dispersion modeling analysis but believes that a more refined modeling analysis for the fugitive dust emissions, even considering an increase in emissions from a more refined fugitive dust emission estimate, would provide results similar in magnitude to those shown above in **Air Quality Table 10**.

Also, the conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected. Additionally, the worst-case predicted PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. In light of the existing PM10 non-attainment status for the project site area, staff considers the construction PM10 emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust PM10 emissions be mitigated pursuant to CEQA.

In light of the existing ozone non-attainment status for the project site area, staff considers the construction NOx and VOC emissions to be potentially CEQA significant and recommends that the off-road equipment NOx and VOC emissions be mitigated pursuant to CEQA.

Staff concludes that with implementation of staff-proposed mitigation measures the construction impacts would not contribute substantially to exceedances of PM10 or ozone standards.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's construction is not predicted to cause new exceedances of the NAAQS. Therefore, staff also determined that no adverse NEPA impacts would occur after implementation of the recommended mitigation measures.

Construction Mitigation

Applicant's Proposed Mitigation

To mitigate the impacts due to construction of the facility, the applicant has stipulated to construction mitigation measures that are similar to older versions of staff's recommended conditions **AQ-SC3** and **AQ-SC5** used for gas turbine siting cases in the past (GSEP 2009a, Section 5.2.2.6). The measures specifically stipulated to by the applicant are listed below:

Proposed Exhaust Emissions Control:

- The Applicant will work with the construction contractor to use, to the extent feasible, EPA/Air Resources Board (ARB) Tier II/Tier III engine compliant equipment for equipment over 100 hp.
- Ensure periodic maintenance and inspections per the manufacturer's specifications.
- Reduce idling time through equipment and construction scheduling.
- Use California low sulfur diesel fuels (≤ 15 ppmw S).

Proposed Fugitive Dust Emissions Control:

- The Applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.
- All unpaved roads and disturbed areas in the Project and laydown construction sites will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on an average schedule of every three hours during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to 15 miles per hour (mph) on unpaved areas within the Project construction site.
- The construction site entrance(s) will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.

- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.
- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or treated with appropriate dust suppressant compounds.
- All vehicles used to transport solid bulk material on public roadways and have the potential to cause visible emissions will be covered, or the materials will be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of two feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- Disturbed areas will be re-vegetated or covered with gravel or other dust suppressant material as soon as practical and restored in accordance with BLM requirements.

Adequacy of Proposed Mitigation

Staff generally concurs with the applicant's proposed mitigation measures, which mirror many of the staff mitigation recommendations from previous siting cases. But staff has been proposing additional fugitive dust mitigation, such as requiring the use of soil binders or paving to reduce emissions on unpaved roads, that is considered necessary to reduce the very high fugitive dust emission potential for large solar projects, such as GSEP. Staff also believes that the off-road equipment mitigation measures need to be updated to meet current staff recommendations.

Staff Proposed Mitigation

Staff recommends the applicant's proposed construction mitigation be formalized, with modifications that update the measures to meet current staff recommendations, in staff Conditions of Certification **AQ-SC1** through **AQ-SC5**. Staff has determined that the proposed conditions of certification would mitigate all construction air quality impacts of the proposed project to less than significant levels pursuant to CEQA.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Operational Impacts and Mitigation

The following section discusses the proposed project's direct operating ambient air quality impacts, as estimated by the applicant and evaluated by staff. Additionally, this section discusses the recommended mitigation measures.

Operational Modeling Analysis

Using estimated peak onsite hourly, daily and annual operating emissions, the applicant modeled the proposed project's operation emissions to determine impacts (GSEP 2009f). The predicted proposed project concentration levels were added to a conservatively estimated background of existing emission concentration levels (**Air Quality Table 5**) to determine the cumulative effect. **Air Quality Table 11** presents the results of the applicant's modeling analysis. Staff notes that the applicant's determined maximum 1-hour NO₂ concentration was not based on the ozone limiting method (OLM) calculation, or any other method to determine the NO₂/NO_x ratio, and so assumes that all NO_x emission are NO₂ which overstates the maximum NO₂ impacts. The operation modeling analysis includes emissions from the stationary sources and the onsite fugitive dust and vehicle tailpipe emission sources estimated by the applicant, which all include the applicant's proposed control measures, and that are summarized in **Air Quality Tables 8 and 9**.

Air Quality Table 11
Project Operation Emission Impacts

Pollutants	Avg. Period	Project Impact ^a ($\mu\text{g}/\text{m}^3$)	Background ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	Standard ($\mu\text{g}/\text{m}^3$)	Percent of Standard
NO ₂	1-hr.	189.9	119	308.9	339	91%
	Annual	0.06	19.0	19.1	57	33%
CO	1-hr	12.3	2,645	2,657	23,000	12%
	8-hr	2.5	878	881	10,000	9%
PM10	24	15.9	83	98.8	50	198%
	Annual	4.3	30.5	34.8	20	174%
PM2.5	24	3.4	20.5	23.9	35	68%
	Annual	0.9	8.7	9.6	12	80%
SO ₂	1-hr	0.184	23.6	23.8	665	4%
	3-hr	0.102	15.6	15.7	1,300	1%
	24-hr	0.008	13.1	13.1	105	12%
	Annual	0.0003	3.5	3.5	80	4%

Source: GSEP 2009f, DR 27, Table 6.

Note:

^a – These results do not include the fugitive dust emission revision performed by the applicant after the data responses (TTEC 2010h).

This modeling analysis indicates, with the exception of 24-hour and annual PM10 impacts, that the proposed project would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected for PM10/PM2.5. Additionally, the worst-case PM2.5 and PM10 impacts occur at the fence line and drop off quickly with distance from the fence line. Therefore, staff concludes that the operation impacts, when considering staff's mitigation measures, would not contribute substantially to exceedances of the PM10 CAAQS.

However, in light of the existing PM10 and ozone non-attainment status for the project site area, staff considers the operation NOx, VOC, and PM emissions to be potentially CEQA significant and recommends that the off-road equipment and fugitive dust emissions be mitigated pursuant to CEQA.

The modeling analysis shows that, after implementation of the recommended emission mitigation measures, the proposed project's operation is not predicted to cause new exceedances of the NAAQS. Therefore, it has also been determined that no adverse NEPA impacts would occur after implementation of the recommended mitigation measures.

Operations Mitigation

Applicant's Proposed Mitigation

Emission Controls

As discussed in the air quality section of the AFC and Data Responses (GSEP 2009f, TTEC 2010h), the applicant proposes the following Best Available Control Technology (BACT) emission controls on the stationary equipment and other emission mitigation measures for the mobile equipment associated with the operation of the GSEP:

HTF Auxiliary Boilers

The applicant has proposed two 30.0 MMbtu/hr auxiliary boilers, which would be fired on pipeline quality natural gas, and would be equipped with low NOx burner technology. The operation of each boiler is limited to 14 hours a day and 1,000 hours per year. The proposed boilers would each have the following emission limits:

- NOx: 0.33 lbs/hr (9 ppmv @ 3% O2)
- CO: 0.563 lbs/hr (50 ppmv @ 3% O2)
- VOC: 0.088 lbs/hr
- PM10/PM2.5: 0.15 lbs/hr
- SO₂: 0.008 lbs/hr

Emergency Electrical Generators

The applicant has proposed two 1341 hp (1000 kW) emergency generator engines. The engines would meet BACT requirements through the engine design (U.S.EPA/ARB Tier 2 compliant engines), and ARB diesel fuel. Testing would be for less than 60 minutes per day per engine and the engines would not run for more than 50 hours per year each. The emergency generator engines would have the following emission guarantees:

- NOx: 4.93 gram/bhp-hour
- CO: 0.13 gram/bhp-hour
- VOC: 0.1 gram/bhp-hour
- PM10/PM2.5: 0.018 gram/bhp-h
- SO₂: ARB diesel fuel (15 ppm sulfur)

Fire Water Pump Engines

The applicant has proposed two 315 hp fire water pump engines. The engines would meet BACT requirements through the engine design (U.S.EPA/ARB Tier 3 compliant engines), and ARB diesel fuel. Testing would be for less than 60 minutes per day per engine and the engines would not run for more than 50 hours per year each. The fire water pump engines would have the following emission guarantees:

- NO_x: 2.69 gram/bhp-hour
- CO: 0.45 gram/bhp-hour
- VOC: 0.06 gram/bhp-hour
- PM₁₀/PM_{2.5}: 0.055 gram/bhp-hour
- SO₂: ARB diesel fuel (15 ppm sulfur)

Cooling Towers

The applicant has proposed two seven-cell cooling towers, which are used for main steam power cycle and auxiliary cooling. The cooling towers would each have a high efficiency drift eliminator guaranteed to control drift to 0.0005 percent of the water recirculation rate. The cooling towers would have a maximum TDS of 5,000 ppm and would operate 15 hours per day and 3,200 hours per year. Each cooling tower would have the following emission limits:

- PM₁₀/PM_{2.5}: 1.18 lbs/hr

HTF Vent Exhausts

The applicant has proposed one HTF ullage tank system for the project. The HTF breaks down over time and these breakdown products need to be released to maintain the working composition of the HTF. The breakdown products are a mixture of higher and lower boiling organic compounds (VOC) that are vented in order to remove them from the HTF mixture. The VOC emissions would be controlled with a carbon adsorption system with a control efficiency of 99%. VOC emissions would be limited to a maximum of 0.337 lb/hr after control, combined for both systems, and the HTF ullage tank would be vented a maximum of 8.8 hours per day and 3,200 hours/year:

HTF Piping Systems

The two HTF piping systems are composed of a number of piping components (pump seals, valves, pressure relief vents, flanges, etc.). These components would leak hot HTF that would evaporate and cause VOC emissions. The applicant is proposing to use double mechanical seals on pumps and maintenance inspections and repair of the piping system to reduce HTF leaks.

Gasoline Tank

The applicant has proposed a 2,000 gallon gasoline tank with Phase I vapor recovery for tank filling, but no Phase II vapor recovery for vehicle refueling. The annual tank throughput is estimated to be 10,768 gallons and would have the following emission factor and annual emissions:

- VOC: 13 lbs/1,000 gallons throughput and 0.07 tons/year

It should be noted that the MDAQMD will require the tank to have both Phase I and Phase II vapor controls, so the emissions determined by the applicant for the gasoline tanks are over estimated.

Operational and Maintenance Vehicles

To minimize operating emissions, the applicant has proposed mitigation measures to minimize the operating and maintenance vehicles emissions. Following are the proposed mitigation measures (GSEP 2009c, p.4; GSEP 2009f, DR 24).

- Vehicles (mobile sources) used for maintenance activities will meet all required exhaust standards as implemented and enforced by the CARB and the United States Environmental Protection Agency.
- Vehicles will use only CARB certified motor vehicle fuels.
- Vehicles will be maintained per the manufacturers' operations and maintenance schedules.
- Vehicles will be "smog" tested (as applicable) on the schedule as determined by the California DMV
- Onsite vehicle speeds will be limited to the following: (1) ≤ 15 mph on onsite paved roads, and (2) ≤ 5 mph on onsite unpaved (gravel) roads.
- Road maintenance will be performed as needed. Paved roads will be swept, sealed, and/or overlaid as needed. Gravel surfaces will inspected and maintained as necessary to insure the integrity of the gravel surface.

Additionally, the applicant would be willing to stipulate to a condition of certification that would require a review of available alternative low-emission vehicle technologies, including electric and hydrogen fueled vehicles, and use of those technologies to replace the proposed diesel and gasoline fueled vehicles used for operations maintenance if lower emission alternative technology vehicles are both available and not cost prohibitive (GSEP 2009f, DR 24).

Adequacy of Proposed Mitigation

Staff generally concurs with the District's preliminary determination that the proposed project's stationary source proposed emission controls/emission levels for criteria pollutants meet regulatory requirements and that the proposed stationary source emission levels are reduced adequately. However, staff will include a comment in the Energy Commission's PDOC Comment Letter regarding whether Phase II vapor controls are required by District rule for the proposed onsite gasoline tank.

Staff believes that additional or different mitigation measures are needed for adequate control of both vehicle tailpipe and fugitive dust emissions from maintenance operations. Specifically, additional fugitive emissions control is necessary by ensuring that vehicle travel is only conducted on paved and stabilized surfaces. Additionally, a few of the applicant's proposed vehicle mitigation measures are required by law, and therefore are not mitigation measures.

Staff Proposed Mitigation

As mentioned earlier in the discussions of the ozone and PM10 impacts, staff concludes that the proposed project's direct stationary source ozone precursor and PM10 emissions are minimal, but when combined with the maintenance vehicles emissions could be significant. Additionally, staff believes that a solar renewable project, which would have a 30-year life in a setting likely to continue to be impacted by both local and upwind emission sources, should address its contribution to the potentially ongoing nonattainment of the PM10 and ozone standards. Staff concludes that the applicant's proposed mitigation measures, that mirror staff's current mitigation requirements for other large solar projects, would adequately mitigate the proposed project's stationary source, mobile equipment, and fugitive dust emissions. Therefore, staff recommends the project owner be required to purchase new on-road and off-road vehicles that meet California emissions standards (**AQ-SC6**) and that the project owner be required to apply fugitive dust controls that are equivalent to those recommended for construction (**AQ-SC7**) to adequately mitigate the proposed project's operation emissions.

Staff is also proposing Condition of Certification **AQ-SC8** to ensure that the Energy Commission license is amended as necessary to incorporate changes to the air quality permits.

Staff has determined that the proposed emission controls and emission levels, along with the applicant proposed and staff recommended emission mitigation measures, would mitigate all proposed project air quality impacts to less than significant pursuant to CEQA.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's direct air quality impacts have been reduced to less than significant, there is no environmental justice issue for air quality.

Indirect Pollutant and Secondary Pollutant Impacts

The proposed project would have direct emissions of chemically reactive pollutants (NO_x, SO_x, and VOC), but would also have indirect emission reductions associated with the reduction of fossil-fuel fired power plant emissions due to the proposed project displacing the need for their operation, since renewable energy operates on a must take basis. The exact nature and location of such reductions is not known, so the discussion below focuses on the direct emissions from the proposed project within the Riverside County portion of the Mojave Desert Air Basin.

Ozone Impacts

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are

input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NO_x and VOC emissions to ozone formation, it can be said that the emissions of NO_x and VOC from the GSEP do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts would be cumulatively significant under CEQA because they would contribute to ongoing violations of the state ozone ambient air quality standards.

PM_{2.5} Impacts

Secondary particulate formation, which is assumed to be 100 percent PM_{2.5}, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SO_x and NO_x emissions are converted into sulfuric acid and nitric acid first and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase would tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air.

The emissions of NO_x and SO_x from GSEP do have the potential (if left unmitigated) to contribute to higher PM_{2.5} levels in the region; however, the region is in attainment with PM_{2.5} standards and the low level of NO_x and SO_x emissions from the proposed project would not significantly impact that status.

Impact Summary

The applicant is proposing to mitigate the proposed project's stationary source NO_x, VOC, SO₂, and PM₁₀/PM_{2.5} emissions through the use of Best Available Control Technology (BACT) and reduce the proposed project's mobile source emissions by using vehicles that meet ARB emission standards. With the applicant's stipulated vehicle emission mitigation, which is formalized and augmented in Staff Condition of Certification **AQ-SC6**, staff concludes that the proposed project would not cause significant secondary pollutant impacts.

C.1.4.3 CEQA LEVEL OF SIGNIFICANCE

Project Construction

Staff considers the unmitigated construction NO_x, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NO_x, VOC, and PM emission be mitigated pursuant to CEQA. Staff is recommending several mitigation measures (**AQ-SC1** through **AQ-SC5**), that also include the applicant's stipulated construction mitigation measures, to limit exhaust emissions and fugitive dust emissions during project construction to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during construction, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Project Operation

Staff considers the unmitigated operation and maintenance NO_x, VOC, and PM emissions to be potentially CEQA significant and, therefore, staff is recommending that the NO_x, VOC, and PM emissions be mitigated pursuant to CEQA. Staff is recommending two mitigation measures (**AQ-SC6** and **AQ-SC7**), that also include the applicant's stipulated operations emission mitigation, to limit exhaust emissions and fugitive dust emissions during project operation to the extent feasible.

Therefore, while there would be adverse CEQA air quality impacts during operation, they are expected to be less than significant after implementation of the applicant's stipulated and staff's recommended mitigation measures.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those emissions would no longer occur. The only other expected emissions would be equipment exhaust and fugitive particulate emissions from the dismantling activities. These activities would be of a much shorter duration than construction of the proposed project, equipment are assumed to have much lower comparative emissions due to technology advancement, and fugitive dust emissions would be required to be controlled in a manner at least equivalent to that required during construction. Therefore, while there would be adverse CEQA air quality impacts during decommissioning, they are expected to be less than significant.

C.1.5 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would essentially be Unit 1 of the proposed project, and would be a 125 MW solar facility located within the boundaries of the proposed project as defined by NextEra. This alternative is analyzed for two major reasons: (1) it eliminates about 50 percent of the proposed project area so all impacts are reduced, and (2) by removing the eastern solar field, it would reduce the water required for cooling by 50 percent. The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 1**.

C.1.5.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the boundaries of the proposed project. It simply eliminates effects to the eastern 125 MW solar field and relocates the gas yard approximately 1.75 miles northwest of its present location. As a result, the environmental setting consists of the western portion of the proposed project, as well as the area affected by the linear project components.

The setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Reduced Acreage Alternative would reduce the total construction emissions of the proposed project by somewhat less than 50 percent, and operation emissions of the proposed project (see **Air Quality Tables 8 and 9**) by somewhat less than 50 percent, due to reduced efficiencies of the smaller project. However, the maximum daily and annual construction emissions are assumed to be similar to the proposed project assuming the same level of maximum activity with a reduction in the overall construction schedule. Therefore, the maximum construction emissions would be approximately the same as the emissions shown in **Air Quality Tables 6 and 7**.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Reduced Acreage Alternative are assumed to be essentially the same as that estimated for the proposed project, assuming the same maximum daily and annual construction activities. Therefore, the worst-case short-term and annual construction pollutant concentration impacts for this alternative are assumed to be essentially the same as those shown for the proposed project in **Air Quality Table 10**.

The maximum short-term and maximum annual operation pollutant concentration impacts for the Reduced Acreage Alternative are likely to be somewhat less than that for the proposed project as shown in **Air Quality Table 11**. However, the amount of reduction in impacts is uncertain as the worst case impacts are based on factors such as proximity to receptors and terrain as well as total emissions.

The results of the Reduced Acreage Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed project and would require the same level of mitigation. The total construction period and total construction emissions would be reduced from those required to construct the proposed project.
- The operation emissions and ground level pollutant concentration impacts would be somewhat lower than the proposed project, but the same level of mitigation would be required.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be reduced.

If the Reduced Acreage Alternative were approved, other renewable projects may be developed on other sites in the Riverside County, the Colorado Desert, MDAB, or in adjacent states to fill the 125 MW gap not supplied by the proposed project as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.

C.1.5.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Reduced Acreage Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant PM10 and ozone precursor (NOx and

VOC) emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Reduced Acreage Alternative would be the same as that proposed for the proposed project (staff and MDAQMD recommended conditions of certification).

C.1.6 DRY COOLING ALTERNATIVE

This section identifies the potential impacts of using air-cooled condenser (ACC) systems rather than the wet cooling towers proposed by NextEra for the Genesis project. It is assumed that the ACC systems would be located where the cooling towers are currently proposed for each of the two 125 MW power blocks, as illustrated in **Alternatives Figure 2** (see Section B.3).

Approximately 18 ACC fans would be required for each of the two solar fields. The 18 fans, or ACC's, would operate when the ambient temperature is above 50 degrees Fahrenheit. When the temperature is below 50 degrees Fahrenheit, only 10 of the fans would be used (GSEP 2009f). The 18 ACC fans would have a length of approximately 279 feet, a width of approximately 127 feet, and a height of 98 feet (GSEP 2009f). This alternative is analyzed because it would reduce the amount of water required for steam turbine cooling from 822 acre-feet per year (AFY) to 66 AFY. This reduction in water use would reduce impacts to water and biological resources.

C.1.6.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the boundaries of the proposed project. It simply eliminates the use of wet-cooling towers and incorporated the use of air-cooled condensers (ACC) in the same location. As a result, the setting and existing conditions for this alternative are the same as the proposed project. The existing ambient air quality does not change and the facility would still be within the same air basin and subject to the same air quality LORS.

C.1.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The magnitude of emissions from the construction of the air-cooled condenser (ACC) would be different than those from the construction of the proposed wet-cooled system. Approximately 40% more land would be disturbed for the ACCs as compared with the cooling towers, and the laydown area(s) may have to be increased to store and/or prepare the air-cooled radiator components prior to installation. Grading and construction equipment would be required to prepare the site and install the ACC system. The additional soil disturbance and equipment activity would result in increased fugitive dust and vehicle exhaust emissions (as compared to the emissions shown in **Air Quality Tables 6 and 7**), which could occur during the worst case construction periods. This additional construction in the context of the total construction requirements for the project are relatively minor, but would to some small extent increase the project's construction emissions.

There would be a minor reduction in particulate (PM10 and PM2.5) emissions from the removal of the two cooling towers, which as shown in **Air Quality Table 9** would be estimated to be a reduction of approximately 3.8 tons per year combined. However, the

use of the ACCs would be expected to increase the auxiliary boilers startup requirements and increase the criteria pollutant emissions from the auxiliary boilers as shown in **Air Quality Tables 8 and 9**. Additionally, the ACCs would to a small extent reduce the steam power cycle's efficiency, which would to a small extent reduce the total amount of facility generation and reduce the displacement of fossil fuel fired power plant emissions from the GSEP.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Dry Cooling Alternative would be slightly higher than that estimated for the proposed project, assuming that the increased ACC construction requirements occur during the maximum daily and annual construction periods. Therefore, the worst-case short-term and annual construction pollutant concentration impacts for this alternative would likely be slightly higher than those shown for the proposed project in **Air Quality Table 10**. With the implementation of the staff proposed construction mitigation, staff believes that impacts from this construction emission increase would be less than significant.

The maximum short-term and maximum annual operation pollutant concentration impacts for the Dry Cooling Alternatives would be expected to be reduced for particulate (PM10/PM2.5) emissions and very slightly increased for the other criteria pollutants from those for the proposed project as shown in **Air Quality Table 11**. With the implementation of the District and staff proposed operation mitigation, staff believes that impacts from the operation emissions for this alternative would be less than significant.

The results of the Cooling Tower Alternative would be the following:

- The worst-case short-term construction emissions and ground level pollutant concentration impacts would very slightly higher than those of the proposed project and would require the same level of mitigation.
- The operation emissions and ground level pollutant concentration impacts of particulate emissions would be somewhat lower than the proposed project, and the operation emissions and ground level pollutant concentration impacts of the other criteria pollutants would be somewhat higher than the proposed project. However, the same level of mitigation, with the exception for the cooling tower emission controls, would be required.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated, but mainly out of air basin, criteria pollutant emissions would be very slightly reduced due to a small reduction in overall facility efficiency.

C.1.6.3 CEQA LEVEL OF SIGNIFICANCE

The level of significance under CEQA for the Dry Cooling Alternative would be the same as for the proposed project, with the same significance rationale, where if left unmitigated there is the potential for significant PM10 and ozone precursor (NO_x and VOC) emission impacts during the Alternative project's construction and operation. The mitigation that would be proposed for the Dry Cooling Alternative would be the same as that proposed for the proposed project (staff and MDAQMD recommended conditions of certification), with the exception of the deletion of the District's cooling tower conditions **AQ-15 to AQ-22**.

C.1.7 NO ACTION ALTERNATIVES

C.1.7.1 NO ACTION ON PROPOSED PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed GSEP would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended. The results of the No Project / No Action Alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in reducing fossil fuel use and greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation (see **Appendix Air-1 - Greenhouse Gas Emissions** for details).

If the proposed project is not approved, renewable projects would likely be developed on other sites in Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, as shown on **Cumulative Impacts Figure 1** and in **Table 1**, several dozen solar and wind development applications for use of BLM land have been submitted for approximately one million acres of the California Desert Conservation Area. Additional BLM land in Nevada and Arizona also has applications for solar and wind projects.

C.1.7.2 NO ACTION ON PROPOSED PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed GSEP would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, air pollutant emissions and impacts would result from the construction and operation of the solar technology and would likely be similar to the air quality impacts from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, the benefits of the proposed project in displacing fossil fuel fired generation and reducing associated pollutant emissions could occur with a different solar technology at this site and therefore with this alternative. As such, this No Project/No Action Alternative could result in air quality impacts and benefits similar to the impacts under the proposed project.

C.1.7.3 NO ACTION ON PROPOSED PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed GSEP would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the air quality of the site is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in air quality impacts under the proposed project nor would it result in the air quality benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.1.8 CUMULATIVE IMPACTS

Cumulative impacts are defined by CEQA as “two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts.” (CEQA Guidelines, § 15355.) A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts.” (CEQA Guidelines, § 15130(a)(1).) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

This analysis is concerned with criteria air pollutants. Such pollutants have impacts that are usually (though not always) cumulative by nature. Rarely would a project by itself cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air offsets and the use of Best Available Control Technology (BACT) for new sources of emissions, and restrictions of emissions from existing sources of air pollution.

Thus, much of the preceding discussion is concerned with cumulative impacts. The “Existing Ambient Air Quality” subsection describes the air quality background in the Riverside County portion of the Mojave Desert Air Basin, including a discussion of historical ambient levels for each of the significant criteria pollutants. The “Construction Impacts and Mitigation” subsection discusses the proposed project’s contribution to the local existing background caused by project construction. The “Operation Impacts and

Mitigation” subsection discusses the proposed project’s contribution to the local existing background caused by project operation. The following subsection includes two additional analyses:

- a summary of projections for criteria pollutants by the air district and the air district’s programmatic efforts to abate such pollution; and
- an analysis of the proposed project’s *localized cumulative impacts*, the proposed project’s direct operating emissions combined with other local major emission sources.

C.1.8.1 SUMMARY OF PROJECTIONS

The Riverside County portion of the MDAB is designated as attainment for all federal ambient air quality standards and the state CO, NO₂, SO₂ and PM10 standards, but is designated as non-attainment for State ozone and PM10 standards.

Ozone

Since a portion of San Bernardino County in the Mojave Desert Air Basin is currently classified as non-attainment for the federal 8-hour ozone standard north and west of the project site, the District is required to prepare and adopt an ozone attainment plan for submittal to the U.S. EPA describing how it will attain the federal 8- hour standard. The District completed this plan in 2008. The project is not specifically subject to the provisions in the federal attainment plan and the site is outside of the non-attainment area.

The District is required to prepare and adopt a state ozone attainment plan for submittal to ARB. The latest state ozone attainment plan was adopted by MDAQMD in 2004. The MDAQMD 2004 Ozone Attainment Plan contains attainment plans for both federal (for areas within San Bernardino County) and state ozone standards. The MDAQMD did not propose to adopt any additional control measures as part of the 2004 Plan. Additionally, while there are no additional control measures for direct ozone precursor reduction as part of the federal 2008 attainment plan, MDAQMD is committed to adopt all applicable Federal Reasonably Available Control Technology (RACT) rules it proposed in 8-hour Reasonably Available Control Technology – State Implementation Plan Analysis (RACT SIP Analysis) in 2006. In addition, the MDAQMD updated and identified new measures in 2007, which will be adopted through 2014, as the State of California mandates all feasible measures. The RACT rules and other new measures do not impact the GSEP emission sources as proposed.

Particulate Matter

Since a portion of San Bernardino County in the Mojave Desert Air Basin is currently classified as non-attainment for the federal PM10 standards north and west of the project site, the District is required to prepare and adopt an attainment plan for submittal to the U.S. EPA describing how it will achieve attainment with the federal PM10 standards. However, the proposed project site that is in Riverside County is outside of the non-attainment area and is not subject to the provisions in the federal attainment plan. There is no legal requirement for air districts to provide plans to attain the state PM10 standard, so air districts have not developed such plans. Therefore, there are no

air quality management plan particulate emission control measures that are applicable to the proposed project.

As a solar power generation facility, the direct air pollutant emissions from power generation are negligible and the emission source would be limited to auxiliary equipment and maintenance activities. The emissions from the proposed project would be minimal compared to the other power generation facilities, and with staff's recommended construction and operation mitigation measures it is unlikely that the proposed project would have significant impact on particulate matter emissions.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plan does not outline any new control measures applicable to the proposed project's operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with those air quality plans.

C.1.8.2 LOCALIZED CUMULATIVE IMPACTS

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see the "Operational Modeling Analysis" subsection) the proposed project's contributions to localized cumulative impacts can be estimated. To represent *past* and, to an extent, *present projects* that contribute to ambient air quality conditions, the Energy Commission staff recommends the use of ambient air quality monitoring data (see the "Existing Ambient Air Quality" subsection), referred to as the *background*. The staff takes the following steps to estimate what are additional appropriate "present projects" that are not represented in the background and "reasonably foreseeable projects":

- First, the Energy Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Based on staff's modeling experience, beyond six miles there is no statistically significant concentration overlap for non-reactive pollutant concentrations between two stationary emission sources.
- Second, the Energy Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIRs) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is "reasonably foreseeable" for new area sources.
- The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources, provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.

- Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources include existing sources that are co-located with or adjacent to the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than two miles away.
- The modeling results must be carefully interpreted so that they are not skewed towards a single source, in high impact areas near that source's fence line. It is not truly a cumulative impact of GSEP if the high impact area is the result of high fence line concentrations from another stationary source and GSEP is not providing a substantial contribution to the determined high impact area.

Once the modeling results are interpreted, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff's cumulative impacts analysis, the applicant must submit a modeling protocol, based on information requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources, and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this: modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the proposed project alone (see the "Operational Modeling Analysis" subsection), and the applicant can act on its own to reduce stipulated emission rates and/or increase emission control requirements as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the proposed project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or the applicant (see the "Operation Mitigation" subsection).

The applicant, in consultation with MDAQMD and SCAQMD, confirmed that there are no projects within a six miles radius from the Genesis Solar project site that are under construction or have received permits to be built or operate in the foreseeable future. Therefore, it has been determined that no stationary sources requiring a cumulative modeling analysis exist within a six mile radius of the proposed project site. However, there are several pending solar and wind projects in the I-10 corridor area between Desert Center and Blythe including two thermal solar projects, the Blythe Solar Power Project and Palen Solar Power Project siting cases, which are currently being evaluated by the Energy Commission and BLM. This potential for significant additional development within the air basin and corresponding increase in air basin emissions is a major part of staff's rationale for recommending Conditions of Certification **AQ-SC6** and **AQ-SC7** that are designed to mitigate the proposed project's cumulative impacts by reducing the dedicated on-site vehicle emissions and fugitive dust emissions during site operation. With these recommended CEQA-only mitigation measures, staff has concluded that the CEQA cumulative air quality impacts are less than significant.

Staff has considered the minority population surrounding the site (see **Socioeconomics Figure 1**). Since the proposed project's cumulative air quality impacts have been mitigated to less than significant, there is no environmental justice issue for air quality.

C.1.9 COMPLIANCE WITH LORS

The Mojave Desert Air Quality Control District issued a Preliminary Determination of Compliance (PDOC) for the GSEP on February 18, 2010 (MDAQMD 2010a), and completed a 30 day notice period. The District will issue a Final Determination of Compliance after resolution of all comments received on the PDOC and obtaining additional information from the applicant. Compliance with all District rules and regulations was demonstrated to the District's satisfaction in the PDOC. The District's PDOC conditions are presented in the Conditions of Certification (**AQ-1 to AQ-40**).

Staff submitted an official PDOC comment letter on March 8, 2010 (CEC 2010h) and expects that the FDOC will contain revisions to conditions due to Energy Commission, applicant, or third party comments. Staff will provide any revised FDOC findings or conditions of certification in a Supplemental Staff Assessment addendum after receipt of the FDOC.

C.1.9.1 FEDERAL

The District is responsible for issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standard (Subparts Dc and IIII). However, this proposed project does not require a federal NSR or Title V permit and this proposed project would not require a PSD permit from U.S.EPA prior to initiating construction.

The proposed project requires the approval of a federal agency (BLM), but is located in an area that is in attainment or unclassified with all federal ambient air quality standards. Therefore, the proposed project is not subject to the general conformity regulations (40 CFR Part 93).

C.1.9.2 STATE

The project owner will demonstrate that the proposed project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the issuance of the District's Final Determination of Compliance and the Energy Commission's affirmative finding for the project.

The emergency generator and fire water pump engines are also subject to the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. This measure limits the types of fuels allowed, established maximum emission rates, and establishes recordkeeping requirements. The proposed Tier 2 emergency engine and Tier 3 fire water pump engine meet the current emission limit requirements of this measure. This measure would also limit the engines' testing and maintenance operation to no more than 50 hours per year.

C.1.9.3 LOCAL

The District rules and regulations specify the emissions control and offset requirements for new sources such as the GSEP. Best Available Control Technology would be implemented, and emission reduction credits (ERCs) are not required to offset the proposed project's emissions by District rules and regulations based on the permitted stationary source emission levels for the proposed project. Compliance with the District's new source requirements would ensure that the proposed project would be consistent with the strategies and future emissions anticipated under the District's air quality attainment and maintenance plans.

The applicant provided an air quality permit application to the MDAQMD and the District issued a PDOC on February 18, 2010 (MDAQMD 2010a). The PDOC states that the proposed project is expected to comply with all applicable District rules and regulations. The DOC evaluates whether and under what conditions the proposed project would comply with the District's applicable rules and regulations, as described below.

Regulation II – Permits

Rule 201 and 203 – Permit to Construct and Permit to Operate

Rule 201 establishes the emission source requirements that must be met to obtain a Permit to Construct. Rule 203 prohibits use of any equipment or the use of which may emit air contaminants without obtaining Permit to Operate. The applicant has complied with this rule by submitting the AFC and District permit applications materials.

Regulation IV – Prohibitions

Rule 401 - Visible Emissions

This rule limits visible emissions from emissions sources, including stationary source exhausts and fugitive dust emission sources. Compliance with this rule is expected. In the PDOC, the District has determined that the facility is expected to comply with this rule.

Rule 402 - Nuisance

This rule restricts discharge of emissions that would cause injury, detriment, annoyance, or public nuisance. The facility is expected to comply with this rule (identical to California Health and Safety Code 41700).

Rule 403 - Fugitive Dust

This rule limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and manmade conditions resulting in wind erosion. With the implementation of recommended staff conditions **AQ-SC3**, **AQ-SC4**, and **AQ-SC7** the facility is expected to comply with this rule.

Rule 404 - Particulate Matter Concentration

The rule limits particulate matter (PM) emissions based on the volume discharge rate. The GSEP stationary sources subject to this rule (HTF heaters and emergency engines) would comply with the PM concentration limits of this regulation.

Rule 406 - Specific Contaminants

The rule prohibits sulfur emissions, calculated as SO₂, in excess of 500 ppmv. Compliance with this rule is assured with the required use of pipeline quality natural gas for the boilers and heaters and California low sulfur diesel fuel for the emergency generator and fire pump engines.

Rule 407 - Liquid and Gaseous Air Contaminants

The rule prohibits carbon monoxide emissions in excess of 2,000 ppmv. The heaters and emergency generator and fire pump engines would have CO emissions well below this concentration limit. Compliance with this rule is expected.

Rule 409 - Fuel Burning Equipment - Combustion Contaminants

This rule limits discharge into the atmosphere from fuel burning equipment combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12 percent of carbon dioxide (CO₂) at standard conditions. The GSEP stationary sources would have particulate concentrations below limit of this rule.

Rule 431 - Sulfur Content of Fuels

The rule prohibits the burning of gaseous fuel with a sulfur content of more than 800 ppm and liquid fuel with a sulfur content of more than 0.5 percent sulfur by weight. The facility is expected to comply with this rule. Compliance with this rule is assured with the required use of pipeline quality natural gas and California low sulfur diesel fuel for the emergency engines.

Regulation IX – Standards of Performance for New Stationary Sources

Rule 900 – Standard of Performance For New Stationary Source (NSPS)

This rule incorporates the Federal NSPS (40 CFR 60) rules by reference. The proposed boilers are subject to subpart Dc. The District conditions would ensure compliance with the requirements of this rule.

The proposed Tier 2 and Tier 3 engines meet the current emission limit requirements of NSPS Subpart IIII. The exact model and size of the engines are only estimated at this time and it is uncertain exactly when the emergency engines would be purchased and whether Tier 4 engine emission limits may apply at that time. So, staff has added a requirement to the verification of District Condition of Certification (**AQ-31** and **AQ-40**) to require the applicant to provide documentation that demonstrates that the engines purchased meet the appropriate NSPS standards for new engines at the time of purchase.

Regulation XIII – New Source Review

Rule 1303 – New Source Review

This rule requires implementation of BACT for any emission source unit which emits or has the potential to emit 25 lbs/day or more and requires offsets if specific annual emission limits are exceeded. The PDOC concluded that the emergency engines trigger

BACT and the engines complied. The other stationary sources did not trigger BACT but would meet BACT requirements based on the applicant's proposed controls. The PDOC concluded that offsets were not required for the proposed project.

Rule 1306 – Electric Energy Generating Facilities

Describes actions to be taken for permitting of power plants. Compliance with this rule would be achieved with the completion of the FDOC.

C.1.10 NOTEWORTHY PUBLIC BENEFITS

Renewable energy facilities, such as GSEP, are needed to meet California's mandated renewable energy goals. While there are no local area air quality public benefits⁹ resulting from the proposed project, it would indirectly reduce criteria pollutant emissions within the Southwestern U.S. by reducing fossil fuel fired generation.

C.1.11 RESPONSE TO AGENCY AND PUBLIC COMMENTS

There have been no agency comments received on staff's Air Quality section.

California Unions for Renewable Energy stated that the staff analysis was incomplete without a final Determination of Compliance (FDOC). However, staff has incorporated its understanding of District requirements based upon the expected content of the FDOC. As stated in this staff assessment, if the FDOC contains information that requires a different analytical treatment, staff will provide a Supplemental Staff Assessment addendum.

There were no other public comments to the Air Quality section.

The applicant has provided comments (TT 2010n) that have been addressed, in some cases with minor modifications, as considered acceptable by staff.

C.1.12 MITIGATION MEASURES/ PROPOSED CONDITIONS OF CERTIFICATION

C.1.12.1 STAFF CONDITIONS OF CERTIFICATION

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction

⁹ Air quality benefits should not be confused with greenhouse gas/climate change benefits, which are discussed in Appendix AIR-1.

activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4**, and **AQ-SC5**.

Verification: At least 30 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The CPM will notify the project owner of any necessary modifications to the plan within 15 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site. Any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report to include the following to demonstrate control of fugitive dust emissions:

- A. a summary of all actions taken to maintain compliance with this condition;
- B. copies of any complaints filed with the District in relation to project construction; and
- C. any other documentation deemed necessary by the CPM, and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.

- a. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved or treated prior to taking initial deliveries.

- b. All unpaved construction roads and unpaved operation and maintenance site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be as efficient as or more efficient for fugitive dust control than ARB approved soil stabilizers, and that shall not increase any other environmental impacts, including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading (consistent with **BIO-7**); and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.
- c. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.
- d. Visible speed limit signs shall be posted at the construction site entrances.
- e. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.
- f. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.
- g. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.
- h. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.
- i. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.
- j. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.
- k. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

- l. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.
- m. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
- n. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing the additional mitigation measures described in the verification below and how they will be implemented to meet these fugitive dust control performance standards.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report to include:

- A. a summary of all actions taken to maintain compliance with this condition;
- B. copies of any complaints filed with the District in relation to project construction; and
- C. Any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

The AQCMP shall include the following additional mitigation measure implementation procedures that will be used to ensure that the performance standards of this condition are met:

The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that visible dust plumes as defined above are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. Any deviation from the AQCMP mitigation measures shall require prior and CPM notification and approval.

Verification: The AQCMM shall include in the Monthly Compliance Report the following to demonstrate control of diesel construction-related emissions:

- A. A summary of all actions taken to maintain compliance with this condition;
- B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and
- C. Any other documentation deemed necessary by the CPM, and the AQCMM to verify compliance with this condition, including any District permits necessary for temporary stationary diesel engines, or ARB certification for state registered portable equipment. Such information may be provided via electronic format or disk at the project owner's discretion.

The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**.

- a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.
- b. All construction diesel engines with a rating of 50 hp or higher and lower than 750 hp shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. Engines larger than 750 hp shall meet Tier 2 engine standards. In the event that a Tier 3 engine is not available for any off-road equipment larger than 100 hp and smaller than 750 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the

on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or
 2. The construction equipment is intended to be on site for 10 days or less.
 3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.
- c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item “b” occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :
1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.
 2. The retrofit control device is causing or is reasonably expected to cause engine damage.
 3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.
 4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.
- d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer’s specifications.
- e. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.
- f. Construction equipment will employ electric motors when feasible.

AQ-SC6 The project owner, when obtaining dedicated on-road or off-road vehicles for mirror washing activities and other facility maintenance activities, shall only obtain vehicles that meet California on-road vehicle emission

standards or appropriate U.S.EPA/California off-road engine emission standards for the latest model year available when obtained.

Verification: At least 30 days prior to the start commercial operation, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report.

AQ-SC7 The project owner shall provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the verification of **AQ-SC3** that would be applicable to minimizing fugitive dust emission creation from operation and maintenance activities and preventing all fugitive dust plumes that would not comply with the performance standards identified in **AQ-SC4** from leaving the project site that:

- A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and
- B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas, or alternative methods for stabilizing disturbed off-road areas, within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be as efficient as or more efficient for fugitive dust control than ARB approved soil stabilizers, and that shall not increase any other environmental impacts, including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 30 days prior to start of commercial operation, the project owner shall submit to the CPM for review and approval a copy of the site Operations Dust Control Plan that identifies the dust and erosion control procedures, including

effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs. Within 60 days after commercial operation, the project owner shall provide to the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed air permit modifications to the CPM within 5 working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

C.1.12.2 DISTRICT CONDITIONS

DISTRICT PRELIMINARY DETERMINATION OF COMPLIANCE CONDITIONS (MDAQMD 2010a)

District conditions **AQ-1** through **AQ-40** are CEQA-only required conditions.

Application No. 00010788 and 00010789 (Two - 30 MMBtu/hr Natural Gas Fired Auxiliary Boiler)

EQUIPMENT DESCRIPTION:

Two 30 MMBtu/hr natural gas boilers with low-NOx burner systems.

AQ-1 Operation of this equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-2 This equipment shall be exclusively fueled with natural gas and shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-3

Emissions from this equipment shall not exceed the following hourly emission limits at any firing rate, verified by fuel use and annual compliance tests:

- a. NO_x as NO₂:
 1. 0.082 lb/hr operating at 25% load (based on 9.0 ppmvd corrected to 3% O₂ and averaged over one hour)
 2. 0.330 lb/hr operating at 100% load (based on 9.0 ppmvd corrected to 3% O₂ and averaged over one hour)
- b. CO:
 1. 0.141 lb/hr operating at 25% load (based on 50 ppmvd corrected to 3% O₂ and averaged over one hour)
 2. 0.563 lb/hr operating at 100% load (based on 50 ppmvd corrected to 3% O₂ and averaged over one hour)
- c. VOC as CH₄:
 1. 0.022 lb/hr operating at 25% load
 2. 0.088 lb/hr operating at 100% load
- d. SO_x as SO₂:
 1. 0.002 lb/hr operating at 25% load
 2. 0.008 lb/hr operating at 100% load
- e. PM₁₀:
 1. 0.038 lb/hr operating at 25% load
 2. 0.150 lb/hr operating at 100% load

Verification: As part of the Annual Compliance Report, the project owner shall include information demonstrating compliance with boiler operating emission rates.

AQ-4

The daily emission of the following pollutants CO, NO_x (as NO₂) and SO_x (as SO₂) as well as O₂ (a diluent gas) shall be monitored using a Continuous Emissions Monitoring System (CEMS). This system shall be operating at all times in accordance with the District approved monitoring plan.

The following are the acceptability testing requirements for the CEMS:

- a. For SO₂ and NO_x CEMS - Performance Specification 2 of 40 CFR 60 Appendix B.
- b. For O₂ CEMS - Performance Specification 3 of 40 CFR 60 Appendix B.

- c. For CO CEMS - Performance Specification 4 of 40 CFR 60 Appendix B.
- d. For quality assurance - Performance Specification 40 CFR 60 Appendix F.

Verification: As part of the Annual Compliance Report, the project owner shall include CEMS information demonstrating compliance with boiler operating emission rates.

AQ-5 This equipment shall not be operated for more than 1,000 hours per rolling twelve month period and more than 14 hours per calendar day.

Verification: The project owner shall submit to the CPM the boiler hours of use records demonstrating compliance with this condition as part of the Annual Operation Report.

AQ-6 The project owner shall maintain an operations log for this equipment on-site and current for a minimum of five (5) years, and said log shall be provided to District personnel on request. The operations log shall include the following information at a minimum:

- a. Total operation time (hours per day, hours per month, and hours per rolling twelve month period);
- b. Maximum hourly, maximum daily, and total calendar year emissions of NO_x, CO, PM₁₀, VOC and SO_x (including calculation protocol); and,
- c. Any permanent changes made to the equipment that would affect air pollutant emissions, and indicate when changes were made.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-7 The project owner shall perform initial compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District within 180 days of initial start up:

- a. NO_x as NO₂ in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).
- b. VOC as CH₄ in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).
- c. SO_x as SO₂ in ppmvd at 3% oxygen and lb/hr.
- d. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).
- e. PM₁₀ in mg/m³ at 3% oxygen and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).

- f. Flue gas flow rate in dscf per minute.
- g. Opacity (measured per USEPA reference Method 9).

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 180 days of initial start up.

AQ-8 The project owner shall perform annual compliance tests on this equipment in accordance with the MDAQMD Compliance Test Procedural Manual. The test report shall be submitted to the District no later than six weeks prior to the expiration date of this permit. The following compliance tests are required:

- a. NO_x as NO₂ in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 19 and 20).
- b. VOC as CH₄ in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Methods 25A and 18).
- c. SO_x as SO₂ in ppmvd at 3% oxygen and lb/hr.
- d. CO in ppmvd at 3% oxygen and lb/hr (measured per USEPA Reference Method 10).
- e. PM₁₀ in mg/m³ at 3% oxygen and lb/hr (measured per USEPA Reference Methods 5 and 202 or CARB Method 5).
- f. Flue gas flow rate in dscf per minute.
- g. Opacity (measured per USEPA reference Method 9).

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within the timeframe required by this condition.

Application No. 00010842 and 00010843 (Two – HTF Ullage Expansion Tank)

EQUIPMENT DESCRIPTION:

Two HTF ullage/expansion tanks.

AQ-9 This tank stores HTF, specifically the condensable fraction of the vapors vented from the ullage system.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-10 This tank must be properly maintained at all times.

Verification: The project owner shall make the site available for inspection of HTF piping Inspection and Maintenance Program records (**AQ-13**) and HTF system equipment by representatives of the District, ARB, and the Energy Commission.

AQ-11 This tank shall be operated at all times under a nitrogen blanket.

Verification: The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-12 The ullage vent system shall be vented to control system with at least 99% control efficiency for VOC and toxic substances.

Verification: The project owner shall provide the District and CPM ullage vent control system manufacturer guarantee data showing compliance with this condition at least 30 days prior to the installation of the ullage vent system control system.

AQ-13 Inspect the tanks and distribution system (valves, flanges, pump seals, etc.) for the presence of leaks daily and repair or shutdown as soon as possible.

Verification: The project owner shall establish an inspection and maintenance program that at a minimum includes the following:

- A. All pumps, compressors and pressure relief devices (pressure relief valves or rupture disks) shall be electronically, audio, or visually inspected once every operating period.
- B. All accessible valves, fittings, pressure relief devices (PRDs), hatches, pumps, compressors, etc. shall be inspected quarterly using a leak detection device such as a Foxboro OVA 108 calibrated for methane.
- C. VOC leaks greater than 100-ppmv shall be tagged (with date and concentration) and repaired within seven calendar days of detection.
- D. VOC leaks greater than 10,000-ppmv shall be tagged and repaired within 24-hours of detection.
- E. The project owner shall maintain a log of all VOC leaks exceeding 10,000-ppmv, including location, component type, and repair made.
- F. The project owner shall maintain record of the amount of HTF replaced on a monthly basis for a period of five years.
- G. Any detected leak exceeding 100-ppmv and not repaired in 7-days and 10,000-ppmv not repaired within 24-hours shall constitute a violation of the District's Authority to Construct (ATC)/Permit to Operate (PTO).
- H. Pressure sensing equipment shall be installed that will be capable of sensing a major rupture or spill within the HTF network.

The inspection and maintenance plan shall be submitted to the CPM for review and approval at least 30 days before taking delivery of the HTF. The project owner shall make the site available for inspection of HTF piping Inspection and Maintenance

Program records and HTF system equipment by representatives of the District, ARB, and the Energy Commission.

AQ-14 If current non-criteria substances become regulated as toxic or hazardous substances and are used in this equipment, the project owner shall submit to the District a plan demonstrating how compliance will be achieved and maintained with such regulations.

Verification: The project owner shall submit a compliance plan of the toxic or hazardous substances for District approval and CPM review if current non-criteria substances in the HTF become regulated as toxic or hazardous substances.

Application No. 00010787 and 00010841 (Two Cooling Towers)

EQUIPMENT DESCRIPTION:

Two 7-cell cooling towers with drift eliminator rate of 0.0005% and water circulation rate of 94,623 gpm.

AQ-15 Operation of this equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-16 This equipment shall be operated and maintained in strict accord with the recommendations of its manufacturer or supplier and/or sound engineering principles.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-17 The drift rate shall not exceed 0.0005 percent with a maximum circulation rate of 94,623 gallons per minute. The maximum hourly PM10 emission rate shall not exceed 2.36 pounds per hour, as calculated per the written District-approved protocol.

Verification: The manufacturer guarantee data for the drift eliminator, showing compliance with this condition, shall be provided to the CPM and the District 30 days prior to cooling tower operation. As part of the Annual Compliance Report the project owner shall include information on operating emission rates to demonstrate compliance with this condition.

AQ-18 The project owner shall perform weekly tests of the blow-down water total dissolved solids (TDS). The TDS shall not exceed 5,000 ppmv on a calendar monthly basis. The project owner shall maintain a log which contains the date and result of each blow-down water test in TDS ppm, and the resulting mass emission rate. This log shall be maintained on site for a minimum of five (5) years and shall be provided to District personnel on request.

Verification: The cooling tower recirculation water TDS content test results shall be provided to representatives of the District, ARB, and the Energy Commission upon request.

AQ-19 The project owner shall conduct all required cooling tower water tests in accordance with a District-approved test and emissions calculation protocol. Thirty (30) days prior to the first such test the project owner shall provide a written test and emissions calculation protocol for District review and approval.

Verification: The project owner shall provide an emissions calculation and water sample testing protocol to the District for approval and CPM for review at least 30 days prior to the first cooling tower water test.

AQ-20 This equipment shall not be operated for more than 3,200 hours per rolling twelve month period and more than 15 hours per calendar day.

Verification: The project owner shall submit to the CPM the cooling tower operating data demonstrating compliance with this condition as part of the Annual Operation Report.

AQ-21 The project owner shall maintain an operations log for this equipment on-site and current for a minimum of five (5) years, and said log shall be provided to District personnel on request. The operations log shall include the following information at a minimum:

- a. Total operation time (hours per day, hours per month, and hours per rolling twelve month period); and
- b. The date and result of each blow-down water test in TDS ppm, and the resulting mass emission rate.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-22 A maintenance procedure shall be established that states how often and what procedures will be used to ensure the integrity of the drift eliminators. This procedure is to be kept onsite and available to District personnel on request.

Verification: The project owner shall make available at request the written drift eliminator maintenance procedures for inspection by representatives of the District, ARB, and the Energy Commission.

Application No. 00010790 and 00010791 (Two - 1,341 HP Emergency IC Engine)

EQUIPMENT DESCRIPTION:

Two - Tier II 1,341 HP diesel fueled emergency generator engines, each driving a generator.

AQ-23 This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound

engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission

AQ-24 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15 ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.

Verification: The project owner shall make the site available for inspection of equipment and fuel purchase records by representatives of the District, ARB, and the Energy Commission.

AQ-25 A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. (Title 17 CCR §93115.10(e)(1)).

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour meter.

AQ-26 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-27 The project owner shall maintain a operations log for this unit current and on-site, either at the engine location or at a on-site location, for a minimum of two (2) years, and for another year where it can be made available to the District staff within 5 working days from the District's request, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

- a. Date of each use and duration of each use (in hours);
- b. Reason for use (testing & maintenance, emergency, required emission testing);
- c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,

- d. Fuel sulfur concentration (the project owner may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-24** and **AQ-26** in the Annual Compliance Report, including a photograph showing the annual reading of engine hours. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-28 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-29 This engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-30 This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent shall govern.

Verification: Not necessary.

AQ-31 This unit is subject to the requirements of the Federal National Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII).

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet NSPS and ARB ATCM emission limit requirements at the time of engine purchase.

Application No. 00010792 and 00010793 (Two - 315 HP Emergency IC Engine)

EQUIPMENT DESCRIPTION:

Two - Tier III 315 HP diesel fueled emergency fire pump engines, each driving a fire suppression water pump.

AQ-32 This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: The project owner shall make the site available for inspection of equipment and records by representatives of the District, ARB, and the Energy Commission

AQ-33 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15 ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.

Verification: The project owner shall make the site available for inspection of equipment and fuel purchase records by representatives of the District, ARB, and the Energy Commission.

AQ-34 A non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed and maintained on this unit to indicate elapsed engine operating time. (Title 17 CCR §93115.10(e)(1)).

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

AQ-35 This unit shall be limited to use for emergency power, defined as in response to a fire or due to low fire water pressure. In addition, this unit shall be operated no more than 50 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit. The 50 hour limit can be exceeded when the emergency fire pump assembly is driven directly by a stationary diesel fueled CI engine operated per and in accord with the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 1998 edition. This requirement includes usage during emergencies. {Title 17 CCR 93115.3(n)}

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-36 The project owner shall maintain an operations log for this unit current and on-site, either at the engine location or at a on-site location, for a minimum of two (2) years, and for another year where it can be made available to

the District staff within 5 working days from the District's request, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

- a. Date of each use and duration of each use (in hours);
- b. Reason for use (testing & maintenance, emergency, required emission testing);
- c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,
- d. Fuel sulfur concentration (the project owner may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: The project owner shall submit records required by this condition that demonstrating compliance with the sulfur content and engine use limitations of conditions **AQ-33** and **AQ-35** in the Annual Compliance Report, including a photograph showing the annual reading of engine hours. The project owner shall make the site available for inspection of records by representatives of the District, ARB, and the Energy Commission.

AQ-37 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-38 This engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: The project owner shall make the site available for inspection of records and equipment by representatives of the District, ARB, and the Energy Commission.

AQ-39 This unit is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the requirements of the ATCM shall govern.

Verification: Not necessary.

AQ-40 This unit is subject to the requirements of the Federal National Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart III).

Verification: The project owner shall submit the engine specifications at least 30 days prior to purchasing the engines for review and approval demonstrating that the engines meet NSPS and ARB ATCM emission limit requirements at the time of engine purchase.

C.1.13 CONCLUSIONS

Staff has made the following conclusions about the Genesis Solar Energy Project:

- The proposed project would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse air quality impacts under NEPA. However, without adequate fugitive dust mitigation, the proposed project would have the potential to exceed the PSD emission levels for PM10 during construction, and could cause potential localized exceedances of the PM10 NAAQS during construction. Recommended Conditions of Certification **AQ-SC1** through **AQ-SC4** would adequately mitigate these potentially adverse impacts.
- The proposed project would comply with applicable District Rules and Regulations and staff recommends the inclusion of the District's PDOC conditions as Conditions of Certification **AQ-1** through **AQ-40**
- If left unmitigated, the proposed project's construction activities would likely contribute to significant CEQA adverse PM10 and ozone impacts. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate the potential impacts.
- The proposed project's operation would not cause new violations of any NO₂, SO₂, PM2.5 or CO ambient air quality standards. Therefore, the project-direct operational NO_x, SO_x, PM2.5 and CO emission impacts are not CEQA significant.
- The proposed project's direct and indirect, or secondary emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are likely CEQA significant if unmitigated. Therefore, staff recommends **AQ-SC6** to mitigate the onsite maintenance vehicle emissions and **AQ-SC7** to mitigate the operating fugitive dust emissions to ensure that the potential ozone and PM10 CEQA impacts are mitigated to less than significant over the life of the project.
- The proposed project would be consistent with the requirements of SB 1368 and the Emission Performance Standard for greenhouse gases (see **Appendix Air-1**).

C.1.14 REFERENCES

ARB 2009a (California Air Resources Board). California Ambient Air Quality Standards available on ARB Website. <http://www.arb.ca.gov/aqs/aqs.htm>.. Accessed 2009.

ARB 2009b (California Air Resources Board). Air Designation Maps available on ARB website. <http://www.arb.ca.gov/degis/adm/adm.htm>. Accessed 2009 and 2010.

ARB 2009c (California Air Resources Board). California Ambient Air Quality Data Statistics available on ARB website. <http://www.arb.ca.gov/adam/welcome.html>. Accessed 2009 and May 2010.

CCR 2006. California Code of Regulations, Chapter 3 (CEQA Guidelines), Article 17, §§15250—15253 as amended on July 11, 2006.

CEC 2009d – California Energy Commission/M. Monasmith (tn: 54067) Data Requests, Set1A (#1-227). 11/13/2009.

CEC 2010h - CEC / M. Layton (tn: 55781). Comments on Preliminary Determination of Compliance, dated 3/8/2010.

CEC 2010i - CEC (TN 56745). Energy Commission Staff Estimate for Construction & On-road Operation Emissions. Docketed for the Abengoa Mojave Solar Power Project (09-AFC-5). Submitted to Dockets 5/19/2010.

GSEP 2009a – Genesis Solar Energy Project/T. Bernhardt (tn: 53083) Application for Certification for the Genesis Solar Energy Project. 08/31/2009

GSEP 2009b – Carlsbad Energy Center Project. (tn: 53259) AFC – Air Quality Modeling Files. 9/16/2009

GSEP 2009c – Genesis Solar Energy Project/S. Busa (tn:53614) Data Adequacy Supplement . 10/13/2009

GSEP 2009f – Genesis Solar Energy Project/T. Bernhardt (tn: 54458) Data Responses Set 1A (# 1-227) for the Genesis Solar Energy Project. 12/14/2009

MDAQMD 2009 – Mojave Desert Air Quality Management District. MDAQMD CEQA and Federal Conformity Guidelines (Feb2009)
<http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=1806>

MDAQMD 2010a (Mojave Desert Air Quality Management District) - Preliminary Determination of Compliance (PDOC). Genesis Solar Energy Project. February 18, 2010.

SCAQMD 2009 – South Coast Air Quality Management District. Historical ambient air quality data. <http://www.aqmd.gov/smog/historicaldata.htm>. Accessed December 2009.

TTEC 2010h – Tetra Tech/T. Bernhardt (tn: 55138). Applicant's Revised Air Quality Responses to the CEC Data Requests. 02/01/2010.

TTEC 2010n – Tetra Tech/T. Bernhardt (tn: 56504). Applicant's Proposed Conditions of Certification for Other Resource Areas. 04/30/2010.

U.S.EPA 2009a - United States Environmental Protection Agency. The Green Book Nonattainment Areas for Criteria Pollutants.
<http://www.epa.gov/oar/oaqps/greenbk/index.html>. Accessed December 2009 and 2010.

U.S.EPA 2009b. - United States Environmental Protection Agency. AirData database ambient air quality data for Victorville and Palm Springs, California.
http://www.epa.gov/aqspubl1/annual_summary.html. Accessed December 2009 and May 2010.

WC (Weather Channel) 2009. Averages and records for Blythe, California. Website:
<http://www.weather.com>. Accessed December 2009.

WPAR 2009b – WorleyParsons Group. Cooling Study – 125 MW Solar Project. Confidential Report for NextEra Energy Resources – Genesis Solar Energy Project. August 2009.

ACRONYMS

AAQS	Ambient Air Quality Standard
ACC	Air Cooled Condenser
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
APCO	Air Pollution Control Officer
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ASOS	Automated Surface Observing Systems
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
bhp	brake horsepower
BLM	Bureau of Land Management
Btu	British Thermal Unit
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CPM	(CEC) Compliance Project Manager
DPM	Diesel Particulate Matter
Degrees F	Degrees Fahrenheit
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
GHG	Greenhouse Gas
GSEP	Genesis Solar Energy Project
H ₂ S	Hydrogen Sulfide

HTF	Heat Transfer Fluid
hp	horsepower
HSC	Health and Safety Code
lbs	Pounds
LORS	Laws, Ordinances, Regulations and Standards
LLC	Limited Liability Company
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
µg/m ³	microgram per cubic meter
mg/m ³	milligrams per cubic meter
MMBtu/hr	Million British Thermal Units per Hour
MW	Megawatts (1,000,000 Watts)
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Protection Act
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen or Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
O ₂	Oxygen
O ₃	Ozone
OLM	Ozone Limiting Method
PDOC	Preliminary Determination Of Compliance
PM	Particulate Matter
PM ₁₀	Particulate Matter less than 10 microns in diameter
PM _{2.5}	Particulate Matter less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PSD	Prevention of Significant Deterioration
PTC	Permit to Construct
PTO	Permit to Operate
RSA	Revised Staff Assessment (this document)
SA/DEIS	Staff Assessment/Draft Environmental Impact Statement
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District

scf	standard cubic feet
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SO ₄	Sulfate
SO _x	Oxides of Sulfur
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
tpy	tons per year
U.S.EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WC	Weather Channel

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APPENDIX AIR-1 - GREENHOUSE GAS EMISSIONS

Testimony of William Walters, P.E.

SUMMARY OF CONCLUSIONS

The Genesis Solar Energy Project (GSEP) is a proposed addition to the state's electricity system. GSEP is a solar concentrating thermal power plant, which would utilize parabolic trough solar thermal technology to solar heat a heat transfer fluid (HTF). This hot HTF would be used to generate steam in a solar steam generator. The proposed project is comprised of two solar plants, each of which would have 125-MW capacity, totaling 250 MW. As a solar project, GSEP would emit considerably less greenhouse gas (GHG) than the existing statewide average GHG emissions per unit of generation and would emit considerably less GHG emissions per unit of generation than existing fossil fuel fired power plants providing generation to California, and thus would contribute to continued reduction of GHG emissions in the interconnected California and the western United States electricity systems.

While GSEP would emit some GHG emissions, the contribution of GSEP to the system build-out of renewable resources to meet the goals of the Renewable Portfolio Standard (RPS) in California would result in a net cumulative reduction of energy generation and GHG emissions from new and existing fossil-fired electricity resources. Electricity is produced by operation of inter-connected generation resources. Operation of one power plant, like GSEP, affects all other power plants in the interconnected system. GSEP would be a must take facility and its operation would affect the overall electricity system operation and GHG emissions in several ways:

- GSEP would provide low-GHG, renewable generation.
- GSEP would facilitate to some degree the replacement high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet the State's 2006 Emissions Performance Standard.
- GSEP could facilitate to some extent the replacement of generation provided by aging fossil-fired power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff concludes that the proposed project would result in a cumulative overall reduction in GHG emissions from power plants, does not worsen current conditions, and would not result in impacts that are cumulatively CEQA significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new, low GHG-emitting power generating facility would be sufficiently reduced by "best practices" and would be more than offset by GHG emission reductions during operation. Thus, construction GHG emissions would not be CEQA significant.

The Genesis Solar Energy Project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance

Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

The California Air Resources Board (ARB) has promulgated regulations for mandatory GHG emission reporting to comply with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a). The Genesis Solar Energy Project, which solely generates electricity from solar power, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities [CCR Title 17 §95101(c)(1)]. However, the proposed project may be subject to future reporting requirements and GHG reductions or trading requirements as additional state or federal GHG regulations are developed and implemented.

INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. However, on April 2, 2007, the U.S. Supreme Court found that GHGs are pollutants that must be covered by the federal Clean Air Act. In response, on September 30, 2009, the U.S. Environmental Protection Agency proposed to apply Prevention of Significant Deterioration (PSD) requirements to facilities whose carbon dioxide-equivalent emissions exceed 25,000 tons per year (U.S.EPA 2009c). The rule making is not finalized, but the GHG emissions for GSEP are not expected to exceed this amount.

The state has demonstrated a clear willingness to address global climate change through research, adaptation and inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

Generation of electricity can produce greenhouse gases with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N₂O, not NO or NO₂, which are commonly known as NO_x or oxides of nitrogen), and methane (CH₄ – often from unburned natural gas). For solar energy generation projects the stationary source GHG emissions are much smaller than fossil fuel-fired power plants, but the associated maintenance vehicle emissions are higher. Other sources of GHG emissions include sulfur hexafluoride (SF₆) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO₂ emissions from carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high global warming potentials.

Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO₂E) metric tonnes (MT) for ease of comparison.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the proposed project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO ₂ equivalent emissions per year.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 MTCO ₂ /MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO ₂ /MWh).

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that “[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California” (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1).

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In 2003, the Energy Commission recommended that the state require reporting of greenhouse gases (GHG) or global climate change¹⁰ emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such

¹⁰ Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The term greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

reductions to be achieved by 2020.¹¹ To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from major sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The regulations must be effective by January 1, 2011 and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities with a nameplate capacity equal or greater than 1 megawatt (MW) capacity if their emissions exceed 2,500 metric tonnes per year. The due date for initial reports by existing facilities was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy), land use planning, and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a requirement for 33% of California's electrical energy to be provided from renewable sources by 2020 (implementing California's 33% RPS goal), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008b).

It is likely that GHG reductions mandated by ARB will not be uniform across emitting sectors, in that reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40 percent reduction in GHG from the electricity sector, even though that sector currently only produces about 25 percent of the state's GHG emissions. In response, in September 2008 the Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches, and identified regulation points should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addressed climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommended such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33 percent renewable portfolio standard. The Energy Commission's *2009 Integrated*

¹¹ Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

Energy Policy Report continues to emphasize the importance of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as backing out use of once-through cooling in coastal California power plants (CEC 2009d).

SB 1368¹², enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard of 0.500 metric tonnes CO₂ per megawatt-hour¹³ (1,100 pounds CO₂/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.¹⁴ If a project, in-state or out of state, plans to sell base load electricity to a California utility that utility will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that operate at a capacity factor higher than 60 percent. As a renewable electricity generating facility, GSEP is determined by rule to be compliant with the SB 1368 EPS.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services¹⁵ include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

¹² Public Utilities Code § 8340 et seq.

¹³ The Emission Performance Standard only applies to carbon dioxide, and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.

¹⁴ See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

¹⁵ See page CEC 2009b, page 95.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. The generation of electricity using fossil fuels, even in a back-up generator at a thermal solar plant, produces air emissions known as greenhouse gases in addition to the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. Greenhouse gas emissions contribute to the warming of the earth's atmosphere, leading to climate change.

PROJECT CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. The construction would last approximately 37 months. The greenhouse gas emissions estimate, for the entire construction period, provided by the applicant¹⁶ is below in **Greenhouse Gas Table 2**.

Greenhouse Gas Table 2
Estimated GSEP Potential Construction Greenhouse Gas Emissions

	CO ₂ -Equivalent (MTCO ₂ E) ^{a,b}
Onsite Equipment	24,094
Gas Pipeline Equipment	1,544
Access Road Equipment	564
Transmission Line Equipment	1,185
Delivery Vehicles	3,520
Construction Worker Vehicles	22,067
Entire Construction Period Total	52,974

Source: TTEC 2010h, Table 2 and Table K.5-5.

^a One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms

^b The vast majority of the CO₂E emissions, over 99 percent, is CO₂ from construction combustion sources.

PROJECT OPERATIONS

Operations GHG emissions, for both units, are shown in **Greenhouse Gas Table 3**. Operation of the GSEP would cause GHG emissions from the auxiliary boilers, fire water pump engines, emergency generator engines, maintenance fleet and employee trips, and sulfur hexafluoride emissions from new electrical component equipment.

¹⁶ As noted in the Air Quality Section staff may be re-estimating certain construction emissions which would revise some of the values in **Greenhouse Gas Table 2**. If so, staff will provide a revised construction GHG emission estimate as part of a Staff Assessment Addendum.

Greenhouse Gas Table 3
Estimated GSEP Potential Operating Greenhouse Gas Emissions

	Annual CO ₂ -Equivalent (MTCO ₂ E) ^a
Auxiliary Boilers ^b	3,520
Emergency Generators ^b	83.9
Fire Pumps ^b	17.5
Maintenance Vehicles ^b	194.1
Delivery Vehicles ^b	42
Employee Vehicles ^b	272.3
Equipment Leakage (SF ₆)	3.4
Total Project GHG Emissions – MTCO₂E^b	4,133
Facility MWh per year	600,000
Facility GHG Emission Rate (MTCO ₂ E/MWh)	0.007

Sources: GSEP 2009f, DR 34; TTEC 2010h, p. 22 to 25.

^a One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.

^b The vast majority of the CO₂E emissions, over 99 percent, is CO₂ from these emission sources.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. All emissions are converted to CO₂-equivalent and totaled. Electricity generation GHG emissions are generally dominated by CO₂ emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For this solar project the primary fuel, solar energy, is greenhouse gas free, but there is natural gas used in the two auxiliary boilers used for morning startup and HTF freeze protection, and gasoline and diesel fuel use in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, the two emergency fire water pump engines, and two emergency generator engines. Another GHG emission source for this proposed project is SF₆ from electrical equipment leakage.

The proposed project is estimated to emit, directly from primary and secondary emission sources on an annual basis, over 4,000 metric tonnes of CO₂-equivalent GHG emissions per year. GSEP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, GSEP has an estimated GHG emission rate of 0.007 MTCO₂E/MWh, well below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO₂/MWh.

Solar Project Energy Payback Time

The beneficial energy and greenhouse gas impacts of renewable energy projects can also be measured by the *energy payback time*¹⁷. **Greenhouse Gas Tables 2 and 3** provide an estimate of the onsite construction and operation emissions, employee transportation emissions, and the final segment of offsite materials and consumables transportation. However, there are additional direct transportation and indirect manufacturing GHG emissions associated with the construction and operation of the

¹⁷ The energy payback time is the time required to produce an amount of energy as great as what was consumed during production, which in the context of a solar power plant includes all of the energy required during construction and operation.

proposed project, which are all considered in the determination of the energy payback time. A document sponsored by Greenpeace estimates that the energy payback time for concentrating solar power plants, such as GSEP, to be on the order of 5 months (Greenpeace 2005, Page 9); and the project life for GSEP is on the order of 30 years. Therefore, the proposed project's GHG emissions reduction potential from energy displacement would be substantial¹⁸.

Natural Carbon Uptake Reduction

This proposed project would cause the clearing of land and removal of vegetation, which would reduce the ongoing natural carbon uptake by vegetation. A study of the Mojave Desert indicated that the desert may uptake carbon in amounts as high as 100 grams per square meter per year (Wohlfahrt et. al. 2008). This would equate to a maximum reduction in carbon uptake, calculated as CO₂, of 1.48 MT of CO₂ per acre per year for areas with complete vegetation removal. For this 1,887 acre proposed project, which does require the complete removal of vegetation over most of the project site, the maximum equivalent loss in carbon uptake would be 2,793 MT of CO₂ per year, which would correspond to 0.005 MT of CO₂ per MW generated. Therefore, the natural carbon uptake loss is negligible in comparison with the reduction in fossil fuel CO₂ emissions, which can range from 0.35 to 1.0 MT of CO₂ per MW depending on the fuel and technology, that is enabled by this proposed project.

CLOSURE AND DECOMMISSIONING

Closure and decommissioning, as a one-time limited duration event, would have emissions that are similar in type and magnitude, but likely lower than, the construction emissions as discussed above.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses four kinds of impacts: construction, operation, closure and decommissioning, and cumulative effects. As the name implies, construction impacts result from the emissions occurring during the construction of the proposed project. The operation impacts result from the emissions of the proposed project during operation. Cumulative impacts analysis assesses the impacts that result from the proposed project's incremental effect viewed over time. The impact of GHG emissions caused by this solar facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on non-fossil and fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the Energy Commission's adopted order initiating an informational (OII) proceeding (08-GHG OII-1) (CEC 2009a), staff is refining and implementing the concept of a "blueprint" that describes the long-term roles (i.e., retirements and displacement) of

¹⁸ The GHG displacement for the project would be similar to, but not exactly the same as, the amount of energy produced after energy payback is achieved multiplied by the average GHG emissions per unit of energy displaced. The average GHG emissions for the displaced energy over the project life is not known but currently fossil fuel fired power plants have GHG emissions that range from 0.35 MT/MWh CO₂E for the most efficient combined cycle gas turbine power plants to over 1.0 MT/MWh for coal fired power plants.

fossil-fueled power plants in California's electricity system as we move to a high-renewable, low-GHG electricity system, which will include projects like GSEP.

PROPOSED PROJECT

Construction Impacts

Staff concludes that the GHG emission increases from construction activities would not be CEQA significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the proposed project. Second, best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. And lastly, these temporary GHG emissions are necessary to create this renewable energy source that would provide power with a very low GHG emissions profile, and the construction emissions would be more than offset by the reduction in fossil fuel fired generation that would be enabled by this proposed project. If the project construction emissions were distributed over the estimated 30 year life of the proposed project they would only increase the project life time annual facility GHG emissions rate by 0.0029 MT CO₂E per MWh.

Direct/Indirect Operation Impacts and Mitigation

The proposed Genesis Solar Energy Project promotes the state's efforts to move towards a high-renewable, low-GHG electricity system, and, therefore, reduces both the amount of natural gas used by electricity generation and greenhouse gas emissions.

Net GHG emissions for the integrated electric system will decline when new renewable power plants are added to: 1) move renewable generation towards the 33 percent target; 2) improve the overall efficiency, or GHG emission rate, of the electric system; or 3) serve load growth or capacity needs more efficiently, or with fewer GHG emissions.

The Role of GSEP in Renewables Goals/Load Growth

As California moves towards an increased reliance on renewable energy by implementing the Renewables Portfolio Standard (RPS), non-renewable energy resources will be displaced. These reductions in non-renewable energy, shown in **Greenhouse Gas Table 4**, are targeted to be as much as 36,500 GWh. These assumptions are conservative in that the forecasted growth in electricity retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the current retail sales forecast¹⁹. Energy Commission staff estimates that as much as 18,000 GWh of additional savings due to

¹⁹ Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC 2009c).

uncommitted energy efficiency programs may be forthcoming.²⁰ This would reduce non-renewable energy needs by a further 12,000 GWh given a 33 percent RPS.

Greenhouse Gas Table 4
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008-2020

California Electricity Supply	Annual GWh	
Statewide Retail Sales, 2008, actual ^a	264,794	
Statewide Retail Sales, 2020, forecast ^a	289,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load ^b	29,840	
California Renewable Electricity	GWh @ 20% RPS	GWh @ 33% RPS
Renewable Energy Requirements, 2020 ^c	57,939	95,600
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy-2008 to 2020	28,765	66,426
Resulting Change in Non-Renewable Energy	176	(36,586)

Source: Energy Commission staff 2010.

Notes:

- a. 2009 IPER Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
- b. 2009 IEPR Demand Forecast, Form 1.5a.
- c. RPS requirements are a percentage of retail sales.

The Role of GSEP in Retirements/Replacements

Genesis Solar Energy Project would be capable of annually providing 600 GWh of renewable generation energy to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require substantial capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

Replacement of High GHG-Emitting Generation

High GHG -emitting resources, such as coal, are effectively prohibited from entering into new long-term contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these contracts are presented in **Greenhouse Gas Table 5**.

²⁰ See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25 percent to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

Greenhouse Gas Table 5
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility ^a	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual. Facilities ^a	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 ^b
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 ^c	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
TOTAL			18,522

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

Notes:

- a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
- b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
- c. Contract not subject to Emission Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder²¹, all the coal contracts (including those in **Greenhouse Gas Table 5**, which expire by 2020 and, other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may be unlikely to contract with California utilities for baseload energy due to the SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation such as this proposed project; some will come from new and existing natural gas fired generation. All of these new facilities will have substantially lower GHG emissions rates than coal and petroleum coke-fired facilities which typically averages about 1.0 MTCO₂/MWh without carbon capture and sequestration. Thus, new renewable facilities will result in a net reduction in GHG emissions from the California electricity sector.

Retirement of Generation Using Once-Through Cooling

The State Water Resource Control Board (SWRCB) has proposed major changes to once-through cooling (OTC) units, shown in **Greenhouse Gas Table 6**, which would likely require extensive capital to retrofit, or retirement, or substantial curtailment of dozens of generating units. In 2008, these units collectively produced almost 58,000 GWh. While the more recently built OTC facilities may well install dry or wet cooling towers and continue to operate, the aging OTC plants are not likely to be retrofit to use

²¹ A carbon adder or carbon tax is a specific value added to the cost of a project for per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

dry or wet cooling towers without the power generation also being retrofit or replaced to use a more efficient and lower GHG emitting combined cycle gas turbine technology. Most of these existing OTC units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would displace the energy provided by OTC facilities and likely accelerate their retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 6** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

New renewable generation resources will emit substantially less GHG emissions on average than other energy generation sources. Existing aging and OTC natural gas facility generation typically averages 0.6 to 0.7 MTCO₂/MWh, which is much less efficient, higher GHG emitting, than a renewable energy project like GSEP. A project like GSEP, located far from the coastal load pockets like the Los Angeles Local Reliability Area (LRA), would more likely provide energy support to facilitate the retirement of some aging and/or OTC power plants, but would not likely provide any local capacity support at or near the coastal OTC units. Regardless, due to its low greenhouse gas emissions, GSEP would serve to reduce GHG emissions from the electricity sector.

Closure and Decommissioning

Eventually the facility would close, either at the end of its useful life or due to some unexpected situation such as a natural disaster or catastrophic facility breakdown. When the facility closes, all sources of air emissions would cease to operate and thus impacts associated with those greenhouse gas emissions would no longer occur. The only other expected, albeit temporary, GHG emissions would be equipment exhaust (off-road and on-road) from dismantling activities. These activities would be of much a shorter duration than construction of the proposed project, equipment used to dismantle the facility are assumed to have lower comparative GHG emissions due to technology advancement, and would be required to be controlled in a manner at least equivalent to that required during construction. It is assumed that the beneficial GHG impacts of this facility, displacement of fossil fuel fired generation, would be replaced by the construction of newer more efficiency renewable energy or other low GHG generating technology facilities. Also, the recycling of the facility components (steel, concrete, etc.) could indirectly reduce GHG emissions from decommissioning activities. Therefore, while there would be temporary adverse greenhouse gas CEQA impacts during decommissioning they are determined to be less than significant.

Greenhouse Gas Table 6
Aging and Once-Through Cooling Units: 2008 Capacity and Energy Output ^a

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Emission Rate (MTCO ₂ /MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 ^b	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 ^b	Utility	None	Yes	132	238	0.814
Grayson 3-5 ^b	Utility	LADWP	Yes	108	150	0.799
Grayson CC ^b	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 ^a	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 ^b	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				7,776	39,988	0.693
Alamitos 1-6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	160	0.615
Coolwater 1-4 ^b	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 ^b	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				15,254	17,828	0.605
Total In-State OTC				23,030	57,817	

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation.

b. Units are aging but are not OTC.

REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would essentially be Unit 1 of the proposed project, and would be a 125 MW solar facility located within the boundaries of the proposed project as defined by NextEra. This alternative is analyzed for two major reasons: (1) it eliminates about 50 percent of the proposed project area so all impacts are reduced, and (2) by removing the eastern solar field, it would reduce the water required for cooling by 50 percent. The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 1**.

This alternative is located entirely within the boundaries of the proposed project. It simply eliminates effects to the eastern 125 MW solar field and relocates the gas yard approximately 1.75 miles northwest of its present location. As a result, the environmental setting consists of the western portion of the proposed project, as well as the area affected by the linear project components.

The Reduced Acreage Alternative would reduce the total construction and operation GHG emissions of the proposed project (see **Greenhouse Gas Tables 2 and 3**) by somewhat less than 50 percent, due to lower efficiencies of the somewhat smaller project size.

The results of the Reduced Acreage Alternative would be the following:

- The impacts of the proposed project would not occur on the lands not used due to the smaller project size. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would be reduced. Both State and Federal law support the increased use of renewable power generation.

If the Reduced Acreage Alternative were approved, other renewable projects may be developed that would compensate for the loss of generation compared to the proposed project on other sites in the Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.

DRY COOLING ALTERNATIVE

This section identifies the potential impacts of using air-cooled condenser (ACC) systems rather than the cooling towers proposed by NextEra for the Genesis project. It is assumed that the ACC systems would be located where the cooling towers are currently proposed for each of the two 125 MW power block, as illustrated in **Alternatives Figure 2** (see Section B.3). This alternative is analyzed because it would reduce the amount of water required for steam turbine cooling from 822 acre-feet per year (AFY) to 66 AFY. This reduction in water use would reduce impacts to water and biological resources.

The Dry Cooling Alternative would minimally impact the direct construction and operation GHG emissions of the proposed project. The construction of the ACC versus the construction of the cooling tower could very slightly increase construction GHG emissions from that of the proposed project shown in **Greenhouse Gas Table 2**. The use of the ACC could require an increase in auxiliary boiler use during daily plant startup increasing the direct GHG emissions from that of the proposed project shown in **Greenhouse Gas Table 3**, and the reduction in steam cycle efficiency would reduce total project generation by a minor amount. This would increase the direct project GHG emissions per net MWh of generation, as shown in **Greenhouse Gas Table 3**, by the same amount and reduce the indirect GHG emission reductions caused by the project

by the same amount. However, this is not that substantial an increase compared to the GHG emissions from the fossil fuel-fired power plant generation that the project would displace and would not change the overall GHG emission findings.

The results of the Dry Cooling Alternative would be the following:

- Direct GHG emissions similar to or slightly higher than the proposed project would occur.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would be slightly reduced due to a reduction in steam cycle efficiency. Both State and Federal law support the increased use of renewable power generation.

NO ACTION ALTERNATIVES

No Action On Proposed Project Application And On CDCA Land Use Plan Amendment

Under this alternative, the proposed project would not be approved by the CEC and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

The results of this alternative would be the following:

- The impacts of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another renewable energy project.
- The benefits of the proposed project in displacing fossil fuel fired generation and reducing associated greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If the proposed project is not approved, renewable projects would likely be developed on other sites in Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates. For example, there are several pending solar and wind projects near the project area along the I-10 corridor including two thermal solar projects, the Palen Solar Power Project and Blythe Solar Power Project siting cases, which are currently being evaluated by the Energy Commission and BLM. Additionally, there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

No Action On Proposed Project And Amend The CDCA Land Use Plan To Make The Area Available For Future Solar Development

Under this alternative, the proposed project would not be approved by the CEC and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow

for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions would result from the construction and operation of the solar technology and would likely be similar to the GHG emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance; however, it is expected that all the technologies would provide the more significant benefit, like the proposed project, of displacing fossil fuel fired generation and reducing associated GHG emissions. As such, this No Project/No Action Alternative could result in GHG benefits similar to those of the proposed project.

No Action On Proposed Project Application And Amend The CDCA Land Use Plan To Make The Area Unavailable For Future Solar Development

Under this alternative, the proposed project would not be approved by the CEC and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the greenhouse gas emissions from the site, including carbon uptake, is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in the GHG benefits from the proposed project. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

CUMULATIVE IMPACTS

Cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts” (CEQA Guidelines § 15355). “A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts” (CEQA Guidelines § 15130[a][1]). Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

This entire assessment is a cumulative impact assessment. The proposed project alone would not be sufficient to change global climate, but would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The Genesis Solar Energy Project, as a solar energy generation project, is exempt from the mandatory GHG emission reporting requirements for electricity generating facilities as currently required by the California Air Resources Board (ARB) for compliance with the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.) (ARB 2008a).

The GSEP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

Since the proposed project would have emissions that are below 25,000 MT/year of CO₂E, the proposed project would not be subject to federal mandatory reporting of greenhouse gases. It would also be exempt from the state's greenhouse gas reporting requirements.

NOTEWORTHY PUBLIC BENEFITS

Greenhouse gas related noteworthy public benefits include the construction of renewable and low-GHG emitting generation technologies and the potential for successful integration into the California and greater WECC electricity systems. Additionally, the GSEP project would contribute to meeting the state's AB 32 goals.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

There have been no agency or public comments received on staff's greenhouse gas section.

CONCLUSIONS

The Genesis Solar Energy Project would emit considerably less greenhouse gases (GHG) than existing power plants and most other generation technologies, and thus would contribute to continued improvement of the overall western United States, and specifically California, electricity system GHG emission rate average. The proposed project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff concludes that the proposed project's operation would result in a cumulative overall reduction in GHG emissions from the state's power plants that would create beneficial impacts, would not worsen current conditions, and would thus not result in CEQA impacts that are cumulatively significant or result in adverse impacts under NEPA.

Staff concludes that the GHG emission increases typical from construction and decommissioning activities would not be CEQA significant for several reasons. First, the periods of construction and decommissioning would be short-term and not ongoing

during the life of the proposed project. Second, the best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment would increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Finally, the construction and decommissioning emissions are miniscule when compared to the reduction in fossil-fuel power plant greenhouse gas emissions during project operation. For all these reasons, staff would conclude that the short-term emission of greenhouse gases during construction would be sufficiently reduced and would be offset during proposed project operations and would, therefore, not be CEQA significant.

The GSEP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]).

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to project greenhouse gas emissions are proposed because the proposed project would create beneficial GHG impacts. The project owner would have to comply with any future applicable GHG regulations formulated by the ARB or the U.S.EPA, such as GHG reporting or emissions cap and trade markets.

REFERENCES

ARB 2006 – Air Resources Board. AB 32 Fact Sheets, California Global Warming Solutions Act of 2006 and Timeline. www.arb.ca.gov/cc/cc.htm. September 2006.

ARB 2008a – Air Resources Board. Instructional Guidance for Mandatory GHG Emissions Reporting. <http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep-guid/ghg-rep-guid.htm>. December 2008

ARB 2008b – California Air Resource Board. Climate Change, Proposed Scoping Plan a Framework for Change, Pursuant to AB 32. Released October 2008, approved December 2008.
<<http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>>.

CalEPA 2006 – California Environmental Protection Agency. Climate Action Team Report to Governor Schwarzenegger and the Legislature. March, 2006.
http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF

- CEC 1998 – California Energy Commission. 1997 Global Climate Change, Greenhouse Gas Emissions Reduction Strategies for California, Volume 2, Staff Report. 1998. <http://www.climatechange.ca.gov/publications/97GLOBALVOL2.PDF>
- CEC 2003 – California Energy Commission. 2003 Integrated Energy Policy Report. December 2003. <http://www.energy.ca.gov/reports/100-03-019F.PDF>
- CEC 2007 – California Energy Commission. 2007 Integrated Energy Policy Report – Scenario Analysis of California’s Electricity System. http://www.energy.ca.gov/2007_energy policy/documents/index.html. 2007.
- CEC 2009a – California Energy Commission. Committee Report (08-GHG OII-01). Committee Guidance On Fulfilling California Environmental Quality Act Responsibilities For Greenhouse Gas Impacts In Power Plant Siting Applications. March 2009. http://www.energy.ca.gov/ghg_powerplants/documents/index.html.
- CEC 2009b – California Energy Commission. Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California, CEC-700-2009-009, MRW and Associates. May 27, 2009. <http://www.energy.ca.gov/2009publications/CEC-700-2009-009/CEC-700-2009-009.PDF>
- CEC 2009c – California Energy Commission, California Energy Demand 2010-2020 Adopted Forecast. December 2009. <http://www.energy.ca.gov/2009publications/CEC-200-2009-012/CEC-200-2009-012-CMF.PDF>
- CEC 2009d – California Energy Commission, 2009 Integrated Energy Policy Report. December 16, 2009. <http://www.energy.ca.gov/2009publications/CEC-100-2009-003/CEC-100-2009-003-CMF.PDF>
- CEC 2010 – California Energy Commission, Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast (CEC-200-2010-001-D, January, 2010), <http://www.energy.ca.gov/2010publications/CEC-200-2010-001/index.html>
- CPUC 2008 – California Public Utilities Commission. Final Opinion on Greenhouse Gas Regulatory Strategies, Joint Agency proposed final opinion, publication # CEC-100-2008-007-D. Posted: September 12, 2008. <http://www.energy.ca.gov/2008publications/CEC-100-2008-007/CEC-100-2008-007-D.PDF>
- Greenpeace 2005. Concentrated Solar Thermal Power – Now! Authors: Rainer Aringhoff and Georg Brakmann ESTIA, Dr. Michael Geyer (IEA SolarPACES), and Sven Teske Greenpeace International. September 2005. <http://www.greenpeace.org/raw/content/international/press/reports/Concentrated-Solar-Thermal-Power.pdf>.

GSEP 2009a – Genesis Solar Energy Project/T. Bernhardt (tn: 53083). Application for Certification for the Genesis Solar Energy Project. 08/31/2009.

GSEP 2009f – Genesis Solar Energy Project/T. Bernhardt (tn: 54458) Data Responses Set 1A (# 1-227) for the Genesis Solar Energy Project. 12/14/2009

TTEC 2010h – Tetra Tech/T. Bernhardt (tn: 55138). Applicant's Revised Air Quality Responses to the CEC Data Requests. 02/01/2010

U.S.EPA 2009c. - United States Environmental Protection Agency. Fact Sheet -- Proposed Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule. September 30, 2009.

Wohlfahrt. et. al. 2008. Georg Wohlfahrt, Lynn F. Fenstermaker, and John A. Arnone III. Large annual net ecosystem CO₂ uptake of a Mojave Desert ecosystem. Global Change Biology, 2008 (14).

ACRONYMS

ARB	California Air Resources Board
CalEPA	California Environmental Protection Agency
CEE	California Energy Commissions
CEQA	California Environmental Quality Act
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ E	Carbon Dioxide Equivalent
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report
EPS	Emission Performance Standard
GCC	Global Climate Change
GHG	Green House Gas
GSEP	Genesis Solar Energy Project
GWh	Gigawatt-hour
HFC	Hydrofluorocarbons
IEPR	Integrated Energy Policy Report
IGCC	Integrated Gasification Combined Cycle
LADWP	Los Angeles Department of Water and Power
LRAs	Local Reliability Areas
MT	Metric tonnes
MW	Megawatts
MWh	Megawatts-hour
N ₂ O	Nitrous Oxide
NO	Nitric Oxide
NO ₂	Nitrogen Dioxide
NO ₃	Nitrates
NO _x	Oxides of Nitrogen or Nitrogen Oxides
OII	Order Initiating an Informational
OTC	Once-Through Cooling
PFC	Perfluorocarbons
PSD	Prevention of Significant Deterioration
QFER	Quarterly Fuel and Energy Report
RPS	Renewables Portfolio Standard
SB	Senate Bill
SCE	Southern California Edison

SF ₆	Sulfur hexafluoride
SWRCB	State Water Resource Control Board
WECC	Western Electricity Coordinating Council

C.2 - BIOLOGICAL RESOURCES

Testimony of Heather Blair, Carolyn Chainey-Davis, Amy Golden, Sara Keeler, Mark Massar and Susan Sanders

C.2.1 SUMMARY OF CONCLUSIONS

Overview of Impacts to Biological Resources

The Genesis Solar Energy Project (Genesis Project or Project) would have significant impacts to biological resources, eliminating all of the Sonoran creosote bush scrub and other native plant and wildlife communities within the approximately 1,880-acre site, including 91 acres of desert washes. Without mitigation the Genesis Project would contribute to the cumulatively significant loss of biological resources within the Chuckwalla Valley and the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) area. Staff recommends avoidance and minimization measures as well as compensatory mitigation to offset direct, indirect, and cumulative impacts to desert tortoise and other special-status species, and to assure compliance with state and federal laws such as the federal and state endangered species acts and regulations protecting waters of the state. With implementation of staff's proposed conditions of certification, Project impacts to biological resources would be reduced to less than significant levels.

Mitigation for Desert Tortoise

The measures in staff's proposed Conditions of Certification **BIO-9** through **BIO-11** would avoid and minimize potential take of desert tortoise during Project construction and operation. To offset the loss of desert tortoise habitat, staff's proposed Condition of Certification **BIO-12** recommends habitat compensation at a 1:1 ratio for desert tortoise 1,749 acres (i.e., acquisition and preservation of one acre of compensation lands for every acre lost). For Project impacts to 23 acres within the Chuckwalla Desert Tortoise Critical Habitat Unit, the mitigation ratio would be 5:1. This compensatory mitigation is consistent with recommendations from the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and BLM guidance in the NECO. Staff's proposed Condition of Certification **BIO-12** also requires that the land acquisitions be within the Colorado Desert Recovery Unit, and have potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise populations and designated critical habitat. These conditions satisfy the California Department of Fish and Game's requirements under Section 2081 of the California Fish and Game Code. To address Project-related increases in ravens, a desert tortoise predator, staff's proposed Condition of Certification **BIO-13** requires implementation of a Raven Monitoring, Management and Control Plan, as well as contributions to the USFWS Regional Raven Management Program.

Impacts to Mojave Fringe-toed Lizards

The Genesis Project would directly impact 38 acres of Mojave fringe-toed lizard habitat (including 1 acre of dunes and 37 acres of playa with sand drifts) and indirectly affect 151 acres of habitat downwind of the Project Disturbance Area. The indirect impact results from the Project solar arrays extending into the sand transport corridor,

diminishing the input of sand to downwind areas and reducing the active sand layer that is crucial to Mojave fringe-toed lizard habitat. The Mojave fringe-toed lizards in the Chuckwalla Valley are at the southernmost portion of the species range, and the proposed Project could increase the risks of local extirpation of an already fragmented and isolated population. Staff's proposed Condition of Certification **BIO-20** recommends acquisition and protection of habitat supporting core populations of Mojave fringe-toed lizard habitat in the Chuckwalla Valley, which would reduce Project impacts to less than significant levels.

Ephemeral Drainages

The Project would directly impact 91 acres of state jurisdictional waters, including 16 acres of microphyllous riparian vegetation, eliminating the hydrological, biogeochemical, vegetation, and wildlife functions of this network of ephemeral drainages. As many as 21 acres of ephemeral drainages downstream of the Project area could also be indirectly impacted by changes in upstream hydrology. Staff considers the direct, indirect, and cumulative impacts to ephemeral drainages to be significant. The measures in staff's proposed Condition of Certification **BIO-22** would minimize and offset direct and indirect impacts to state waters to less than significant levels and would assure compliance with CDFG codes that provide protection to these state waters. These measures include acquisition and enhancement of 132 acres of ephemeral dry washes within the Chuckwalla-Ford Dry Lake watershed, as well as avoidance and minimization measures to protect drainages near the Project site.

Special-Status Plants

No federal or state-listed plant species occur within the Project Disturbance Area but four species of special-status plants were detected within the Study area during spring 2009 and 2010 surveys, including Harwood's milk-vetch, desert unicorn, and ribbed cryptantha. Harwood's eriastrum, a California endemic and BLM Sensitive species, was detected at the Colorado River Substation site and Project linears east of the site during the 2010 spring surveys by Solar Millennium (AECOM 2010d). Harwood's eriastrum has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations, several of which are historic records that have not been verified. Staff concludes that the Project's direct, indirect, and cumulative impacts to Harwood's eriastrum and Harwood's milk-vetch are significant, but impacts to ribbed cryptantha are not. While the direct effects of the Project on desert unicorn are minor, the impacts of all future projects in the NECO planning area are cumulatively considerable. The avoidance, minimization and compensation measures described in Condition of Certification **BIO-19** (Special-Status Plant Mitigation) would minimize the impacts to Harwood's eriastrum and Harwood's milk-vetch to a level less than significant, and would reduce the Project's contribution to cumulative effects to special-status plants to a level less than considerable.

Abram's spurge, flat-seeded spurge, lobed ground cherry, have moderate to high potential to occur within the Project site. They were not detected during spring 2009 and 2010 botanical surveys but may have been missed because they are late season plants that cannot be detected during routine spring surveys. Project construction and operation could result in direct and indirect impacts to late season special-status plants, if present, and impacts to these and other species may be significant. **BIO-19** includes a

requirement to conduct late-season surveys in summer-fall 2010. Specific triggers and detailed performance standards for mitigation of impacts are included in **BIO-19** to ensure that impacts to any special-status plants found during the late season surveys are mitigated to a level less than significant.

Impacts to Groundwater Dependent Vegetation Communities

The proposed Project's groundwater pumping would have an impact on groundwater levels within the zone of potential effect centered on the Project's pumping well. Considerable uncertainty remains as to the potential extent of the Project's impacts to groundwater and the potential adverse effects to groundwater dependent sensitive plant communities and to wildlife. To ensure that the Project's proposed use of groundwater does not lower groundwater levels in the basin so that biological resources are significantly and adversely affected, staff has proposed that the Applicant develop a vegetation monitoring program and identify what changes are occurring in basin water levels and in groundwater-dependent vegetation. Substantial changes in the vigor of groundwater-dependent vegetation would be monitored and documented under the Vegetation Monitoring and Reporting Plan outlined in staff's proposed Condition of Certification **BIO-25**. Condition of Certification **BIO-26** specifies remedial action to be taken if adverse effects are detected. These measures would be sufficient to ensure that the groundwater pumping for the Project would not result in significant adverse impacts to groundwater-dependent ecosystems in the Chuckwalla Basin.

Migratory Birds/Burrowing Mammals

Sonoran creosote bush scrub and ephemeral drainages within the Project Area provide foraging, cover, and/or breeding habitat for migratory birds, including a number of special-status bird species potentially occurring at the site (including loggerhead shrike, western burrowing owl, and California horned lark). Implementation of staff's proposed Conditions of Certification **BIO-8** (Impact Avoidance and Best Management Practices), **BIO-15** (Pre-Construction Nest Surveys), and **BIO-16** (Avian Protection Plan) would avoid these potentially significant impacts to nesting birds. Potential impacts to burrowing owls would be further mitigated by implementation of staff's proposed Condition of Certification **BIO-18**. This condition involves impact avoidance and minimization measures and passive relocation of burrowing owls

American badgers and desert kit foxes occur throughout the Project area, and construction activities could crush or entomb these burrowing species. Staff's proposed Condition of Certification **BIO-17**, which requires preconstruction surveys and avoidance measures to protect badgers and kit foxes, would avoid these potential impacts.

Impacts and Mitigation for Golden Eagles

Surveys were conducted in spring 2010 for golden eagle territories within 10 miles of the Project boundaries, but survey results were not available at the time of publication of the Revised Staff Assessment. In the absence of survey information, staff analyzed the potential impacts to nesting golden eagles using the conservative assumption that nests might occur close enough to Project boundaries to be disturbed by construction activities. Staff's proposed Condition of Certification **BIO-28**, implementation of a golden eagle monitoring and management program, would mitigate potential impacts to golden

eagles from construction to less than significant levels. Staff also concluded that the Project would contribute to the cumulative loss of golden eagle foraging habitat, but staff's proposed Condition of Certification **BIO-12** would compensate for the Project's contribution to the cumulative loss of golden eagle foraging habitat.

Alternatives

Staff analyzed two alternatives to the Proposed Project other than the No Project Alternative, the Reduced Acreage Alternative and the Dry Cooling Alternative. Staff considers direct, indirect, and cumulative impacts from the Proposed Project and both alternatives to be similar (aside from differences in impact acreage) for most biological resources, including impacts to desert tortoise habitat, Couch's spadefoot toad, microphyll woodland, and migratory birds. While impacts from the Reduced Acreage Alternative are substantially less to Mojave fringe-toed lizard habitat and desert washes, these impacts would still be considered significant under this alternative as well as under the Proposed Project and Dry Cooling Alternative.

Cumulative Effects

Construction and operation of the Genesis Project will have effects on a number of biological resources that are individually limited but cumulatively considerable. In conducting the cumulative effects analysis, staff employed a quantitative, GIS-based analysis of direct impacts to habitat, and a qualitative analysis of indirect effects. Geographic scope varied between biological resources, but most analyses were based on the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries. Staff identified significant cumulative effects to: desert washes in the Chuckwalla-Ford Dry Lake watershed and the broader NECO planning area; desert tortoise habitat; golden eagle foraging habitat; Mojave fringe toed lizard and their habitat; habitat for American badger, desert kit fox, and burrowing owl; Le Conte's thrasher habitat; Couch's spadefoot toad range; habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants; wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe toed lizard, dunes, and playa); Mojave and Sonoran creosote bush scrub; desert dry wash woodland; playa and sand drifts over playa, and dunes. Implementation of staff's proposed conditions of certification would reduce the Project's contribution to cumulative effects to a level that is not cumulatively considerable.

C.2.2 INTRODUCTION

This section of the Revised Staff Assessment (RSA) provides the California Energy Commission staff analysis of potential impacts to biological resources from the construction and operation of the Genesis Project. This analysis describes the biological resources at the proposed Project site and addresses potential impacts to special-status species, sensitive natural communities, and other significant biological resources. This section discusses the need for mitigation, evaluates the adequacy of mitigation proposed by the Applicant, and specifies additional mitigation measures designed to reduce impacts. It also describes compliance with applicable laws, ordinances, regulations, and standards (LORS) and recommends staff's proposed conditions of certification.

This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (GSEP 2009a); Data Adequacy Supplement (GSEP 2009c) and Data Adequacy Supplement 1A (GSEP 2009d); responses to staff data requests (GSEP 2009f, TTEC 2010f); staff workshops held on November 23 and 24, December 18 and 31, 2009 and January 6, 11, and 12, February 10 and 18, 2010, April 19, 20, and 21 and May 5, 2010; site visits by staff on October 27, 2009, December 10, 2009, January 12 and February 25, 2010; the Applicant's December 2009 Notification of a Lake or Streambed Alteration (TTEC 2009d) revisions to the Notification of a Lake or Streambed Alteration (TTEC 2010j, TTEC 2010l); the applicant's *Aeolian Transport Evaluation and Ancient Shoreline Delineation Report for the GSEP* (Worley Parsons 2010c); the applicant's *Interim Preliminary Aeolian Sand Source, Migration and Deposition Letter Report for GSEP* (Worley Parsons 2010d); PWA's Geomorphic Assessment of the Genesis Solar Project Site (**Soil and Water Appendix A**; PWA 2010a); the Applicant's *Incidental Take of Threatened and Endangered Species Permit Application* (TTEC 2009c); the Applicant's draft mitigation plans including the Draft Desert Tortoise Relocation/Translocation Plan (TTEC 2010a), Draft Weed Management Plan (TTEC 2010g), Draft Revegetation Plan (TTEC 2010i), and Draft Common Raven Monitoring, Control and Management Plan (TTEC 2010k); preliminary 2010 survey data (TTEC 2010m) and other supplemental information (TTEC 2010r, TTEC 2010p); information about minor changes to the Project (TTEC 2010o); communications with representatives from the California Department of Fish and Game (CDFG), Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (USFWS); and information contained within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO).

Changes from Staff Assessment/Draft Environmental Impact Statement:

While much of this section of the Revised Staff Assessment (RSA) is identical to that published in the March 2010 Staff Assessment/Draft Environmental Impact Statement (SA/DEIS), some revisions have been made that reflect changed circumstances and new information, as summarized below:

- Separate CEQA/NEPA Documents. The SA/DEIS was a joint California Environmental Quality Act (CEQA) /National Environmental Policy Act (NEPA) document, but now the BLM's NEPA analysis, the Final Environmental Impact Statement, will be published separately from the RSA. The NEPA-specific language from the SA/DEIS has generally been retained in this section. The **Introduction** section of the RSA provides a detailed discussion of the separation of the CEQA and NEPA documents.
- 2010 Survey Results: The RSA incorporates preliminary spring 2010 survey results (TTEC 2010m) from special-status plant and wildlife species survey results that were performed within the Project's gen-tie transmission line. The 2010 spring surveys followed a wet winter and spring and as a result additional species and new locations of rare plants were detected that had been missed in 2009.
- New Project Features and Modifications: Minor Project changes have been made since the Genesis Solar Energy Project SA/DEIS was published (TTEC 2010o). Staff

- has analyzed the impacts of these Project modifications in subsection C.2.4.2. The modifications include:
 - A proposed six pole extension of the Genesis transmission line at the tie-in with the Colorado River Substation;
 - A power and telecommunications line to provide power and communication during construction at the plant site; and
 - The removal of the “toe” area, a 41.4-acre area at the easternmost portion of the solar fields, to avoid impacts to sand dune habitat and a sand transport corridor.
- Additional Mitigation Options: Discussion of mitigation options has been added to reflect recent establishment of a Renewable Energy Action Team –National Fish and Wildlife Foundation Account that may be used by the Applicant to deposit mitigation funding, as well as SBX8 34, legislation recently signed by the Governor that allows qualifying projects like the Genesis Project to make use of a new in-lieu fee program.
- New and Revised Conditions of Certification: The RSA includes two new conditions of certification: **BIO-28** Golden Eagle Monitoring and **BIO-29** In-Lieu Fee Mitigation Option. Conditions of Certification **BIO-12**, Desert Tortoise Compensatory Mitigation, and **BIO-19**, Special-Status Plant Species Mitigation, have been extensively revised and expanded. Revisions have been made in most other conditions of certification to address comments from the Applicant and other parties. **Biological Resources Table 22** summarizes the changes to the conditions of certification.

Compliance with Laws, Ordinances, Regulations, and Standards

The Project developer would need to comply with the following laws, ordinances, regulations, and standards (LORS) during Project construction and operation, as listed in **Biological Resources Table 1**.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and protects federally threatened and endangered plants and animals and their critical habitats.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge of dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
Eagle Act (Title 50, Code of Federal Regulations, section 22.26)	Would authorize limited take of bald eagles (<i>Haliaeetus leucocephalus</i>) and golden eagles (<i>Aquila chrysaetos</i>) under the Eagle Act, where the taking is associated with, but not the purpose of activity, and cannot practicably be avoided.
Eagle Act (Title 50, Code of Federal Regulations, section 22.27)	Would provide for the intentional take of eagle nests where necessary to alleviate a safety hazard to people or eagles; necessary to ensure public health and safety; the nest prevents the use of a human – engineered structure, or; the activity, or mitigation for the activity, will provide a net benefit to eagles. Only inactive nests would be allowed to be taken except in the case of safety emergencies.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Northern and Eastern Colorado Desert Coordinated Management Plan (NECO)	A regional amendment to the CDCA Plan approved in 2002, NECO protects and conserves natural resources while simultaneously balancing human uses in the northern and eastern portion of the Colorado Desert.
California Desert Protection Act of 1994 (CDPA)	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included substantial portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
Migratory Bird Treaty (Title 16, United	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the

Applicable LORS	Description
States Code, sections 703 through 711)	Migratory Bird Treaty Act.
Executive Order 11312	Prevent and control invasive species.
California Desert Conservation Area Plan	The California Desert Conservation Area (CDCA) comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land and Policy Management Act (FLPMA) in 1976. The FLPMA outlines how the BLM will manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.
Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994) and Draft Revised Recovery Plan (USFWS 2008a)	Describes a strategy for recovery and delisting of the desert tortoise.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.
Protected furbearing mammals (California Code of Regulations, Title 14, section 460)	Fisher, marten, river otter, desert kit fox and red fox may not be taken at any time.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of Prey (Fish and Game Code section 3503.5)	Unlawful to take, possess, or destroy any birds in the orders Falconiformes and Strigiformes or to take, possess, or destroy the nest or eggs of any such bird.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Nongame mammals (Fish and Game Code section 4150)	Makes it unlawful to take or possess any non-game mammal or parts thereof except as provided in the Fish and Game Code or in accordance with regulations adopted by the commission.
Significant Natural Areas (Fish and Game	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.

Applicable LORS	Description
Code section 1930 and following)	
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as “endangered” or “rare” under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG’s Special Animals List.
Streambed Alteration Agreement (Fish and Game Code sections 1600 and following)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 and following)	Designates state rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 and following and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Porter-Cologne Water Quality Control Act	Regulates discharges of waste and fill material to waters of the State, including “isolated” waters and wetlands.
Local	
Riverside County General Plan	Protection and preservation of wildlife for the maintenance of the balance of nature.

Desert Renewable Energy Conservation Plan – Interim Planning

In addition to the federal, state, and local LORS summarized above, federal and state agencies are currently collaborating to establish joint policies and plans to expedite development of California’s utility-scale renewable energy projects. On October 12, 2009, the State of California and the U.S. Department of Interior entered into a Memorandum of Understanding (MOU) on renewable energy, building on existing efforts by California and its federal partners to facilitate renewable energy development in the state. The MOU stems from California and Department of Interior energy policy directives, and California’s legislative mandate to reduce greenhouse gases to 1990 levels by 2020, and meet the goal of 33 percent of California’s electricity production from renewable energy sources by 2020.

The California-Department of Interior MOU expands on several MOUs issued in 2008 to establish the activities of the California Renewable Energy Action Team (REAT). The REAT was established with California Executive Order S-14-08 (issued November 18, 2008), to “*establish a more cohesive and integrated statewide strategy, including greater coordination and streamlining of the siting, permitting, and procurement processes for renewable generation*”

The Energy Commission and CDFG are the primary state collaborators in the REAT, operating under a November 18, 2008 MOU between the two agencies to create a “one-stop process” for permitting renewable energy projects under their joint permitting authority. The BLM and the USFWS also participate in the REAT under a separate MOU signed in November 2008, which outlines the state and federal cooperation of the group. The October 12, 2009 MOU between California and the Department of Interior reiterates several tasks of the REAT provided for in S-14-08 and the Energy Commission-Fish and Game MOU.

The REAT’s primary mission is to streamline and expedite the permitting processes for renewable energy projects in the Mojave and Colorado Desert ecoregions within the State of California, while conserving endangered species and natural communities at the ecosystem scale. To accomplish this goal the REAT Agencies are developing a Desert Renewable Energy Conservation Plan (DRECP), a science-based process for reviewing, approving, and permitting renewable energy applications in California. Once the DRECP is complete, anticipated in late 2012, the plan will provide tools to expedite coordination of federal and state endangered species act permitting. The DRECP will also offer a unified framework for state and federal agencies to oversee mitigation actions, including land acquisitions, for listed species.

The REAT Agencies recognize that some renewable energy projects are scheduled to be approved prior to completion of the DRECP. Section 8.9 of the October 2009 Draft Planning Agreement for the DRECP <www.energy.ca.gov/2009publications/...2009.../REAT-1000-2009-034.PDF> provides explicit guidance for such interim projects, and directs the REAT Agencies to ensure that permitting for these projects: be consistent with the preliminary conservation objectives for the DRECP; not compromise successful completion and implementation of the DRECP; facilitate Federal Endangered Species Act, California Endangered Species Act, National Environmental Policy Act, and California Environmental Quality Act compliance; and not be unduly delayed during preparation of the DRECP.

REAT Account and SBX8 34

The REAT agencies recently signed a Memorandum of Agreement (MOA) to establish a REAT Account that may be used by project developers to deposit funding for specified mitigation for approved renewable energy projects in the Mojave and Colorado Desert region of southern California (the MOA is available at <www.energy.ca.gov/33by2020>). For each project using the REAT Account an individual subaccount would be established for project specific tracking, compliance and accounting purposes. The subaccount would identify a list of the specific mitigation actions, the cost, and a timeframe for carrying out the actions. The National Fish and Wildlife Foundation (NFWF) would manage the subaccount on behalf of the REAT agencies, and at their direction would disburse mitigation funding to satisfy mitigation requirements for impacts

to biological resources. NFWF is a charitable non-profit corporation established in 1984 by the federal government to accept and administer funds to further the conservation and management of fish, wildlife, plants and other natural resources <hwww.nfwf.org>. Use of the REAT Account would not change any of the requirements a project proponent must fulfill in order to comply with applicable State and Federal environmental laws governing the permitting of the projects.

The REAT Account will also aid project proponents in carrying out contracting and construction activities in a timely manner per requirements for American Recovery and Reinvestment Act of 2009 (ARRA) funding. The SBX8 34 legislation that was recently signed into law by the Governor created a \$10 million loan that provides for advanced mitigation habitat purchases. This advanced mitigation can be used by a qualifying solar renewable energy project to receive credit for implemented mitigation after a project proponent pays into the Renewable Energy Development Fee Trust Fund that was created by the SBX8 34 legislation (SBX8 34 Trust Fund). Funds in the MOA REAT Account and the SBX8 34 Trust Fund are similar in that renewable energy project proponents pay into accounts set up to receive project-specific mitigation funds, and a third party entity implements the mitigation actions. Staff's proposed Condition of Certification **BIO-29** provides an opportunity for the Applicant to fulfill their mitigation obligations by depositing funds into the SBX8 34 Trust Fund.

C.2.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed Project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land jurisdictions of the California Energy Commission (Energy Commission) and U.S. Bureau of Land Management (BLM). CEQA requires that the significance of individual effects be determined by the Lead Agency, but the use of specific significance criteria is not required by NEPA.

CEQA requires a list of criteria that are used to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (State CEQA Guidelines Section 15382).

Thresholds for determining CEQA significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff. The determination of whether a project has a significant effect on biological resources is based on the best scientific and factual data that staff could review for the project. In this analysis the following impacts to biological resources are considered significant if the project would result in: a substantial adverse effect to plant species considered by the California Native Plant Society (CNPS), CDFG, or USFWS to be rare, threatened, or endangered in California or with strict habitat requirements and narrow distributions; a substantial impact to a sensitive natural community (i.e., a community that is especially diverse; regionally uncommon; or of special concern to local, state, and federal agencies); a substantial adverse effect to wildlife species that are federally-listed or state-listed or proposed to be listed; a

substantial adverse effect to wildlife species of special concern to CDFG, candidates for state listing, or animals fully protected in California; substantial adverse effects on habitats that serve as breeding, foraging, nesting, or migrating grounds and are limited in availability or that serve as core habitats for regional plant and wildlife populations; substantially interferes with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; a substantial adverse effect on important riparian habitats or wetlands and any other “Waters of the U.S.” or state jurisdictional waters; or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

In contrast to CEQA, “significantly” as used in NEPA requires considerations of both context and intensity (40 CFR 1508.27). According to the NEPA Regulations adopted by the President’s Council on Environmental Quality (CEQ) (40 CFR 1500-1508), context means the affected environment in which a proposed action would occur; it can be local, regional, national, or all three, depending upon the circumstances. In determining the intensity of an impact, the following factors are considered: adverse effects of a project even though the overall proposed action is beneficial; effects on public health or safety; unique characteristics of the geographic area, such as historic resources, park lands, prime farmland, wetlands, wild and scenic rivers, ecologically critical areas; degree of controversy; degree of highly uncertain effects or unique or unknown risks; precedent-setting effects; cumulative effects; adverse effects on scientific, cultural, or historical resources; adverse effects on endangered or threatened species or designated critical habitat (pursuant to the Endangered Species Act); and violations of federal, state, or local environmental law.

For NEPA, thresholds serve as a benchmark for determining if a project action would result in a significant adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) be prepared when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.”

C.2.4 PROPOSED PROJECT

C.2.4.1 SETTING AND EXISTING CONDITIONS

Proposed Project

Genesis Solar, LLC (Genesis Solar) is proposing development of their 250-megawatt (MW) solar generating facility within a 4,640-acre right-of-way (ROW) grant application from the Bureau of Land Management. Approximately 1,727 acres within the proposed ROW would be used for the solar power plant facility and 84 acres would be used for the linear facilities, collectively referred to as the Project Disturbance Area throughout the remainder of this Biological Resources Section (CEC 2010d). The Project Disturbance Area encompasses all areas to be temporarily and permanently disturbed including the following:

- “plant site” described by the applicant as the solar arrays, power blocks, power equipment, support facilities and evaporation ponds (TTEC 2009c);

- “linear facilities” including the access road, transmission line, natural gas pipeline (TTEC 2009c); and
- All areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas or by any other activities resulting in disturbance to soil or vegetation.

Interstate-10 is located approximately 2 miles south of the southernmost boundary of the ROW. The Project site occurs at elevations ranging from approximately 350 to 450 feet above mean sea level, approximately 25 miles west of the community of Blythe and 27 miles east of Desert Center, California in eastern Riverside County. The proposed Project would be located within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) area. A detailed description of the Project is provided in section B.1. The Genesis Project would be located on the alluvial fan on the southern flank of the Palen Mountains in the Chuckwalla Valley.

Regional Setting

The Genesis Solar Energy Project (Project) would be located within the northeastern portion of Chuckwalla Valley, an area east of Palm Springs in the remote Colorado Desert, a subsection of the Sonoran Desert. The range of the Chuckwalla Valley is from 400 feet above mean sea level at Ford Dry Lake to approximately 1,800 feet above mean sea level along some of the bajadas that occur west of Desert Center, California with the surrounding mountains rising to over 3,000 above mean sea level (GSEP 2009a).

Hydrologically, the proposed Project site occurs in the Colorado River Basin within the Chuckwalla Valley Drainage Basin. This is an internally drained basin and all surface water flows to Palen Dry Lake in the western portion of Chuckwalla Valley and Ford Dry Lake in the eastern section of Chuckwalla Valley. Palen Dry Lake is characterized as a “wet playa” since it supports significant groundwater discharge at the ground surface by evaporation. Ford Dry Lake is characterized as a “dry playa” with groundwater sources occurring well below the surface of the dry lake bed and as a result receives occasional inflow of surface water (GSEP 2009a,f).

A number of Areas of Critical Environmental Concern (ACECs) and federally-designated Wilderness Areas occur within the vicinity of the Project site. The 236,488-acre Palen-McCoy Wilderness area abuts the plant site to the north. Within this wilderness area, there are five distinct mountain ranges with characteristic sloping bajadas: the Granite, McCoy, Palen, Little Maria, and Arica Mountains (BLM 2009). Two additional wilderness areas occur in the Project vicinity, the Little Chuckwalla Mountains and Chuckwalla Mountains wilderness areas (GSEP 2009a). The 3,632-acre Palen Dry Lake ACEC occurs about 10 miles west of the Project site and is managed for protection of its prehistoric resources. The 2,273-acre Chuckwalla Valley Dune Thicket ACEC occurs immediately west of the southern terminus of the proposed Project transmission line, and is managed for its wildlife habitat use, specifically for birds.

Vegetation and Wildlife

Upland Natural Communities

The Study area supports four major upland natural communities. The majority of the Project Disturbance Area supports Sonoran creosote bush scrub; the eastern portion of the Project Disturbance Area also supports stabilized and partially stabilized desert dunes. A small amount of playa and sand drifts over playa occur within the Project Disturbance Area along the margins of Ford Dry Lake. The larger surveyed area, the Study area, supports chenopod scrub, and desert wash woodland in addition to the two vegetation communities mentioned above (GSEP 2009a). All of these communities except the Sonoran creosote bush scrub are considered sensitive according to the NECO plan. These upland communities are discussed in more detail below and acreages are summarized in **Biological Resources Table 2**. Additionally, the southern linear facility route was determined by the applicant to support wash-associated, microphyll riparian woodland communities (GSEP 2009f, BIO-DR-70). Dry desert wash woodland and microphyllous riparian vegetation are described in detail in the following section, Waters of the State.

Sonoran Creosote Bush Scrub

A total of 1,773 acres of Sonoran creosote bush scrub occurs within the Project site; 1,713 acres occur in the solar power plant Disturbance Area and 60 acres occur along the linear Disturbance Area (CEC 2010d, TTEC 2010o). Sonoran creosote bush scrub occurs on well-drained, secondary soils of slopes, fans, and valleys and is the basic creosote scrub community of the Colorado Desert (Holland 1986). Within this community in the Project site, soils are generally sandy-loams with scattered areas of fine gravel. The dominant plant species within this community are creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), white ratany (*Krameria grayi*), and cheesebush (*Hymenoclea salsola*).

Stabilized and Partially Stabilized Desert Dunes

Approximately 1 acre of stabilized and partially stabilized desert dunes occurs within the linear Disturbance Area along I-10 (CEC 2010d, TTEC 2010o). These dune systems are described as accumulations in the desert which are stabilized or partially stabilized by evergreen and/or deciduous shrubs and scattered, low grasses. These dunes typically occur lower than active dune systems and retain water just below the sand surface which allows deep-rooted, perennial vegetation to survive during longer drought periods. Shrub cover is lower in this community compared to Sonoran creosote bush scrub community in the Project site and shrubs become less sparse the closer to Ford Dry Lake. Where partially stabilized desert dunes intergrade with playas and the margins of Ford Dry Lake, fine sand drifts occur (GSEP 2009a, Appendix C). The dominant plant species associated with this community include four-wing saltbush (*Atriplex canescens*), desert croton (*Croton californicus*), and Colorado desert buckwheat (*Eriogonum deserticola*).

Playa and Sand Drifts Over Playa

A total of 37 acres of playa and sand drifts over playa occurs within the Project site in association with Ford Dry Lake; over 14 acres occur in the plant site Disturbance Area

and over 23 acres occur within the linear Disturbance Area (CEC 2010d). There is not a formal description of this natural community according to CDFG, Holland (1986), or Sawyer and Keeler-Wolf (1995). This community occurs in close association with stabilized and partially stabilized desert dunes within the Study area and shrub cover continues to decrease towards Ford Dry Lake. There are intermittent, shallow sand drift deposits along the margins of the playa within the Study area. Playas and sand drifts over playas provide food and foraging opportunities for many species of wildlife and also provide habitat for several common and special-status plant species.

Chenopod Scrub

A portion of chenopod scrub occurs within the Study area; since this vegetation community does not occur within the Project Disturbance Area, an acreage was not determined (GSEP 2009f). Holland identifies two types of chenopod scrub, desert saltbush scrub and desert sink scrub. These communities are usually comprised of low-growing, grayish, with microphyllous (small-leaved) shrubs and some succulent species. The total vegetative cover is often low with bare ground between widely spaced shrubs. Both types of chenopod scrub occur on poorly-drained soils with high alkalinity or salinity. These communities often occur on the margins of dry lake beds in the Colorado, Sonoran, Mojave, and Great Basin deserts typically below 4,000 feet in elevation (Holland 1986). Chenopod scrub provides habitat for many species of common and special-status plants, mammals, and reptiles as dispersal, foraging and cover habitat especially in association with other upland and desert wash communities.

**Biological Resources Table 2
Upland Natural Communities within the GSEP Study Area**

Natural Community Types within Study Area³	Solar Power Plant Site (Acres)	Linear Facilities (Acres)	Buffer Area (Acres)¹	Total Surveyed (Acres)²
Upland				
Sonoran creosote bush scrub	1,713	60	14,370	16,143
Stabilized and partially stabilized desert dunes	0	1	3,903	3,904
Playa and sand drift over playa	14	23	4,781	4,818
Chenopod scrub	0	0	370	370
Total Upland	1,727	84	23,424	25,235

¹ For the purposes of this table and this Biological Resources Section, the portion identified within the buffer area of this table is the difference between the total surveyed area less the sum of plant site acreage and linear facilities acreages.

² Includes natural community types observed during field surveys out to one mile buffer from the Project ROW and 2,400 feet of linear facilities.

³ Acreages adjusted to reflect removal of the 41.4 acre "toe" (TTEC 2010o).

Waters of the State

A formal jurisdictional delineation for regulated waters was conducted by the Applicant to determine the extent of potential jurisdictional waters of the U.S. and/or waters of the State within the Project. This includes waters (and/or wetlands) regulated under the federal Clean Water Act and/or streams and associated habitat regulated under the California Fish and Game Code. The Applicant is requesting a jurisdictional determination of isolated waters (non-jurisdictional waters of the U.S.) from the U.S.

Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency and submitted an application for a Streambed Alteration Agreement (TTEC 2009d). The application to the USACE assumed there are no potential jurisdictional waters of the U.S. because the features occur in a closed basin with no identifiable outlet and have no direct hydrologic connection to any navigable waters. The USACE has not yet completed their jurisdictional determination, although they have tentatively concluded that drainages at the Project site would not fall under their jurisdiction as waters of the U.S. (Mace pers. comm.).

The Applicant submitted a Notification of a Lake or Streambed Alteration (TTEC 2009d) in December 2009 to CDFG, and in response to data requests from staff, submitted a revised jurisdictional delineation report and application in January 2010 (TTEC 2010j). The revised delineation also included waters and wash-dependent vegetation downstream of the Project footprint that are likely to be indirectly affected by the diversion of waters. CDFG staff conducted a field verification of the delineation of state waters on February 17, 2010, and made some recommendations for adjustments to the boundaries (CDFG 2010). These revised boundaries (TTEC 2010l) encompassed several additional drainages in the western portion of the Project, expanded the delineation of the jurisdictional features to encompass the full width of the floodplain, and included features that would be indirectly affected downstream of the engineered channel.

The total (91 acres) area of all waters of the state delineated within the Project Disturbance Area includes 16 acres of microphyllous riparian vegetation, also called desert dry wash woodland, and 74 acres of other ephemeral desert washes. A total of 21 acres of jurisdictional state waters, consisting of unvegetated ephemeral dry washes, were delineated downstream of the Project Disturbance Area, encompassing the full downstream reach of waters that would likely be indirectly affected by the diversion of waters at the upstream edge of the Project Disturbance Area, and then discharged at several points below the Project.

Hydrology

The Project area is within the Chuckwalla-Ford Dry Lake watershed. The primary hydrologic feature in the watershed is Ford Dry Lake, a closed basin, which is the receiving basin for 1,503 miles of unnamed desert washes, including the many smaller ephemeral desert washes that pass through the Project site and drain the southeastern flank of the Palen Mountains. The "Palen Wash" is the larger feature that drains the alluvial fan between the Palen and McCoy mountains and supports an old growth forest of ironwood on its upper reaches. The lower reaches of this feature passes through the western portion of the transmission line, natural gas line and access road alignment. The entire study area is crossed by numerous ephemeral washes ranging from small, weakly expressed erosional features to broad (over 10 feet wide) channels. The active flow channels are generally devoid of vegetation and typically have a sandy-gravel substrate, although some washes also contained cobble and scattered larger rocks. Small- to medium-sized washes are common and widespread throughout the entire Project area. The larger washes tend to dissipate into smaller, more braided channels as they progress downslope. The majority of the channels terminate prior to reaching Ford Dry Lake as well-defined conveyance features diminish and transition into broad,

shallow surface flow. All of the ephemeral washes identified in the Project area flow only in response to storm events.

Unvegetated Ephemeral Washes

The majority of washes identified throughout the study area are associated with Sonoran creosote bush scrub habitat. Species such as white bursage are common in some medium to large-sized washes, especially in braided channels that contain slightly elevated areas intermixed with the active flow channels. The larger washes (typically over 6 feet) that contain sandy, gravelly substrate and well-defined banks typically include big galleta grass and scattered desert wash tree species such as ironwood and palo verde. Ironwood and palo verde trees are sparsely scattered throughout the Project area and are associated with areas of heavier sheet flow.

Desert Dry Wash Woodland/Microphyllous Riparian Vegetation

Desert dry wash woodland is a sensitive vegetation community recognized by the CNDDDB, BLM, and is also designated as state waters by CDFG (CDFG 2003, BLM CDD 2002). Desert dry wash woodland is an open to dense woodland of microphyllous desert riparian trees (Holland 1986). The Applicant has identified a stand of desert dry wash woodland as occurring east of the Project area, within the large Palen Wash, but had described this habitat type as absent from the Project area (GSEP 2009a). In their revised delineation the Applicant describes areas of areas of microphyllous riparian vegetation occurring in washes along the linear Disturbance Area. The microphyllous vegetation identified in these washes consists of three tree species (palo verde, ironwood, and honey mesquite) and totals 16 acres (TTEC 2010). Within the proposed Project area ironwood and palo verde occur in low densities but one wash along the linear facility route, identified as Wash 24-26 in the jurisdictional delineations report (TTEC 2010) supports a relatively dense concentration of 270 palo verde trees. Wash 31 consists of honey mesquite and is also relatively dense.

Habitat Function and Value of State Waters

The Project area's ephemeral washes, both vegetated and unvegetated, provide unique habitat that is distinct from the surrounding uplands, providing more continuous vegetation cover and microtopographic diversity than the surrounding uplands, migration corridors, and refuge, for a variety of wildlife. Both the wash-dependent and upland vegetation along these washes drive food webs, provide seeds for regeneration, habitat for wildlife, access to water, and create cooler, more hospitable microclimatic conditions essential for a number of plant and animal species. The vegetation, whether dominated by woodland trees or shrubs and perennial herbs, contributes channel roughness that reduces the velocity of floodwaters and provides organic matter for soil development and nutrient cycling (USEPA 2008).

Because ephemeral and intermittent stream channels have a higher moisture content and more abundant vegetation than the surrounding areas, they are very important to wildlife. Frequently, these streams may retain the only available water in the area, with permanent pools interposed wherever hydrogeological conditions allow (USEPA 2008). The short duration and episodic flood pulses of surface and overbank flow is important as it allows some species to complete important life-history developmental stages. The habitat provided by desert streams contracts and expands dramatically in size due to

the extreme variations in flow, which can range from high-discharge floods to periods when surface flow is absent. This spatial variation in habitat or ecosystem size is a fundamental, defining feature of these streams (Smith et al. 1995, USEPA 2008).

Groundwater-Dependent Vegetation Communities in the Project Vicinity

Groundwater elevation contour mapping done by Steinemann (1989) suggests that groundwater levels are very close to the ground surface beneath the northwestern 25 percent of Palen Dry Lake (Worley Parsons 2009), approximately three to six miles from the Project's proposed groundwater pumping well and at Ford Dry Lake, near the Project, the water table was measured at 80 feet, extending to a depth of 200 feet. The groundwater-dependent plant communities ("phreatophytes") outside of the Project Disturbance Area are included because they are within the Applicant's estimated area of water table drawdown by the end of operation, a 9 to 10-mile radius from the Project pumping well, and because these are sensitive communities recognized by the California Natural Diversity Data Base (CDFG 2003) and BLM. Some woody phreatophytes are documented to root to depths of over 100 feet.

Mesquite Bosque and Other Phreatophytes

In the Chuckwalla Valley Groundwater Basin the groundwater is too deep to support shallow marshes and meadows, but it does support communities of deeper-rooted, groundwater-dependent "phreatophytes", most notably the shrubby "bosques" (groves) of honey mesquite around the open, unvegetated playa. Mesquite bosques are a rare and sensitive community recognized by BLM and the CNDDDB (CDFG 2003). They occur in areas with access to permanent and stable groundwater; the deep roots can tap water supplies up 40 feet below the surface, although tap roots as long as 190 feet have been documented (Sosebee & Chan 1989). When available, mesquite will exploit sources of deep water by growing a taproot. Mesquite can also persist on sites that have little or no ground water by growing lengthy shallow lateral roots. In some parts of their range they are considered "facultative phreatophytes" that function as phreatophytes if unlimited water is available, but are capable of surviving on sites with limited soil water. In California, however, they are very rare outside of washes or areas with available groundwater; they also occur as a decumbent or running bush found on coppice dunes (vegetated sand mounds). These adaptations allow honey mesquite to retain most leaves in all but the most severe droughts (Ansley et al 2004). In the Project vicinity, they are found along the northwest and southwest margins of Palen Dry Lake on small coppice dunes. They have also been documented elsewhere in Chuckwalla Valley (Evans and Hartman 2007) and observed by staff in aerial photos on the southwest margin of Palen Dry Lake.

Mesquite could provide critical refugia for wildlife during these extended droughts, due to the mesquite's ability to draw water from deep sources and then create a relatively mesic oasis at the surface (Barrows pers. comm.). The fruit of honey mesquite is valuable forage for wildlife; it is quite predictable, even in drought years, annually providing an abundant and nutritious food source for numerous wildlife species upon ripening in summer (Steinberg 2001). The fruit's pericarp is high in sugars and the seeds contain large amounts of protein. Where they occur, honey mesquite seeds form an important part of the diet of mice, kangaroo rats, ground squirrels, quail, black-tailed jackrabbit, mule deer, and many other wildlife. Mesquite flowers are eaten by numerous

bird species. Quail and many other birds eat mesquite buds and flowers in the spring and seeds during the fall and winter. Western honey mesquite communities often attract large numbers of birds that feed on the mistletoe fruit.

Microphyll Woodland

Other known phreatophytes in the Project area include the native trees ironwood, palo verde, and cat's claw; the invasive exotic salt cedar (tamarisk), and the native chenopod shrub bush seep-weed. Most of the microphyllous trees (ironwood, palo verde, cat's claw) occur along the many desert washes in the Project area. The best examples are described under "Desert Dry Wash Woodland/Microphyllous Riparian Vegetation", above. However, these deep-rooted trees also occur away from the streams on portions of the bajada (above and below the Project) where they have access to deep groundwater. Desert phreatophytes are legendary for their deep-rooting. One mesquite was documented to root to a depth of over 250 feet in a mine shaft, although most are documented to root at depths up to 40 feet (Sosebee & Chan 1989). They are also observed to occur sporadically around the perimeter of Ford Dry Lake, where the water table is measured at 80 feet. It is unclear at this time whether they are supported by the shallow groundwater table under Ford Dry Lake or by the mountain front aquifer, or surface runoff.

Bush Seep-Weed Alkali Sink Scrub

Other known phreatophytes observed within the zone potentially influenced by Project or cumulative groundwater pumping include succulent chenopod scrubs dominated by bush seep-weed, which forms pure stands over large areas around the margins of Palen Dry Lake. It also occurs sporadically around Ford Dry Lake, where it co-occurs with the xerophyte saltbush. Bush seep-weed is a characteristic component of alkali sinks, a phreatophyte (Barbour et al. 2007) occupying fine-textured saline soils on or around the playa margins, and rooting to depths of several meters to access groundwater (Patten et al. 2007).

Sand Transport System

This subsection provides a brief explanation of wind transport of sand relative to the creation, preservation and destruction of sand dunes in the Project area. **Soil & Water Appendix A** provides a more detailed explanation, as does the "*Aeolian Transport Evaluation and Ancient Shoreline Delineation Report, Genesis Solar Energy Project, Riverside County, California*" (Worley Parsons 2010). Movement of sand by wind and water is relevant to sensitive biological resources because these geomorphic processes create and maintain habitat for Mojave fringe-toed lizards and other species dependent on fine, wind-blown sand.

Two sand migration corridors occur in the vicinity of the Project. The Palen-Dry Lake (PDL) -Chuckwalla Valley Sand Corridor is located immediately to the south of the Project site, and is a major aeolian sand transport moving sand east along the Chuckwalla Valley toward the Colorado River (see Plate 5 in Worley Parsons 2010c). This is a regionally-significant geomorphic feature that provides sand to build and support sand dune habitat in the Project vicinity. To the east of the Project site is the Palen-McCoy Valley Sand Corridor, which moves sand to the south from the valley between the Palen and McCoy mountains. In addition, the regional wind transport

system can also be transported locally by washes. These carry sediment from upstream sand corridors and distribute it on the alluvial fan where it is available for wind transport, creating smaller sand corridors around the main washes.

Noxious Weeds

Noxious weeds are species of non-native plants included on the weed lists of the California Department of Food and Agriculture (CDFA) (CDFA 2007), the California Invasive Plant Council (Cal-IPC), or those weeds of special concern identified by the BLM. They are of particular concern in wild lands because of their potential to degrade habitat and disrupt the ecological functions of an area (Cal-IPC 2006). Specifically, noxious weeds can alter habitat structure, increase fire frequency and intensity, decrease forage (including for special-status species, such as desert tortoise), exclude native plants, and decrease water availability for both plants and wildlife. Soil disturbance and gathering and channeling water create conditions favorable to the introduction of new noxious weeds or the spread of existing populations. Construction equipment, fill, and mulch can act as vectors introducing noxious weeds into an area.

Non-natives species were recorded as a part of Project surveys; additional baseline surveys to identify population locations and densities are pending (TTEC 2010g). Four noxious weed species were observed within the study area: Sahara mustard, Russian thistle, salt cedar, and Mediterranean grass. Each of these species is identified on a list of the region's worst weeds compiled by the Low Desert Management (NRCS 2005). Noxious weeds found in the study area are discussed further below.

Sahara Mustard

Sahara mustard (*Brassica tournefortii*) was widespread throughout the Project study area, including in Sonoran creosote bush scrub, in and contributed to a relatively large portion of the plant biomass. There were patches of higher concentrations occurring within runnels, along the existing two-track road on the western side of the ROW, and along the linear facility routes (TTEC 2010g). This species is of high concern; it is a BLM weed of special concern and Cal-IPC has declared this plant highly invasive (Cal-IPC 2006) and recommends that it should be eradicated whenever encountered. This species is associated with impacts to habitat for native wildlife as well as for native plants. It promotes the spread of fire by increasing fuel load and competes with native plants for moisture and nutrients. In addition, it increases cover and works to stabilize sand, thereby affecting wildlife species dependent on open sandy habitat (Brossard et al. 2000; Barrows and Allen 2007).

Russian Thistle

Russian thistle (*Salsola* sp.) was common in the dune areas on the east side of the Project area and along the linear facilities (TTEC 2010g). Although all invasive plants share the trait of being adapted to disturbed habitat, Russian thistle or tumbleweed particularly tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed. However, once an area is disturbed this species competes readily and can affect native plant ecosystems and increase fire hazard (Orloff et al. 2008; Lovich 1999). Dune habitat is particularly vulnerable to non-native species, which can stabilize sand or block sand movement, and Russian thistle is considered an invasive species of primary concern in this habitat (CDFG 2007). There is a high

potential that Russian thistle could become established in the construction area and this species should be eradicated if observed. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006) and the CDFG has given it a “C” rating.

Mediterranean Tamarisk

Mediterranean tamarisk or salt cedar (*Tamarix ramosissima*) is a riparian plant and is therefore restricted to habitats where there is perennial saturation such as springs and seeps, or runoff from poorly maintained water pipelines or well pumps. It was observed south of the Project area on the edge of the dry lake bed (GSEP 2009a) and by staff south of I-10 along the transmission line route. Cal-IPC has declared this plant highly invasive (Cal-IPC 2006) and it is a CDFG “B” rated species. Salt cedar is associated with many ecological impacts including impacts to channel geomorphology, groundwater availability, plant species diversity, and fire frequency (Lovich 1999). Salt cedar can also affect sand dunes by blocking sand movement, a vital part of the natural function of these habitats (CDFG 2007).

Mediterranean Grass

Mediterranean grass (*Schismus arabicus*, *S. barbatus*) is prevalent throughout the Project area (TTEC 2010g). Mediterranean grass is an annual that reproduces by seed, and is widespread in arid and semi-arid California landscapes. This species competes effectively with native plants for nutrients and water and can provide cover that prevents native annuals from sprouting (VanDevender et al. 1997; Brossard et al. 2000) and contributes to dune stabilization (CDFG 2007). Fire, historically, was rare in the Colorado Desert. The presence of Mediterranean grass on other annual non-native grasses has provided a continuous and increased fuel load, influencing the extent, frequency, and intensity of fire in these ecosystems (Brooks and Pyke 2001; Brooks et al. 2004). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to eradicate, but is still subject to monitoring and control requirements.

Special-Status Species

Special-status species are plant and wildlife species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

1. Listed as threatened or endangered or candidates for future listing as threatened or endangered under CESA or FESA;
2. Protected under other regulations (e.g. Migratory Bird Treaty Act);
3. Listed as species of concern by CDFG;

4. A plant species considered by the CNPS to be “rare, threatened, or endangered in California” (CNPS List 1A, 1B, and 2) as well as CNPS List 3 and 4¹ plant species;
5. A plant listed as rare under the California Native Plant Protection Act²;
6. Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
7. Any other species receiving consideration during environmental review under CEQA.

The BLM designates Sensitive species as those requiring special management considerations to promote their conservation and reduce the likelihood and need for future listing under FESA. BLM Sensitive species include all Federal Candidate and Federally Delisted species which were so designated within the last 5 years, and CNPS List 1B species that occur on BLM lands. For the purposes of this analysis, Energy Commission staff considers all BLM Sensitive species as special-status species.

Biological Resources Table 3 lists all special-status species evaluated during the analysis that are known to occur or could potentially occur in the Project area and vicinity. Special-status species (or their sign) observed during the 2009 field surveys are indicated by **bold-face type**. Special-status species listed in **Table 3** that were detected or considered likely to occur based on known occurrences in the vicinity and suitable habitat present within the Project area are discussed in more detail below. The rest of these species have no or low-to-moderate potential to occur in the Project area and are described in **Biological Resources Table 4**.

**Biological Resources Table 3
Special-Status Species Known or Potentially Occurring in the GSEP Study Area**

PLANTS		
Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
Chaparral sand verbena	<i>Abronia villosa</i> var. <i>aurita</i>	_/_/1B.1/_/G5T3T4/S2.1
Angel trumpets	<i>Acleisanthes longiflora</i>	_/_/2.3/_/G5/S1.3

¹ List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. CNPS List 3 and 4 may be considered regionally significant if, e.g., the occurrence is located at the periphery of the species' range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate. For these reasons, CNPS List 3 and 4 plants should be included in the field surveys. List 3 and 4 plants are also included in the California Natural Diversity Database's (CNDDDB) Special Plants, Bryophytes, and Lichens List. [Refer to the current online published list available at: <http://www.dfg.ca.gov/biogeodata>.] Data on Lists 3 and 4 plants should be submitted to CNDDDB. Such data aids in determining or revising priority ranking (CDFG 2009).

² As defined by the California Native Plant Protection Act, a plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901) (CDFG 2009).

PLANTS		
Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
Desert sand parsley	<i>Ammoselinum giganteum</i>	_/_/2.3/_/G2G3/SH
Small-flowered androstephium	<i>Androstephium breviflorum</i>	_/_/2.2/_/G5/S2
Harwood's milk-vetch	<i>Astragalus insularis</i> var. <i>harwoodii</i>	_/_/2.2/_/G5T3/S2.2?
Coachella Valley milk-vetch	<i>Astragalus lentiginosus</i> var. <i>cochellae</i>	_/FE/1B.2./S/G5T2/S2.1
California ayenia	<i>Ayenia compacta</i>	E/_/2.3/_/G4/S3.3
Pink fairy duster	<i>Calliandra eriophylla</i>	_/_/2.3/_/G5/S2.3
Sand evening-primrose	<i>Camissonia arenaria</i>	_/_/2.2/_/G4?/S2
Crucifixion thorn	<i>Castela emoryi</i>	_/_/2.3/_/G3/S2.2
Abram's spurge	<i>Chamaesyce abramsiana</i>	_/_/2.2/_/G4/S1.2
Arizona spurge	<i>Chamaesyce arizonica</i>	SR/_/2.3/_/G5/S1.3
Flat-seeded spurge	<i>Chamaesyce platysperma</i>	_/_/1B.2/S/G3/S1.2?
Las Animas colubrina	<i>Colubrina californica</i>	_/_/2.3/_/G4/S2S3.3
Spiny abrojo/Bitter snakeweed	<i>Condalia globosa</i> var. <i>pubescens</i>	_/_/4.2/_/G5T3T4/S3.2
Foxtail cactus	<i>Coryphantha alversonii</i>	_/_/4.3/_/G3/S3.2
Ribbed cryptantha	<i>Cryptantha costata</i>	_/_/4.3/_/G4G5/S3.3
Winged cryptantha	<i>Cryptantha holoptera</i>	_/_/4.3/_/G3G4/S3?
Wiggins' cholla	<i>Cylindropuntia wigginsii</i> (syn= <i>Opuntia wigginsii</i>)	_/_/3.3/_/G3?Q/S1.2?
Utah vining milkweed	<i>Cynanchum utahense</i>	_/_/4.2/_/G4/S3.2
Glandular ditaxis	<i>Ditaxis claryana</i>	_/_/2.2/_/G4G5/S1S2
California ditaxis	<i>Ditaxis serrata</i> var. <i>californica</i>	_/_/3.2/_/G5T2T3/S2.2
Harwood's eriastrum	<i>Eriastrum harwoodii</i>	_/_/1B.2/BLM/G2/S2
California satintail	<i>Imperata brevifolia</i>	_/_/2.1/_/G2/S2.1
Cottontop cactus	<i>Echinocactus polycephalus</i> var. <i>polycephalus</i>	_/_/ / / / / / /
Pink velvet mallow	<i>Horsfordia alata</i>	_/_/4.3/_/G4/S3.3
Bitter hymenoxys	<i>Hymenoxys odorata</i>	_/_/2/_/G5/S2
Spearleaf	<i>Matelea parvifolia</i>	_/_/2.3/_/G5?/S2.2
Argus blazing star ³	<i>Mentzelia puberula</i>	_/_/ / / / / / /
Slender woolly-heads	<i>Nemacaulis denudata</i> var. <i>gracilis</i>	_/_/2.2/_/G3G4T3?/S2S3
White-margined penstemon	<i>Penstemon albomarginatus</i>	_/_/1B.1/S/G2/S1
Lobed cherry	<i>Physalis lobata</i>	_/_/2.3/_/G5/S1.3
Desert portulaca	<i>Portulaca halimoides</i>	_/_/4.2/_/G5/S3
Desert unicorn plant	<i>Proboscidea althaeifolia</i>	_/_/4.3/_/G5/S3.3
Orocopia sage	<i>Salvia greatae</i>	_/_/1B.3./S/G2/S2.2
Desert spikemoss	<i>Selaginella eremophila</i>	_/_/2.2./_/G4/S2.2?
Cove's cassia	<i>Senna covesii</i>	_/_/2.2/_/G5?/S2.2
Mesquite nest straw	<i>Stylocline sonorensis</i>	_/_/1A/_/G3G5/SX
Dwarf germander	<i>Teucrium cubense</i> ssp. <i>depressum</i>	_/_/2.2/_/G4G5T3T4/S2
Jackass clover	<i>Wislizenia refracta</i> ssp. <i>refracta</i>	_/_/2.2/_/G5T5?/S1.2?
Palmer's jackass clover ⁴	<i>Wislizenia refracta</i> ssp. <i>palmeri</i>	_/_/Proposed 1B/ / / / /
<i>Atriplex</i> sp. nov. ("Palen Lake atriplex")	<i>Atriplex</i> sp. nov. J. Andre	_/_/Proposed ?/ / / / /

³ Proposed new addition to the CNPS Inventory (Andre, pers. comm.)

⁴ Proposed new addition to the CNPS Inventory (Silverman, pers comm.)

WILDLIFE		
Common Name	Scientific Name	Status State/Federal
Reptiles/Amphibians		
Desert tortoise	<i>Gopherus agassizii</i>	ST/FT
Couch's spadefoot toad	<i>Scaphiopus couchii</i>	CSC/__/BLM Sensitive
Mojave fringe-toed lizard	<i>Uma scoparia</i>	CSC/BLM Sensitive
Desert rosy boa	<i>Charina (Lichanura) trivirgata</i>	__/_
Chuckwalla	<i>Sauromalus obesus</i>	__/_
Birds		
Western burrowing owl	<i>Athene cunicularia hypugaea</i>	CSC/BCC/BLM Sensitive
Golden eagle	<i>Aquila chrysaetos</i>	CFP/__/BLM Sensitive
Short-eared owl	<i>Asio flammeus</i>	CSC
Ferruginous hawk	<i>Buteo regalis</i>	WL/BLM Sensitive
Swainson's hawk	<i>Buteo swainsoni</i>	ST
Prairie falcon	<i>Falco mexicanus</i>	WL
American peregrine falcon	<i>Falco peregrinus anatum</i>	SFP
Vaux's swift	<i>Chaetura vauxi</i>	CSC
Mountain plover	<i>Charadrius montanus</i>	CSC/__/BLM Sensitive
Northern harrier	<i>Circus cyaneus</i>	CSC
Gilded flicker	<i>Colaptes chrysoides</i>	SE
Yellow warbler	<i>Dendroica petechia sonorana</i>	CSC
California horned lark	<i>Eremophila alpestris actia</i>	WL
Yellow-breasted chat	<i>Icteria virens</i>	CSC
Loggerhead shrike	<i>Lanius ludovicianus</i>	CSC/BCC
Gila woodpecker	<i>Melanerpes uropygialis</i>	SE
Black-tailed gnatcatcher	<i>Poliophtila melanura</i>	__/_
Purple martin	<i>Progne subis</i>	CSC
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>	CSC
Brewer's sparrow	<i>Spizella breweri</i>	BCC
Bendire's thrasher	<i>Toxostoma bendirei</i>	CSC/__/BLM Sensitive
Crissal thrasher	<i>Toxostoma crissale</i>	CSC
Le Conte's thrasher	<i>Toxostoma lecontei</i>	WL/BCC/Sensitive
Mammals		
Pallid bat	<i>Antrozous pallidus</i>	CSC/__/BLM Sensitive
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	CSC/__/BLM Sensitive
Spotted bat	<i>Euderma maculatum</i>	CSC/__/BLM Sensitive
Western mastiff bat	<i>Eumops perotis californicus</i>	CSC/__/BLM Sensitive
Hoary bat	<i>Lasiurus cinereus</i>	__/_
California leaf-nosed bat	<i>Macrotus californicus</i>	CSC/__/BLM Sensitive
Arizona myotis	<i>Myotis occultus</i>	CSC
Cave myotis	<i>Myotis velifer</i>	CSC/__/BLM Sensitive
Yuma myotis	<i>Myotis yumanensis</i>	__/_/BLM Sensitive
Colorado Valley woodrat	<i>Neotoma albigula venusta</i>	__/_
Pocket free-tailed bat	<i>Nyctinomops femorosaccus</i>	CSC
Big free-tailed bat	<i>Nyctinomops macrotis</i>	CSC

WILDLIFE		
Common Name	Scientific Name	Status State/Federal
Burro deer	<i>Odocoileus hemionus eremicus</i>	_ / _ / _
Nelson's bighorn sheep	<i>Ovis canadensis nelson</i>	_ / BLM Sensitive
Yuma mountain lion	<i>Puma concolor browni</i>	CSC
American badger	<i>Taxidea taxus</i>	CSC
Desert kit fox	<i>Vulpes macrotis arsipus</i>	_ / _

Sources: CNDDDB 2010

Status Codes:

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range

FT = Federally listed, threatened: species likely to become endangered within the foreseeable future

BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>

State CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

SE = State listed as endangered

ST = State listed as threatened

CFP = California Fully Protected

WL = State watch list

SR = State-listed rare; Plant species listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901)

California Native Plant Society

List 1B = Rare, threatened, or endangered in California and elsewhere

List 2 = Rare, threatened, or endangered in California but more common elsewhere

List 3 = Plants which need more information

List 4 = Limited distribution – a watch list

0.1 = Seriously threatened in California (high degree/immediacy of threat)

0.2 = Fairly threatened in California (moderate degree/immediacy of threat)

0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Bureau of Land Management

BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all Federal Candidate species and Federal Delisted species which were so designated within the last 5 years and CNPS List 1B plant species that occur on BLM lands.

http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.435.45.File.dat/6840.pdf.

Global Rank/State Rank

Global rank (G-rank) and **State rank (S-rank)** is a reflection of the overall condition of an element throughout its global (or State) range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values. **State rank (S-rank)** is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical

G1 or S1 = Critically imperiled; Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals

G2 or S2 = Imperiled; 6-20 EOs OR 1,000-3,000 individuals

G3 or S3 = Rare, uncommon or threatened, but not immediately imperiled; 21-100 EOs OR 3,000-10,000 individuals

G4 or S4 = Not rare and apparently secure, but with cause for long-term concern; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.

G5 or S5 = Demonstrably widespread, abundant, and secure.

Threat Rank

.1 = very threatened

.2 = threatened

.3 = no current threats known

Special-Status Plant Species

As shown in **Biological Resources Table 3**, several special-status plant species have the potential to occur within the study area. Thirteen of these species were either observed during botanical and wildlife field surveys performed during spring 2009 and 2010 and/or considered to have moderate to high potential for occurrence, based on suitable habitat and/or known occurrences in the region, including:

- Harwood's eriastrum
- Harwood's milk-vetch
- Ribbed cryptantha
- Desert unicorn plant
- Abram's spurge
- Las Animas colubrina
- Flat-seeded spurge
- Glandular ditaxis
- California ditaxis
- Lobed ground cherry
- Dwarf germander
- Palmer's jackass clover
- Jackass clover
- Winged cryptantha
- Utah vining milkweed, and a
- New undescribed taxon of saltbush (*Atriplex* sp. nov.)

Harwood's eriastrum

Harwood's eriastrum, also known as Harwood's phlox or woollystar, is a BLM Sensitive spring annual currently known from only 14 documented locations worldwide. It is CNPS List 1B.2 species, which indicates it is rare, threatened, or endangered throughout its range. It is a California endemic with a global range restricted to San Diego, Riverside, and San Bernardino counties, typically in dunes associated with the margins around dry lakes such as Dale, Cadiz, and Soda lakes. Recently, surveys conducted in spring of 2010 for the Blythe Solar Project located this plant primarily in the sandy areas south of I-10, where 2,134 plants were located and mapped (AECOM 2010d). All of these plants were identified in the general vicinity of the proposed SCE Colorado River substation. Staff considers all stabilized and partially stabilized dunes to be suitable habitats for this species in the study area.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 new occurrences that were not in the CNDDDB. Both of these are historical records from 1939 and 1958. Of the total of 14 occurrences in California (12 CNDDDB plus two additional historic records), three of these are protected under Park Service or State Park ownership. A total of three records are historical records. Four of these occurrences have documented threats, including OHV and non-native plant impacts.

Harwood's Milk-vetch

Harwood's milk-vetch is a CNPS 2.2 species, meaning that it is fairly threatened in California, but more common elsewhere. It is also a covered species under NECO. It

has a CNDDDB (NatureServe) Global rank of G5T3/S2.2; which denotes a subspecies that is rare, uncommon or threatened, but not immediately imperiled, and its occurrences in California are threatened. It is an annual herb that mainly occurs in Sonoran desert scrub habitat throughout the Colorado Desert (BLM CDD 2002). This subspecies is found in desert dunes and sandy or gravelly areas throughout the Mojavean and Sonoran deserts covering portions of Imperial, Riverside, and San Diego counties (CNPS 2009). Historic and recent collections include Ogilby Road in Imperial County and three locales west of Blythe, the Pinto Basin, and Chuckwalla Basin in Riverside County. Harwood's milk-vetch has also been reported from Baja California, Sonora Mexico, and portions of Yuma County, Arizona (Reiser 1994). There are several CNDDDB records for this species within the Project vicinity (CNDDDB 2010).

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 3 new occurrences that were not in the CNDDDB. All of these are historical occurrences. Of the total 46 occurrences in California (CNDDDB plus new additional occurrences), 9 of these are protected under Park Service or State Park ownership. A total of 11 records are historical records. Sixteen of these occurrences have documented threats including development, OHV, agriculture, transmission lines, road maintenance, and trash dumping.

Preliminary surveys performed during spring 2010 identified several hundred (700+) plants of Harwood's milk-vetch along the previously unsurveyed areas (TTEC 2010m). In addition, several Harwood's milk-vetch occurrences were identified in the general vicinity of the proposed SCE Colorado River substation. Spring 2009 surveys identified twelve plants of Harwood's milk-vetch in the Study area, two within solar power plant Disturbance Area and 10 within the linear Disturbance Area.

Ribbed Cryptantha

Ribbed cryptantha is a CNPS 4.3 species, meaning that it has limited distribution in California, but it is not very threatened in California. It typically occurs in loose friable soils in the eastern Mojave and Sonoran deserts in Imperial, Riverside, San Diego, and San Bernardino counties and into Arizona and south to Baja California, Mexico (CNPS 2009). It commonly occurs in stabilized and partially stabilized desert dunes and sandy areas of Sonoran and Mojavean desert creosote bush scrub. There are 116 records of this species from several locations throughout Riverside, Imperial, San Diego, and Imperial counties in the Consortium of California Herbaria database; the nearest collection is from the Palen Valley approximately three miles east of the Desert Center Airport (CCH 2010).

Spring 2009 surveys identified a single population of a few ribbed cryptantha northwest of the Wiley's Well rest area at approximately 380 feet elevation from an area of mixed sand drifts, hummocks with Patton tank tracks with widely scattered shrubs (GSEP 2009f). Preliminary survey findings from spring 2010 identified large populations (estimated in the tens of thousands) of ribbed cryptantha in the previously unsurveyed areas and buffer area (TTEC 2010m). In addition, another large population of ribbed cryptantha plants and a large occupied habitat area of this species were identified in the general vicinity of the proposed SCE Colorado River Substation (TTEC 2010o). This area occurs along the southern linear corridor route north of I-10. This species was

identified in an area mapped as stabilized and partially stabilized desert dunes during March 2009 surveys and in close association with other areas mapped as playa and sand drifts and Sonoran creosote bush scrub with similar habitat qualities.

Desert Unicorn Plant

Desert unicorn plant is a CNPS List 4.3 plant species, meaning it has limited distribution, but is not very threatened in California. This is a covered species under NECO. This is a low-growing, perennial species that occurs in sandy washes within Sonoran desert scrub habitats in San Bernardino, Imperial, Riverside, and San Diego counties of California. There are 13 records known from the NECO planning area in Milipitas Wash, Chuckwalla Valley, and Chemehuevi Valley (BLM CDD 2002). The blooming period for this species is from May to August (CNPS 2009) although is also known to flower between July and September after substantial summer rains (GSEP 2009a). It has a fleshy root system that can remain dormant in dry years.

As a CNPS List 4, it is not tracked in CNDDDB but there are 36 records in the Consortium of California Herbaria, several of which are from the Chuckwalla Mountains and Desert Center area, including the Project area (CCH 2010).

During 2009 spring field surveys, a total of 22 seed pods of this typically summer-blooming perennial were found within the Study area, 5 within the solar power plant Disturbance Area and 17 along the linear Disturbance Area (GSEP 2009f). According to the Biological Resources Technical Report, seed pods were found as evidence of this species occurring in the Project area (75 seed pods and 1 individual plant) (GSEP 2009a, Appendix C). Preliminary results from spring 2010 surveys identified several hundred seed pods and individual plants of desert unicorn plants along the transmission line and buffer area (TTEC 2010m).

Abram's Spurge

Abram's spurge is a CNPS List 2.2 species meaning it is fairly rare in California but more common elsewhere (CNPS 2009). Habitat consists of sandy flats in creosote bush scrub habitat from approximately 600 to 2,700 feet above mean sea level. This ephemeral desert annual occurs in halophytic scrub flats, playas, and along inlets and floodplains of playas and always seems to prefer the lower floodplain ecotone but can also extend higher up into floodplains where braided drainages nexus with dune-mesquite-saltbush-galleta associations (Silverman, pers. comm.). Based on fourteen Consortium of California Herbaria database records for this species, habitats in Riverside, San Diego, and Imperial counties consist of sandy soil habitats often along dry lake margins, whereas documented occurrences in San Bernardino County occur on coarser, possibly sandy loams. Abram's spurge occurs from San Bernardino County to Imperial and eastern San Diego counties to Arizona, Nevada, Mexico, and Baja California (GSEP 2009f). The CNDDDB (CNDDDB 2010) lists 15 occurrences of this plant within the Riverside, Imperial, San Bernardino, and San Diego counties in California, east through Nevada to Arizona, and as far south as Baja California, Mexico. Of the total of 15 occurrences in California, seven of these are protected under Park Service, CDFG, or State Park ownership. A total of four records are historical records and one of these occurrences has documented threats which include grazing. A recent 2000 CNDDDB record is from a location near the Project site; approximately 0.50 mile east of

Ford Dry Lake on Gasline Road just south of I-10, and reported as a “substantial population” (CNDDDB 2010).

The blooming period is identified by CNPS as September through November (CNPS 2009). Since the Project site occurs in the Chuckwalla Valley of the Sonoran Desert, an area known for bi-modal rain patterns and late summer/fall rains, this species typically only blooms during summer or fall months following monsoonal rains (>+/- 0.10 inch) (Silverman pers. comm.). On average, August receives the most rainfall, although rainfall is also received during winter months of December, January, and February. Regional botanical experts have concluded that this, and other summer annuals, may be missed if surveys are only conducted within the mid-March through mid-April window, and that a full inventory at multiple temporal windows are necessary in order to capture all appropriate growing conditions (typically following 12 to 18 mm rain events) (CEC 2009d).

Abram’s spurge is a late-summer, early-fall blooming plant species and was therefore not targeted or detectable during field surveys which were performed during March and April 2009. Based on preliminary survey results from spring 2010, this species has not been identified within the study area (TTEC 2010m). Given the presence of suitable habitat within the Study area, and a recent CNDDDB record immediately south of the Project Disturbance Area near Ford Dry Lake, Abram’s spurge could occur anywhere in the Project Disturbance Area in a wet summer but it is most likely to occur in the washes, playa margins, dune swales and other low-lying areas where moisture can collect.

Las Animas Colubrina

Las Animas colubrina is a CNPS List 2.3 species indicating it is not very endangered in California and more common elsewhere (CNPS 2009). This is a covered species under NECO. It is an evergreen to semi-evergreen shrub that occurs in Mojavean and Sonoran desert scrub (creosote bush series) and occurs at elevations from approximately 30 to 3,000 feet. It primarily occurs in dry canyons or headwater reaches of desert washes with gravelly, sandy soils. The distribution of this species includes San Diego, Imperial, and Riverside counties; portions of Arizona; Baja California; and Sonora, Mexico. This species has been reported from isolated desert locales in Joshua Tree National Monument, the Eagle Mountains, and Chuckwalla Mountains (Reiser 1994). There are approximately 27 occurrences primarily from the Chocolate Mountains area (BLM CCD 2002). The nearest CNDDDB record is from McCoy Springs in the McCoy Mountains in 1976 from approximately 2,800 feet elevation (CNDDDB 2010); however, its occurrence in the McCoy Mountains was recently confirmed during surveys for the Blythe Solar Power Project (Solar Millennium 2009b). This species typically blooms from April through June.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 12 new occurrences that were not in the CNDDDB. Of these eight are historical records from between 1930 and 1966; however four of these are more recent occurrences found in the Sonoran (Colorado) Desert. Of the total 36 records in California (CNDDDB plus new additional occurrences), six of these are protected under

Park Service, State Park, or BLM DWMA land ownership. A total of 11 records are historical records. None of these occurrences have documented threats.

One Las Animas colubrina plant was found in the buffer area one mile north of the plant site Disturbance Area (closer to the southern flank of the Palen Mountains) during 2009 field surveys; no additional plants were detected during the spring 2010 surveys. This species is associated with rockier, steeper headwater reaches and not likely to be found in the Project Disturbance Area.

Atriplex sp. nov

A potentially new taxon of saltbush (*Atriplex*) was discovered on the saline playa margins of Palen Dry Lake last year by a botanist with the U.C. Reserve System (Andre and La Doux, pers. comm.). Although it resembles the common four-wing saltbush (*Atriplex canescens*)—a common plant of dunes which has very linear leaves—the new taxon has obovate leaves that distinguish it from all *Atriplex canescens* and its subspecies. Although plasticity in fruit and vegetative characters hinders description and identification, many of the subspecies have been demonstrated to differ in ploidy level and chemical constituents and thus their biological validities are confirmed, including *Atriplex canescens* ssp. *linearis* (Sanderson & Stutz 1994).

The undescribed *Atriplex* was first collected in 2005 at the "dry lake" just northeast of the Interstate 15 and Highway 95 junction approx 35 miles east and northeast of Las Vegas, Nevada. The first voucher/observation of it in California was at Palen Lake 2009. There is also potential for it to occur along the I-8 corridor in Imperial County. Although it is distinct from the common *Atriplex canescens* in its obovate leaves, it would be easy to overlook the new taxon where they co-occur, even by experienced botanists. The new taxon is more confined to subsaline/saline playa margins, though not necessarily so. Andre (pers. comm.) indicated that it may also have been observed in the Ford Dry Lake area (unconfirmed) and it has been observed in other saline (but non-playa) habitats on remnants of the lower Colorado River flood plain.

Flat-seeded Spurge

Flat-seeded spurge is a CNPS List 1B.2 species meaning it is rare, threatened, or endangered in California and elsewhere; fairly endangered in California. It is a BLM Sensitive species and CNDDDB state rank S1.2. This species occurs in desert dunes and Sonoran desert scrub habitat types, in sandy places or shifting dunes, at elevations from approximately 200 to 300 feet. Some experts speculate that the species may be a "waif" in California, or a species that is not naturalizing, and note that it is more common in Arizona and Mexico (CNDDDB 2010) but overall little is known or can be concluded (LaDoux pers comm). This ephemeral summer annual blooms February through September (CNPS 2009). There are four CNDDDB records of this species for the entire state of California, only one of which is from Riverside County; the closest CNDDDB occurrences is a historical record mapped near the City of Thousand Palms during 1926 (CNDDDB 2010).

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 1 new occurrence that were not in the CNDDDB. This occurrence is a historical record from 1933. Of the total five occurrences in California (CNDDDB plus new

additional occurrences), one of these are protected under State Park ownership. A total of three records are historical records. None of these occurrences have documented threats.

This species was not observed during spring 2009 or spring 2010 (TTEC 2010m) surveys; however, the surveys were not timed to detect this species. Although there are no documented nearby occurrences, the Project occurs within its range, suitable habitat is present, and—as an ephemeral summer annual—it may be under-surveyed; its potential to occur cannot be dismissed (LaDoux pers. comm.).

Glandular Ditaxis

This is a CNPS List 2.2 species meaning that it is rare, threatened, or endangered in California, but more common elsewhere, fairly endangered in California. It is a CNDDDB state rank S1/S2. This plant species grows from sea level to approximately 1,400 feet in Mojavean and Sonoran desert scrub habitat, in the sandy soils of dry washes and rocky hillsides. *Glandular ditaxis* (an annual or short-lived perennial) blooms from October through March (CNPS 2009); while it can be detected during spring surveys; it is easier to detect in fall following the start of the rainy season (Silverman pers. comm.).

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 3 new occurrences that were not in the CNDDDB. All of these are historical records from 1932. Of the total 21 occurrences (CNDDDB plus new additional occurrences), one of these is protected on under CDFG land ownership. A total of six records are historical occurrences. One of these has documented threats, including land development, and is likely extirpated.

This species was not observed during spring 2009 field surveys; nor was it detected during the spring 2010 surveys (TTEC 2010m).

California Ditaxis

California ditaxis is a CNPS List 3.2 species (a review list), meaning that its taxonomic status is questionable and more information is needed; however, its occurrences in California are fairly endangered (CNPS 2009). It is a NatureServe (CNDDDB) state rank S2.2. This species occupies Sonoran desert scrub habitat, and prefers sandy washes and alluvial fans of the foothills and lower desert slopes, from 100 to 3,000 feet above MSL. Reports of this species are known from San Bernardino, Riverside, Imperial, San Diego, and Sonora, Mexico (CNPS 2009). There are 17 records from the CNDDDB (2010) primarily from Riverside.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected four new occurrences that were not in the CNDDDB. Three of these are historical records from between 1921 and 1952; however, one more recent occurrence was found at Anza-Borrego Desert State Park near Starfish Cove Canyon. Of the total 21 occurrences in California (CNDDDB plus new additional occurrences), two of these are protected under Park Service ownership. A total of four records are historical records. Five of these occurrences have documented threats, including, OHV, road grading, and construction of a new power line.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the previously unsurveyed areas (TTEC 2010m).

Lobed Ground Cherry

Lobed ground cherry is a CNPS List 2.3 species, meaning that is rare, threatened, or endangered in California, but more common elsewhere; not very endangered in California. It is a CNDDDB state rank S1.3. This species occurs in Mojavean desert scrub on decomposed granite soils, playas, and alkaline dry lake beds. This species occurs from approximately 1,500 feet to 2,400 feet. There are six records from the Consortium of California Herbaria database, all from San Bernardino County (CCH 2010).

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected two new occurrences that were not in the CNDDDB. Both of these are more recent occurrences, including one from Joshua Tree National Monument and one in the eastern Mojave Desert. Of the total six occurrences in California (CNDDDB plus new additional occurrences), none of these are protected under Park Service or other agency land ownership. None of these are historical records. None of these occurrences have documented threats.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the study area (TTEC 2010m).

Dwarf Germander

Dwarf germander is a CNPS 2.2 meaning that is it rare, threatened, or endangered in California, but more common elsewhere, fairly endangered in California. It is a CNDDDB state rank 2. This species occurs in desert dune, playa margins, and Sonoran desert scrub habitats from approximately 100 feet to 1,200 feet. This species typically blooms from March to May but may also bloom from September through November. This species typically occurs in sandy soils and wash habitats and is known from fewer than 10 occurrences in California (CNPS 2009).

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 new occurrences that were not in the CNDDDB. Both of these are historic records from 1905 and 1949. Of the total seven occurrences in California (CNDDDB plus new additional occurrences), 1 is protected under the BLM DWMA land ownership. A total of three records are historical records. None of these occurrences have documented threats.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the previously unsurveyed areas (TTEC 2010m).

Palmer's jackass clover

Palmer's jackass clover is a proposed new addition to the CNPS inventory and is likely to be added to CNPS List 2 by the end of 2010 (California Energy Commission, 2010, in draft). Palmer's jackass clover is a perennial herb that occupies sandy washes, and

Sonoran desert scrub habitat from sea level to 650 feet. There are no CNDDDB records for this species (CNDDDB 2010).

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected seven occurrences that were not in the CNDDDB. Four of these are historical records from between 1937 and 1952; however, two more recent occurrences were found in the Chocolate-Chuckwalla Mountains region, one southeast of Palen Dry Lake and one near the Palen Sand Dunes. No information on land ownership or documents of threats is available from the Consortium of California Herbaria.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the previously unsurveyed areas (TTEC 2010m).

Jackass-clover

This is a CNPS List 2.2 Species: rare, threatened, or endangered in California, but more common elsewhere, fairly endangered in California. It is CNDDDB state rank 1.2. Jackass-clover inhabits desert dunes Mojavean desert scrub, playas, or Sonoran desert scrub. This species is commonly associated with sandy washes, roadsides, or alkaline flats, of elevations from 425 to 2,630 feet.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 new occurrences that were not in the CNDDDB. One of these occurrences is a historical record from 1937; however one more recent occurrence was found at the Junction I-5 and Stockdale Highway west of Bakersfield. Of the total 9 occurrences in California (CNDDDB plus new additional occurrences), three of these are protected under Park Service ownership. A total of three records are historical records. One of these occurrences has documented threats, including development.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the study area (TTEC 2010m).

Utah vining milkweed

This twining perennial occurs in sandy or gravelly soils in Mojavean and Sonoran desert scrub habitats or washes from approximately 500 feet to 4,300 feet in elevation (CNPS 2009). The distribution of this species covers San Diego, Imperial, Riverside, and San Bernardino counties and portions of Arizona, Nevada, and Utah. Until recently discovered growing on the Palo Verde Mesa (AECOM 2010d), it was believed that the Project was outside of the range of Utah vining milkweed. This species was not observed during spring 2009 field surveys. It was originally thought to be present onsite, but this was due to a mis-identification (GSEP 2009f). As a CNPS List 4, it is not tracked in CNDDDB but there are 58 records of this species from the Consortium of California Herbaria database primarily from San Bernardino and San Diego counties; there is one record from the Big Maria Mountains from wash and stabilized dune habitat at approximately 1,200 feet elevation (CCH 2010).

Winged cryptantha

This is a spring-blooming annual that occurs in Mojavean and Sonoran desert scrub habitats from 300 feet to approximately 5,000 feet above mean sea level. This species blooms from March through April (CNPS 2009). Winged cryptantha is found in Mojavean and Sonoran deserts within California, Arizona, and Nevada. There are 79 records of this species in the Consortium of California Herbaria database from Riverside, Imperial, San Bernardino, and San Diego counties (CCH 2010). This species has low to moderate potential to occur at the Project site. There are no CNDDDB records for this species for the entire state of California (CNDDDB 2010). This species was not observed during spring 2009 field surveys, but one occurrence was detected north of the proposed substation (TTEC 2010o).

Special-status Wildlife Species

Desert Tortoise

The desert tortoise was state-listed in California as threatened on August 3, 1989. The Mojave population was federally listed as threatened on April 2 1990, and critical habitat was designated on February 8, 1994. 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, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS 1990; USFWS 1994a). The desert tortoise's range, outside the listed Mojave population, extends into the Sonoran Desert, where tortoises occur in the lower Colorado River Valley, Arizona uplands, plains of Sonora, and the central Gulf Coast; the species has not been documented in northeastern Baja California (Germano et al. 1994).

Desert tortoises are well adapted to living in a highly variable and often harsh desert environment. They spend much of their lives in burrows, even during their seasons of activity, which generally coincides with the greatest annual forage availability. In late winter or early spring, they emerge from over-wintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms to drink (Henen *et al.* 1998). During activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Berry 1974; Luckenbach 1982; Esque 1994). During periods of inactivity, they reduce their metabolism and water loss and consume very little food. Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind and can apparently tolerate large imbalances in their water and energy budgets (Nagy and Medica 1986; Peterson 1996a, b; Henen et al. 1998).

The size of desert tortoise home ranges varies with respect to location and year (Berry 1986a) and also serves as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor *et al.* 1994). Females have long-term home ranges that may be as little or less than half that of the average male, which can range to up to 200 acres (Burge 1977; Berry 1986a; Duda et al. 1999; Harless et al. 2009). Core areas used within tortoises' larger home ranges depend on the number of burrows used within those areas (Harless et al. 2009). Over its lifetime, each desert tortoise may use more than 1.5 square miles of habitat and may make periodic forays of more than 7 miles at a time (Berry 1986a).

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner et al. 1984b; Bury 1987; Germano 1994). Mating occurs both during spring and fall (Black 1976; Rostal et al. 1994), and the number of eggs as well as the number of clutches (set of eggs laid at a single time) that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Turner et al. 1986, 1987; Henen 1997; McLuckie and Fridell 2002). Egg-laying occurs primarily from April to July (Rostal et al. 1994; USFWS 1994); the female typically lays 2-14 eggs (average 5-6) eggs in an earthen chamber excavated near the mouth of a burrow or under a bush (Woodbury and Hardy 1948; USFWS 1994). The eggs typically hatch 90 to 120 days later, between August and October. The success rate of clutches has proven difficult to measure, but predation, while highly variable (Bjurlin and Bissonette 2004), appears to play an important role in clutch failure (Germano 1994).

The majority of threats to the desert tortoise and its habitat are associated with human land uses. Many of those identified in the 1994 Recovery Plan, and that formed the basis for listing the species as threatened, continue to affect the tortoise today (USFWS 2008a). Some of the threats identified at the time of listing include urbanization, upper respiratory tract disease and possibly other diseases, predation by common ravens and domestic and feral dogs, unauthorized off-road vehicle activity, authorized vehicular activity, illegal collecting, mortality on paved roads, vandalism, drought, livestock grazing, feral burros, non-native plants, changes to natural fire regimes, and environmental contaminants (USFWS 1994).

Even though a wide range of threats are known to affect desert tortoises and their habitat, very little is known about their demographic impacts on tortoise populations or the relative contributions each threat makes to tortoise mortality (Boarman 2002a). Extensive research shows that all of these threats can directly kill or indirectly affect tortoises; research has also clarified many mechanisms by which these threats act on individuals. While current research results can lead to predictions about how local tortoise abundance should be affected by the presence of threats, quantitative estimates of the magnitude of these threats, or of their relative importance, have not yet been developed. Thus, the revised recovery plan focuses on expanding the knowledge of individual threats and places emphasis on understanding their multiple and combined effects on tortoise populations (USFWS 2008a).

The original *Desert Tortoise (Mojave Population) Recovery Plan* identified 6 recovery units (Upper Virgin River, Northeastern Mojave, Eastern Mojave, Eastern Colorado, Northern Colorado, and Western Mojave) and recommended the establishment of 14 DWMA's throughout the recovery units (USFWS 1994). Since 1994, greater insight into patterns of both ecological and genetic variation within the Mojave desert tortoise population has been gained. While the revised recovery plan has not yet been finalized, based on this new information, the revision redefines the recovery units to balance both distinctiveness and variability within the population. Given the generally continuous variation in genetic structure and biomes across the Mojave desert tortoise's range, the approach in delineating revised recovery units stresses identification of geographic discontinuities or barriers that coincide with any observed variation among tortoise populations. Several potential barriers are evident from topographic maps, the U.S.

Geological Survey habitat model (Nussear et al. 2009), and landscape genetic analyses (Hagerty 2008). Differences in genetic, ecological, and physiological characteristics to help highlight boundaries or other differences between units were used in the delineation. In doing this, the USFWS considered demographic, ecological, and behavioral considerations to be of greater importance than genetic issues alone, as have been suggested by researchers providing recommendations on the formulation of conservation plans for threatened or endangered species (Awise 2004; Mace and Purvis 2008). The draft revised recovery plan reduces the number of recovery units from six to five, which reflects the newly obtained information and ensures that local adaptations and critical genetic diversity are maintained (USFWS 2008a).

According to the 1994 Recovery Plan, the Project is located within Eastern Colorado Recovery Unit, which was merged with the Northern Colorado Recovery Unit in the draft revised recovery plan and referred to simply as the Colorado Desert Recovery Unit (USFWS 2008a). Within this recovery unit desert tortoise are found primarily in “well-developed washes, desert pavements, piedmonts, and rocky slopes characterized by relatively species-rich succulent scrub, creosote bush scrub, and blue palo verde-ironwood-smoke tree communities” (USFWS 1994). Habitat within this recovery unit has been described as being in excellent condition despite declines in tortoise densities over the past several decades; disturbance was estimated at less than 1.3 percent throughout (USFWS 2005). The highest desert tortoise densities within this recovery unit occur in Chemehuevi and Ward valleys, on the Chuckwalla Bench within the Chuckwalla Desert Wildlife Management Area (DWMA and associated Critical Habitat Unit) and in Joshua Tree National Park. Desert tortoise densities at the Chuckwalla Bench in 1992 were estimated between 22 and 49 adults per square kilometer (approximately 57–127 adults per square mile) but have shown declining trends (Berry 1997; Tracey et al. 2004).

According to the 1994 Recovery Plan, tortoise densities in the Eastern Colorado Recovery Unit were estimated between 5 and 175 adult tortoises per square mile and the area was given a threat level of 4 out of 5 (5 = extremely high) (USFWS 1994). Density estimates based on range-wide line distance sampling monitoring from 2001–2005 (USFWS 2006) are lower than estimates from earlier studies (Luckenbach 1982; Berry 1984), but these simple comparisons cannot be taken at face value when the historical monitoring efforts were conducted using different techniques at different scales and with different goals. Differences may reflect a difference in scale between methods, with relatively large historical tortoise densities estimated in small, local areas being smoothed over larger areas with range-wide sampling. However, low tortoise densities across recovery units from 2001-2005 may also represent continued decline of populations throughout the Mojave Desert since the species was listed (USFWS 2006).

Protocol-level surveys of most of the Study area were conducted between March 17 – 25 and April 6 – 13, 2009 (Study area except south of I-10) and October 30, 2009 (transmission line south of I-10). The transmission line route changed after spring surveys; the northern alignment was included in spring surveys, but not to the same level of intensity as the rest of the Study area, and further surveys are scheduled for Spring 2010 (TTEC 2010a). Survey results of the Project Disturbance Area include 19 mineralized and 9 non-mineralized carcass fragments. Preliminary spring 2010 surveys

identified approximately 30 tortoise bone fragments (>> 4 years age) along the transmission line and buffer area (TTEC 2010m).

The Applicant indicates that the Project Disturbance Area is currently unoccupied by desert tortoise. They conclude that the northwestern portion of the Project site is suitable or marginally suitable habitat, while the remainder of the site is not habitat for desert tortoise. They also conclude that the Sonoran creosote bush scrub and wash habitat north and west of the Project site is higher quality habitat (GSEP 2009a, TTEC 2009c). Energy Commission, BLM, CDFG and USFWS staff agree that the habitat within the Project Disturbance Area is of lower quality closer to the Ford playa and is higher quality toward the upper bajadas, but consider the entire Project site to contain suitable habitat for desert tortoise (e.g., Sonoran creosote bush scrub with friable soils for burrowing and appropriate forage plants) and could potentially be occupied by this species in the future.

Mojave Fringe-toed Lizard

The Mojave fringe-toed lizard is endemic to southern California and a small area of western Arizona, where it is restricted to aeolian (wind-blown) sand habitats in the deserts of Los Angeles, Riverside, and San Bernardino Counties in California and La Paz County in Arizona (Hollingsworth and Beaman 1999; Stebbins 1985). Nearly all records for this species are associated with present-day and historical drainages and associated sand dune complexes of the Mojave and Amargosa Rivers (Norris 1958).

The distribution of Mojave fringe-toed lizards is naturally fragmented because of its obligate habitat specificity to loose sand, a patchy habitat type (Murphy et al. 2007). Many local populations of this species are quite small, with small patches of sand supporting small populations of lizards. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation (Murphy et al. 2007). The loose wind-blown sand habitat, upon which the species is dependent, is a fragile ecosystem requiring the protection against both direct and indirect disturbances (Weaver 1981; Barrows 1996). Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will also affect this species (Turner et al. 1984; Jennings and Hayes 1994). Additional threats to this species include habitat loss or damage from urban development, off-highway vehicles (OHV), and agriculture. Aside from the direct loss of land, development can also increase predators, such as the common raven, to occupied habitat.

Murphy et al. (2006) identified two maternal lineages of this species; the northern lineage is associated with the Amargosa River drainage system, and the southern with the Mojave River drainage system, Bristol Trough, Clark's Pass (including Palen Lake and Pinto Wash), and the Colorado River sand transport systems.

The Mojave fringe-toed lizard is found in arid, sandy, sparsely vegetated habitats and is associated with creosote bush scrub throughout much of its range (Norris 1958; Jennings and Hayes 1994). This species is totally restricted to habitats of fine, loose, aeolian sand, typically with sand grain size no coarser than 0.375 mm in diameter (Turner et al. 1984; Jennings and Hayes 1994; Stebbins 1944). It burrows in the sand for both cover from predators and protection from undesirable temperatures (Stebbins 1944), though it will also seek shelter in rodent burrows. They are primarily

insectivorous, but also eat plant food including leaves, seeds, and buds (Stebbins 1944). Mojave fringe-toed lizards normally hibernate from November to February, emerging from hibernation sites from March to April. The breeding season is April to July, and adult Mojave fringe-toed lizards reach sexual maturity two summers after hatching. Females deposit 2-5 eggs in sandy hills or hummocks May through July (Mayhew 1964, Jennings and Hayes 1994). April to May, while temperatures are relatively cool, this species is active during mid-day; from May to September, they are active in mornings and late afternoon, but seek cover during the hottest parts of the day. Common predators of the Mojave fringe-toed lizard include burrowing owls, leopard lizards, badgers, loggerhead shrikes, roadrunners, various snakes, and coyotes (Jennings and Hayes 1994).

Thirty-nine Mojave fringe-toed lizards were observed during spring 2009 Project surveys. Approximately 60+ Mojave fringe-toed lizards including juvenile, subadult, and adults were found during spring 2010 field surveys within the transmission line and buffer area (TTEC 2010m). Several Mojave fringe-toed lizards were observed within the proposed six-pole extension area for the gen-tie transmission line at the SCE Colorado River Substation site. The Project Disturbance Area contains suitable Mojave fringe-toed lizard habitat wherever stabilized and partially stabilized sand dune habitat (1 acres) and playa/sand drift over playa habitat (37 acres) occur. Mojave fringe-toed lizard habitat preferences are more closely tied to the landform than to the vegetation community, and Sonoran creosote bush scrub habitat with an active sand layer can also support this species. This species was detected south of I-10 in Sonoran creosote bush scrub because this area supports a layer of wind-blown sand from the adjacent dunes.

Couch's Spadefoot Toad

Couch's spadefoot toad is found in southeastern California east through Arizona, New Mexico, Texas, and Oklahoma, south to San Luis Potosi, Nayarit, Mexico, at the southern tip of Baja California, Mexico, and an isolated population in Colorado. In California, it is found in the extreme southeast, including southeastern San Bernardino County and eastern Riverside and Imperial Counties (Jennings and Hayes 1994). The Project area is west of the range for this species as the range is described in the Northern & Eastern Colorado Desert Coordinated Management Plan (BLM CDD 2002) and Amphibian and Reptile Species of Special Concern in California (Jennings and Hayes 1994); however, Dimmitt (1977) identifies the Palen Dry Lake area as a place of interest for further surveys.

They are found in a variety of plant communities, including desert dry wash woodland, creosote bush scrub, and alkali sink scrub. They require habitat with substrate capable of sustaining temporary pools for breeding, and loose enough to permit burial in subterranean burrows (Jennings and Hayes 1994, BLM CDD 2002). Breeding habitat includes temporary impoundments at the base of dunes as well as road or railroad embankments, temporary pools in washes or channels, pools that form at the downstream end of culverts, and playas (Morey 2005; Morey, pers. comm.; Mayhew 1965). Natural scour sites in washes with breeding toads (included in Dimmitt 1977) had washed down to a hardpan, which enabled ponding (Dimmitt, pers. comm.). The majority of known Couch's spadefoot toad breeding ponds are artificial, though this may be because of the difficulty of locating natural ponds within the limited amount of time

ponds may retain water. Couch's spadefoot toads require a food source, primarily alate termites, but they also eat beetles, ants, grasshoppers, solpugids, scorpions, and centipedes.

This species is dormant from 8-10 months of the year, emerging from burrows at the onset of warm summer rains. Emergence appears to be triggered by the low frequency sound caused by falling rain, though it appears to be inhibited by low soil temperatures.

Threats to Couch's spadefoot include loss of habitat from urbanization and agriculture and impacts from off-highway vehicles, which can destroy potential pool habitat. There are also indications that the low-frequency sound created by off-highway vehicles may trigger emergence cues, and result in emergence in poor environmental conditions (Jennings and Hayes 1994). Emergence may also be triggered by construction vehicle noise (Dimmitt, pers. com.).

No Couch's spadefoot toads were observed during surveys; however, because of the short time this species is above ground, and because the surveys were not conducted during the proper season (i.e., after summer rains), the lack of observations does not suggest the species is absent from the Project site. During Project surveys, the Applicant searched for artificial or temporary water catchments that could serve as breeding pools (GSEP 2009a). None were identified within the Study area. Staff reviewed Project site aerials, however, and has identified some areas that appear to sustain or that could potentially sustain surface water.

The closest known record for this species is from Dimmitt (1977) from a breeding pond near the intersection of I-10 and Wiley Well Road. While Dimmitt (1977) does not identify the exact location of this pond, a large ponded area (an old borrow pit) is visible in aerial photos in the same general area identified by Dimmitt (1977). Aerial photos and a site visit by BLM staff indicate the borrow pit can sustain ponded water. This area is within the Project transmission line route.

Western Burrowing Owl

The western burrowing owl inhabits arid lands throughout much of the western United States and southern interior of western Canada (Haug et al. 1993) and is typically a year-round resident in much of California (Gervais et al. 2008).

Burrowing owls are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by California ground squirrels, kit fox, desert tortoise, and other wildlife. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats. They often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al. 2008). The southern California breeding season (defined as from pair bonding to fledging) generally occurs from February to August with peak breeding activity from April through July (Haug et al. 1993).

In the Colorado Desert, western burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant, including along the lower Colorado River (Gervais et al. 2008). Western burrowing owls tend to be opportunistic

feeders. Large arthropods, mainly beetles and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice and voles (*Microtus*, *Peromyscus*, and *Mus* spp.), are also important food items for this species. Other prey animals include

reptiles and amphibians, young cottontail rabbits, bats, and birds, such as sparrows and horned larks. Consumption of insects increases during the breeding season (Haug et al. 1993).

Threats to burrowing owls include habitat modification and destruction of ground squirrel burrows. Other threats include pesticide accumulation, burrow destruction from farming practices and canal and road maintenance, roadside shooting, and direct mortality from squirrel poisons (BLM CDD 2002; Gervais et al. 2008).

Protocol-level surveys of part of the Project Disturbance Area (except for part of the Study area associated with the newest transmission line route south of I-10) were conducted in winter of 2007 (Phase I) and spring of 2009 (GSEP 2009a). One burrowing owl was observed during 2007 surveys and two owls and burrowing owl sign (burrows, whitewash, feathers and pellets) were observed throughout the study area during 2009 field surveys although outside of the Project Disturbance Area. One burrowing owl was observed during spring 2010 field surveys within the transmission line study area (TTEC 2010m). The entire Project Disturbance Area (1,811 acres) is considered burrowing owl habitat.

Golden Eagle

Golden eagles are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover.

The status of golden eagle populations in the United States is not well known, though there are indications populations may be in decline (USFWS 2009b, Kochert et al. 2002). Accidental death from collision with man-made structures, electrocution, gunshot, and poisoning are the leading causes of mortality for this species, and loss and degradation of habitat from agriculture, development, and wildfire continues to put pressure on golden eagle populations (Kochert et al. 2002; USFWS 2009b).

Absent interference from humans, golden eagle breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009b). A compilation in Kochert et al. (2002) of breeding season home ranges from several western United States studies showed an average home range of 20 to 33 square kilometers (7.7 to 12.7 square miles) that ranged from 1.9 to 83.3 square kilometers (0.7 to 32.2 square miles). In San Diego, a study of 27 nesting pairs

found breeding ranges to be an average of 36 square miles with a range from 19 to 59 square miles (Dixon 1937). Other studies from within and outside the United States include ranges from 9 to 74.2 square miles (McGahan 1968; Watson et al. 1992 [range of 14.7 to 26.1 pairs per 1,000 square kilometers]). An Environmental Assessment (EA) and Implementation Guidance for take permits was issued under the Bald Eagle and Golden Eagle Protection Act (USFWS 2009b). The EA specifies that in implementing the resource recovery permit for take of inactive golden eagle nests (50 CFR 22.25), data within a 10-mile radius of the nest provides adequate information to evaluate potential effects. In Spring 2010, the Applicant along with applicants of other adjacent proposed solar development projects jointly funded golden eagle helicopter surveys, following the during spring 2010 following the USFWS's February 2010 *Interim Golden Eagle Inventory and Monitoring Protocols* (Pagel et al. 2010); however to-date, the results of the surveys are not available. The closest known historic golden eagle nests are within 14 miles of the Project site (BLM 1999). No recent survey information is available indicating whether these nests are currently active or have recently been used. Nearby Palen and McCoy mountains may also provide suitable nesting habitat. No golden eagles were observed during surveys in the Study area, including during avian point count surveys. The avian point count surveys were conducted in March and April, 2009 (GSEP 2009a). However, these surveys were conducted within the Project site only and therefore were not designed to survey potential golden eagle nesting habitat near the Project site, and did not assess the quality of foraging habitat or prey abundance for eagles.

Loggerhead Shrike

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast (Humple 2008).

Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996).

This species can be found within lowland, open habitat types, including creosote bush scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996). Loss of habitat to agriculture, development, and invasive species is a major threat; this species has shown a significant decline in the Sonoran Desert (Humple 2008).

Loggerhead shrikes were observed throughout the survey area during spring 2009 and preliminary spring 2010 field surveys (TTEC 2010m) as well as during avian point count surveys. The entire Project site is considered loggerhead shrike habitat (GSEP 2009a).

Le Conte's Thrasher

In California, Le Conte's thrasher is a resident in the San Joaquin Valley and the Mojave and Colorado deserts. It occurs in desert flats, washes and alluvial fans with sandy

and/or alkaline soil and scattered shrubs. It rarely occurs in monotypic creosote bush scrub habitat, because creosote bush is unable to support a nest, or in massive Sonoran Desert woodlands (Prescott 2005). Preferred nest substrate includes thorny shrubs and small desert trees. Breeding activity occurs from January to early June, with a peak from mid-March to mid-April (BLM CDD 2002). Le Conte's thrashers forage for food by digging and probing in the soil. They eat arthropods, small lizards and snakes, and seeds and fruit; the bulk of their diet consists of beetles, caterpillars, scorpions, and spiders.

This species was observed during Project surveys. Although the entire project area may provide suitable habitat for this species, the best habitat is likely the microphyll woodland associated with the linear facilities.

Crissal thrasher

Crissal thrashers are non-migratory residents ranging from southern Nevada and southeastern California to western Texas and central Mexico. This species prefers habitats characterized by dense, low scrubby vegetation, which, at lower elevations, includes desert and foothill scrub and riparian brush. Nests of this species typically consist of an open cup of twigs, lined with finer vegetation, and are placed in the middle of a dense shrub (Shuford & Gardali 2008).

Based on a review of the vegetation community descriptions provided by the Applicant, the Project site contains little, if any, of the dense scrub habitat preferred by this species. They are known from the area, including from McCoy Spring, Palen Valley, and Chuckwalla Well (Shuford & Gardali 2008). The closest occurrence based on the CNDDDB (2010) is south of the Project site within one mile of the transmission line interconnection location.

California Horned Lark

The California horned lark is found throughout California except the north coast, and is less common in mountainous areas. This species prefers open areas that are barren or with short vegetation including deserts, brushy flats, and agricultural areas. Eggs are laid March to early June, and this species frequently lays a second clutch.

The Project site contains suitable habitat for this species, especially in creosote bush scrub. This species was observed frequently in the Project Disturbance Area during surveys, and was the most numerous species observed during avian point count surveys (GSEP 2009a).

Brewer's Sparrow

In California, Brewer's sparrow is a common breeding bird east of the Cascade-Sierra Nevada crest, in the mountains and higher valleys of the Mojave Desert, and, uncommonly, at high elevations in San Bernardino, Ventura, Kern, and San Luis Obispo counties. This species winters in the southeastern part of the state in sagebrush shrublands and brushy desert habitat, including desert scrub dominated by various saltbush species and creosote (Zeiner et al. 1990, Rotenberry et al. 1999).

Declines in this species have been noted in the breeding range, and may be attributable to loss and fragmentation of breeding habitat. Impacts due to degradation of wintering habitat have not been reported for this species (Rotenberry et al. 1999).

Brewer's sparrows were observed during Project surveys, and would be expected in the Project area as a winter resident.

Prairie Falcon

The prairie falcon inhabits dry environments in the North American west from southern Canada to central Mexico. It is found in open habitat from annual grasslands to alpine meadows at all elevations up to 3,350 m, but is associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. They require cliffs or bluffs for nesting though will sometimes nest in trees, on power line structures, on buildings, or inside caves or stone quarries. Ground squirrels and horned larks are the primary food source, but prairie falcon will also prey on lizards, other small birds, and small rodents.

One prairie falcon was observed (flyover) within the transmission line buffer area during spring 2010 surveys (TTEC 2010m). The entire Project Disturbance Area (1,811 acres) is suitable foraging habitat for prairie falcon, and this species was observed on the Project site. The Project site does not contain suitable nesting habitat, although adjacent mountains may. There are numerous CNDDDB (2010) records in the region for this species, including nest records from Little Maria Mountains to the northeast (1977) and the Chuckwalla Mountains to the southwest (1978).

Short-eared Owl

Short-eared owls breed through much of northern North America, and are year-round residents in some areas of California. Historically, this species bred throughout much of California, west of the southern deserts, in low numbers. Currently, small populations breed regularly in the Great Basin and in the Sacramento/San Joaquin River Delta area, but sporadically in other parts of its former range. Short-eared owls require open country that supports small mammal populations, and that also provides adequate vegetation to provide cover for nests. This includes salt- and freshwater marshes, irrigated alfalfa or grain fields, and ungrazed grasslands and old pastures (Shuford & Gardali 2008, Zeiner et al. 1990).

The Project area is not within the breeding range for short-eared owl as the range is described in CDFG publications (Zeiner et al. 1990, updated 2008; Shuford & Gardali 2008); in addition, the Project site does not provide suitable breeding habitat. The Project site does contain suitable wintering habitat for the short-eared owl, and this species was observed during Project surveys.

Swainson's Hawk

Swainson's hawks require large areas of open landscape for foraging, including grasslands and agricultural lands that provide low-growing vegetation for hunting and high rodent prey populations. Swainson's hawks typically nest in large native trees such as valley oak, cottonwood, walnut, and willow, and occasionally in nonnative trees, such

as eucalyptus within riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands (CDFG 1993).

While there are historical breeding records of this species from the Colorado Desert (Woodbridge 1998), this species is now known from southern California only as a spring and fall migrant (CDFG 1993). This reduction in breeding range is believed to be from loss of nesting habitat (Zeiner et al. 1990, updated 2006).

The Project site may provide foraging habitat for migrating individuals, and this species was observed in the Project site during spring 2009 and preliminary 2010 field surveys. Three individual Swainson's hawks (flyovers) were found during 2010 field surveys along the transmission line and buffer area (TTEC 2010m).

Ferruginous Hawk

Ferruginous hawks do not breed in California, but are winter residents and in California are most common in grassland and agricultural areas in the southwest. Ferruginous hawks are found in open terrain from grasslands to deserts, and are usually associated with concentrations of small mammals. Threats to this species include loss of wintering habitat from urbanization and cultivation.

The Project site contains suitable wintering habitat for ferruginous hawks, and this species was observed during spring 2009 and preliminary 2010 field surveys. One individual ferruginous hawk (flyover) was observed along the transmission line following spring 2010 surveys (TTEC 2010m).

Northern Harrier

In western North America, the northern harrier breeds from northern Alaska south to Baja California, Mexico. This species does not commonly breed in desert regions of California, where suitable habitat is limited, but winters broadly throughout California in areas with suitable habitat. Northern harriers forage in open habitats including deserts, pasturelands, grasslands, and old fields.

The Project site contains suitable wintering habitat for the northern harrier, and this species was observed during spring 2009 and 2010 field surveys (GSEP 2009a). One individual harrier was observed during 2010 field surveys (TTEC 2010m). There are CNDDDB (2010) nesting records for this species in eastern Riverside County

American Badger

American badgers were once fairly widespread throughout open grassland habitats of California. Badgers are an uncommon permanent resident with a wide distribution across California, except from the North Coast area. American badger is most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and cold desert areas (Zeiner et al. 1990). Badgers inhabit burrows and often predate and forage on other small mammal burrows as evidenced by claw marks along the edges of existing burrows.

American badger sign was found during spring 2009 field surveys; burrow predation evidence by badgers was found in the buffer area west of the solar power plant Project Disturbance Area. Therefore, the entire Study area is considered suitable habitat for American badger.

Desert Kit Fox

Desert kit fox is an uncommon to rare permanent resident of arid regions of the southern portion of California. Kit fox occur in annual grasslands, or grassy open, arid stages of vegetation dominated by scattered herbaceous species. Kit fox occur in association with their prey base which is primarily cottontail rabbits, ground squirrels, kangaroo rats and various species of insects, lizards, or birds (Zeiner et al. 1990). California Code of Regulations 14 CCR § 460 stipulates that desert kit fox may not be taken at any time. Protection provided by kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species.

Desert kit fox burrows, complexes and scat were observed throughout the Study area within desert wash and upland scrub habitats during 2009 field surveys; desert kit fox complexes, kit fox scat and burrows were observed south of I-10 during spring 2010 field surveys (TTEC 2010m). Over 65 kit fox burrow complexes, both active burrows with fresh scat present and inactive burrow complexes were observed throughout the solar power plant Project Disturbance Area and linear Disturbance Area (GSEP 2009a). The entire Study area is suitable habitat for desert kit fox.

Nelson's Bighorn Sheep

Nelson's bighorn sheep includes bighorns from the Transverse Ranges through most of the desert mountain ranges of California, Nevada, and northern Arizona to Utah. Essential habitat for bighorn sheep includes steep, rocky slopes of desert mountains, termed "escape terrain." Their agility on steep rocky terrain is an adaptation used to escape predators such as coyotes, eagles, and cougars (Wehausen 1992). Surface water is another element of desert bighorn habitat considered essential to population health. Male and female bighorn sheep inhabiting desert ecosystems can survive without consuming surface water (Krausman et al. 1985) and males appear to drink infrequently in many situations; however, there are no known large populations of bighorn sheep in the desert region that lack access to surface water. In the spring, when annual plants are available, bighorn tend to disperse downhill to bajadas and alluvial fans to forage. Desert bighorn have a long lambing season that can begin in December and end in June in the Mojave Desert, and a small percentage of births commonly occur in summer as well (Wehausen 1992).

Over the past 140 years, bighorn sheep have suffered considerable population declines throughout their range and metapopulations have been fragmented by roads and other barriers with a resulting decline in genetic diversity (Bleich et al. 1996, Epps et al. 2005). Disease, sometimes brought about by contacts with domestic sheep, drought and predation, interacting with other anthropogenic factors may also have contributed to declines in bighorn sheep populations (Wehausen 2005). Loss of surface water sources may also diminish the viability of existing populations (Wehausen 2005).

Two metapopulations of bighorn sheep occur within the NECO Planning Area, the Southern Mojave and Sonoran. Within these metapopulations, there are smaller, somewhat isolated subpopulations of bighorn sheep known as demes, with nine demes occurring in the Sonoran metapopulation (BLM CDD 2002). Bighorn sheep metapopulations have been fragmented by highways, roads, railroads, and aqueducts primarily by the construction of Interstate 10 and Interstate 40 which are major barriers to bighorn sheep movements. Transportation corridors of Highways 66, 62, 177, 95, and 78, the Atchison, Topeka & Santa Fe Railroad (parallel to Old Highway 66) and the Eagle Mountain Railroad (scheduled for reactivation) inhibit bighorn sheep movements between demes. Nevertheless, bighorn sheep are known to cross these and other linear features such as transmission lines and fences.

The Project site is located southeast of an occupied bighorn Sheep WHMA in the Palen, Granite, and Coxcomb Mountains (BLM CDD 2002), and southwest of a currently unoccupied Bighorn Sheep WHMA in the McCoy Mountains. Recent surveys suggest bighorn sheep may occur in the Little Maria Mountains, farther northeast of the Project area, in an area designated by the NECO Plan as an unoccupied WHMA (Wehausen 2009). The CNDDDB records for this species from the Project area indicate that bighorn sheep disperse through these mountain ranges typically whenever forage and water conditions permit.

No sign or evidence of Nelson's bighorn sheep were found during field surveys and bighorn sheep are not expected to occur in the Project area. The Project Area is not within a known bighorn sheep corridor as identified in the NECO Plan.

Burro Deer

Burro deer is a subspecies of mule deer (*Odocoileus hemionus*) found in the Colorado Desert of southern California. This species is found in the Colorado region of the Sonoran Desert near the Colorado River and within desert dry wash woodland communities. Some burro deer are resident along the Colorado River, but a significant portion move into desert areas in response to water and forage. During the hot summers, water is critical, and burro deer concentrate along the Colorado River or the Coachella Canal where water developments have been installed and where microphyll woodland is dense and provides good forage and cover. With late summer thundershowers and cooler temperatures, deer move away from the Colorado River and Coachella Canal and then up the larger washes into mountains or wash complexes in the foothills (BLM CDD 2002).

During spring 2009 field surveys, tracks of burro deer were found in one location south of I-10 along the southern transmission line route (GSEP 2009a, Appendix C). Burro deer sign (tracks) were found along the transmission line and buffer area during spring 2010 field surveys (TTEC 2010m). This species is expected to occur north of I-10 and within the Study area especially along desert washes and areas of dry desert wash woodland and other microphyllous riparian vegetated washes. Therefore, these habitat areas are considered suitable for burro deer within the Study area.

Biological Resources Table 4 lists all special-status species evaluated during the analysis that are not likely to occur or have a low to moderate potential for occurrence in the Project area. This table provides additional information on the species identified in

Biological Resources Table 3 and the determination of their potential for occurrence in the Project area such as the presence or absence of suitable habitat, nearby occurrence records, and survey efforts that have taken place.

**Biological Resources Table 4
Special-Status Species with No, Low or Moderate Potential to Occur at the GSEP Study Area**

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Plants		
Angel trumpets <i>Acleisanthes longiflora</i>	This species occurs in Sonoran desert scrub habitats on carbonate soils from approximately 200 to 300 feet above MSL. There are two records from the Consortium of California Herbaria from the Colorado Desert, Palo Verde area (CCH 2010).	This species has low potential to occur in the Project area due to the presence of suitable habitat although the site being located above the elevation range of this species. Surveys will be conducted for this species in 2010. This species is not expected to occur in the Project area because it is above the elevation range of this species.
Argus blazing star <i>Mentzelia puberula</i>	This plant species occurs in desert scrub and desert woodlands with limestone and granitic slopes above 2,000 feet in elevation. This is a species of hot, rugged, rocky areas and should be distinguishable from <i>M. multiflora</i> on habitat characteristics alone. Argus blazing star was a proposed addition and is now a recent addition to CNPS List 2. In California, this species has been observed in good numbers in the Whipple, Chemehuevi and Turtle mountains, in southeastern San Bernadino and eastern Riverside counties along the Colorado River (Silverman, Pers. Comm. March 2010). Based on 13 Consortium of California Herbaria database records for this species, this species has been collected from Riverside, San Bernardino, and Imperial counties from the Little and Big Maria Mountains in Riverside County.	This species has low potential to occur in the study area; limestone and granitic slopes which are soil types preferred by this species are absent from the study area. The Project site is located at approximately 360 to 450 feet above MSL which is well below the typical elevation where this species typically occurs. This will be a target species during 2010 focused botanical surveys.
Arizona spurge <i>Chamaesyce arizonica</i>	This species occupies sandy, Sonoran desert scrub habitat areas and has been reported from Imperial, Riverside, San Diego counties and portions of Arizona and Baja, California (CNPS 2009) from approximately 150 feet to 1,200 feet above MSL. There are 7 database records from the Consortium of California Herbaria primarily from San Diego County but also Riverside and Imperial counties often from sandy areas and transition areas between chaparral and desert habitats. The record from Riverside County is near Palm Springs from Andreas Canyon (CCH 2010).	This species has a low potential to occur within the study area. Although suitable habitat is present and the project site is within the appropriate elevation range, there are no CNDDDB occurrences within 10 miles of the site and the species is not known to occur in the area.
Bitter hymenoxys	Bitter hymenoxys grows in riparian scrub and Sonoran	This species has low potential to occur within the

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<i>Hymenoxys odorata</i>	desert scrub habitats from 150 feet to 500 feet above MSL. This plant species blooms from February through November (CNPS 2009). There are five CNDDDB records for this species for the entire state of California, two of which occur in Riverside County.	Sonoran creosote bush scrub habitats within the Project area. However, this species was not found during spring 2009 field surveys. There are no CNDDDB occurrences within 10 miles of the site.
Bitter snakeweed <i>Condalia globosa</i> var. <i>pubescens</i>	Another common name for this species is spiny abrojo. Bitter snakeweed occurs in Sonoran desert scrub from approximately 400 feet to 3,000 feet above MSL. Bitter snakeweed blooms from March through May (CNPS 2009). Based on 35 records Consortium of California Herbaria database, all records are from Imperial County except one from Riverside County, a record from 1,900 feet elevation from a relatively flat alluvial fan from Chuckwalla Bench (CCH 2010). There are no CNDDDB records for this species for the state of California (CNDDDB 2010).	The higher elevation levels of the Project site are within the appropriate elevation range where this species typically occurs. However, this species was not observed during spring 2009 field surveys. There are no CNDDDB occurrences within 10 miles of the site.
California ayenia <i>Ayenia compacta</i>	This species occurs in Mojavean and Sonoran desert scrub habitats from approximately 500 to 3,300 feet above MSL. This species blooms from March through April. There are 29 records from the Consortium of California Herbaria database from the Anza Borrego area alone, one from Riverside County from a sandy wash in the Santa Rosa Mountains off Martinez Canyon (CCH 2010).	This species was not observed during spring 2009 field surveys. This species not expected to occur since the elevation range of the Project site is not appropriate for this species.
California satintail <i>Imperata brevifolia</i>	This species occurs in grassy areas found near chaparral, desert scrub, riparian scrubs, coastal scrub, wet springs, meadows, stream sides and floodplains from sea level to approximately 1,500 feet above MSL. There are 64 records from the Consortium of California Herbaria database from many northern and southern California counties. Records from Riverside County are from the Palm Springs and San Jacinto Mountains area along irrigation ditches or streams.	This species has low potential to occur within the study area due to the presence of suitable habitat. However, this species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Chaparral sand verbena <i>Abronia villosa</i> var. <i>aurita</i>	This species occupies sandy soil areas of chaparral, coastal sage scrub, and sandy desert dune habitats (CNPS 2009) from approximately 240 feet to approximately 4,800 feet above MSL. There are 147 records in the Consortium of California Herbaria database many from Riverside County in the San Jacinto Mountains area.	This species has low potential to occur within the study area due to the presence of suitable habitat. However, this species was not observed during spring 2009 field surveys. There are no CNDDDB occurrences within 10 miles of the site.
Coachella Valley milk-vetch	The Coachella Valley Multiple Species Habitat Conservation Plan states that this species occurs on	This species was not observed during spring 2009 surveys and does not have a potential to

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<i>Astragalus lentiginosus</i> var. <i>coachellae</i>	“dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides and in areas formerly occupied by undisturbed sand dunes. Within the sand dunes and sand fields, this milk-vetch tends to occur in the coarser sands at the margins of dunes, not in the most active blows and areas. As this species is strongly affiliated with sandy substrates, it may occur in localized pockets where sand has been deposited by wind or by active washes. It may also occur in sandy substrates in creosote bush scrub, not directly associated with sand dune habitat (CVAG 2007). This plant species blooms from February to May, producing pink to deep magenta-colored flowers. This species occurs on aeolian deposits with fewer than 25 occurrences in the Coachella Valley. Coachella Valley milk-vetch depends on natural disturbances from fluvial and aeolian processes for seedling establishment (BLM CDD 2002).	occur in the study area. The distribution of Coachella Valley milk-vetch is restricted to the Coachella Valley in Riverside County, between Cabazon and Indio. CVAG (2007) identifies six outlying occurrences within a 5-mile area along Rice Road in the Chuckwalla Valley north of Desert Center, California (CVAG 2007); however, USFWS staff has indicated that these occurrences are not of the listed taxon (Engelhard, personal communication).
Cove’s cassia <i>Senna covesii</i>	This species occurs on dry, sandy desert washes and slopes, roadsides, alkaline flats in the Mojave Desert and northern Sonoran Desert between 1,600 to 2,000 feet above MSL (CNPS 2009).	This species is not expected to occur within the study area since the Project site is located below the typical elevation range where this species is known to occur. This species was not observed during spring 2009 field surveys.
Crucifixion thorn <i>Castela emoryi</i>	This species occurs in Sonoran Desert and Mojavean Desert in scrub habitats and playas with dry, gravelly washes, slopes, and plains from approximately 300 to 2,100 feet above MSL. There are 64 records in the Consortium of California Herbaria database from Riverside, San Bernardino and Imperial counties among others and often times prefers grassy or hayfield habitats. There is a record from a hayfield in Chuckwalla Valley.	This species has a low potential to occur within the study area due to the presence of suitable habitat and appropriate elevation range of the Project site. However, this species was not observed during spring 2009 field surveys. The nearest CNDDDB record for this species is approximately 5 miles north of the Project site in the Palen Mountains.
Desert portulaca <i>Portulaca hamiloides</i>	This species occurs in Joshua tree woodlands and has been reported from Riverside, San Bernardino, and portions of Arizona and Baja, California from 3,000 feet to 3,600 feet above MSL (CNPS 2009).	Given the lack of typical habitat associations and the Project site being located outside of the elevation range, this species has low potential to occur within the study area. This species was not observed during spring 2009 field surveys, and will be a target species for the 2010 botanical surveys.
Desert sand parsley	This species occupies Sonoran creosote bush scrub habitat	This species has a low potential to occur within

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<i>Ammoselinum giganteum</i>	and has been reported from Riverside County, California and portions of Arizona (CNPS 2009) at approximately 1,200 feet elevation. There are 2 records from the Consortium of California Herbaria database from Riverside County from the Chuckwalla Valley where this species was observed growing in dry basins at 500 feet above MSL (CCH 2010).	the study area due to presence of suitable habitat and reported occurrences from the Chuckwalla Valley. However, this species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Desert spike moss <i>Selaginella eremophila</i>	This is a dense, mat forming, non-flowering plant. This species occurs in Sonoran creosote bush scrub habitats in gravelly or rocky soils from approximately 600 to 2,700 feet above MSL. There are 56 records in the Consortium of California Herbaria database from Riverside and San Diego counties with several records from Anza Borrego State Park, Palm Springs, Palm Canyon, and San Jacinto Mountain Range. One collection from Riverside County is from the vicinity of the Chocolate-Chuckwalla Mountain region near the north side of the Orocopia Mountains from sloped rocky, shady surfaces in gravelly soils (CCH 2010).	This species has a low potential to occur within the study area given the presence of suitable desert scrub habitat, although the Project site is located below the typical elevation range of this species. This species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Foxtail cactus <i>Coryphantha alversonii</i>	This species occurs on rocky, granitic soils in Sonoran and Mojavean desert scrub habitats from 200 feet to 4,600 feet above MSL. Prior to conducting spring 2009 field surveys, a reference population was observed on April 9, 2009 at a gravel pit northwest of Blythe along State Route 95 and several individuals were observed in relatively undisturbed Sonoran creosote bush scrub on granitic rock, a preferred habitat type of this species (CNPS 2009). There are 25 records of this species from the Consortium of California Herbaria database from Riverside, Imperial, and San Bernardino counties. There are records from the Chuckwalla Valley from rocky, granitic slopes (CCH 2010).	This species has a low potential to occur within the Project area due to the presence of suitable desert scrub habitat and appropriate elevation of the site. However, there are no rocky, granitic soils, which is required for this species. This species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Mesquite nest straw <i>Stylocline sonorensis</i>	This species occupies Sonoran desert scrub habitats around 1,300 feet elevation and has been reported from Riverside County and portions of Arizona and Sonora, Mexico (CNPS 2009). There are 2 records from the Consortium of California Herbaria database from Riverside County both from the Chuckwalla Mountains, Hayfields region from 1930 (CCH 2010).	There is low potential for this species to occur given the presence of suitable habitat although the Project occurs well below the typical elevation range of this species. This species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Orocopia sage	This species occurs in the southeastern Sonoran Desert	This species has a low potential to occur within

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<i>Salvia greatae</i>	and is associated with the Orocopia and Chocolate Mountains on alluvial slopes between 100 and 800 feet above MSL. There are 49 records from the Consortium of California Herbaria database several from the Chocolate, Chuckwalla, and Orocopia mountain areas (CCH 2010).	the study area due to the presence of suitable habitat and appropriate elevation range of the site. This species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Pink fairyduster <i>Calliandra eriophylla</i>	This species occurs in the Sonoran Desert in sandy washes, slopes and mesas from 350 to 5,000 feet above MSL. There are 62 records from the Consortium of California Herbaria database several from the Chocolate-Chuckwalla Mountains area in Imperial and San Diego counties (CCH 2010).	This species has a low potential to occur within the Project area due to the presence of suitable habitat and appropriate elevation range of the site. However, this species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Pink velvet mallow <i>Horsfordia alata</i>	This species occurs in the Sonoran Desert in California, Arizona, and Mexico. It occurs in Sonoran desert scrub habitats from approximately 300 to 1,500 feet above MSL.	This species was not observed during spring 2009 field surveys. There are no CNDDDB records for this species for the entire state of California; the most recent collections have been from the Chocolate, Chuckwalla, and Cargo Muchacho Mountains approximately 50 miles south of the study area and are believed to be extant. Surveys will be conducted for this species in 2010.
Sand evening-primrose <i>Camissonia arenaria</i>	This species occupies sandy and gravelly areas of Sonoran desert scrub habitat and has been reported from Imperial and Riverside counties and areas of Arizona and Mexico from 200 feet to 2,700 feet above MSL (CNPS 2009). There are 13 records of this species in the Consortium of California Herbaria database several from the Chocolate-Chuckwalla Mountains, Palo Verde Valley, and Ogilby Pass area (CCH 2010).	This species has a low potential to occur within the study area due to the presence of suitable habitat and appropriate elevation of the site. However, this species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Slender woolly-heads <i>Nemacaulis denudata</i> var. <i>gracilis</i>	This species occupies desert sand dunes, coastal dunes, and Sonoran desert scrub (CNPS 2009) from 150 to 1,200 feet above MSL. There are 45 records in the Consortium of California Herbaria database from the Palm Springs, Indian Wells area in Riverside County (CCH 2010).	This species has a low potential to occur within the Project area due to suitable habitat and appropriate elevation range of the site. However, this species was not observed during spring 2009 field surveys and there are no CNDDDB occurrences within 10 miles of the site.
Small-flowered androstephium <i>Androstephium breviflorum</i>	This species occurs in desert dune and Mojavean desert scrub habitats from approximately 700 feet to 2,000 feet above MSL (CNPS 2009). This species blooms from March through April and often occurs on desert bajadas.	This species has a low potential to occur within the study area given the presence of suitable desert scrub habitat, although the Project site is located below the typical elevation range of this

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		species. The nearest CNDDDB record for this species is from Cadiz Valley from Riverside and San Bernardino counties approximately one mile north of Highway 62 during 1995 from a sandy, Mojavean Desert shrub-land bajada (CNDDDB 2010). This species was not observed during 2009 field surveys and will be a target species to be surveyed for during 2010 botanical surveys.
Spearleaf <i>Matelea parvifolia</i>	This species occurs on rocky ledges and slopes in Mojavean and Sonoran desert scrub habitats from 1,000 feet to approximately 6,000 feet above MSL. This species blooms from March through May (CNPS 2009). The nearest CNDDDB record for this species is from the Chuckwalla Bench area during 1986 from desert dry wash woodland and creosote bush scrub habitats (CNDDDB 2010).	This species is not likely to occur within the Project site. The Project site is located below the typical elevation range of this species. This species was not observed during spring 2009 field surveys.
White-margined penstemon <i>Penstemon albomarginatus</i>	White-margined penstemon is a perennial herb that is restricted to sandy substrates in desert dunes and Mojavean desert scrub habitats from approximately 2,000 feet elevation to 3,000 feet above mean sea level and appears to be restricted to the southeastern Mojave Desert ecoregion (BLM 2006, TNC 2007). In California, this plant often occurs in fine alluvial sand and in wide canyons within a creosote bush scrub community; sandy environments help establish and hold the deep taproot of this species. This species also occurs in deep, loose to stabilized sand, sometimes on sand dunes or in sandy to gravelly washes. White-margined penstemon typically blooms from March through May and flowering does not always appear to be dependent on the amount of rainfall (CNPS 2009, BLM 2006). It is believed that established plants may bloom even in very dry years by utilizing water and food resources that are stored in the large taproot (1 to 4 feet long); however rain probably affects germination rates of this species (BLM 2006, TNC 2007). White-margined penstemon occurs in southern Nevada, western Arizona,	The Genesis Project site occurs at elevations of approximately 400 feet above mean sea level which is a significantly lower elevation where this species has been reported; however given the location of the Project site in the distributional range of this species and presence of suitable habitats, this species has a potential to occur within the Genesis Project site. This species was not observed during spring 2009 or preliminary spring 2010 field surveys although white-margined penstemon was not specifically targeted during botanical field surveys.

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	and in the western Mojave Desert in San Bernardino County (BLM 2006). There are 19 recent CNDDDB records for the entire state of California all of which are from San Bernardino County near the vicinity of Highway 40 and Pisgah Crater (CNDDDB 2010). There are 40 records of this species from the Consortium of California Herbaria database from the same general Ludlow and Lavic areas in San Bernardino County (CCH 2010).	
Wiggins' cholla <i>Cylindropuntia wigginsii</i> (syn= <i>Opuntia wigginsii</i>)	Wiggins' cholla is not believed to be a valid taxon and is considered a hybrid of silver cholla (<i>C. echinocarpa</i>) and pencil cholla (<i>C. ramosissima</i>) (GSEP 2009f); however, this species is covered under the NECO Plan and was targeted during spring 2009 field surveys. CNPS describes the potential taxon as occurring in Sonoran creosote bush scrub in sandy areas between 100 feet and 2,600 feet elevation. There are two records of this species from the Consortium of California Herbarium from San Bernardino and Imperial counties (CCH 2010).	Since this is not a valid taxon recognized by local botanical experts; this species is not expected to occur in the Project site.
Birds		
Bendire's thrasher <i>Toxostoma bendirei</i>	Bendire's thrashers are known in California from scattered locations in Kern, Inyo, San Bernardino, and Riverside counties. This species is a summer resident in southeastern California, and arrives at breeding grounds from mid-March through May, and departs by late August. This species favors open grassland, shrubland, or woodland with scattered shrubs, primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, palo verde, mesquite, catclaw, desert-thorn, or agave. The status of populations of this species is poorly understood, but threats are believed to be loss of habitat due to urbanization, harvesting of yucca and Joshua trees, overgrazing, and off-road vehicle activity. In parts of the range, grazing may increase habitat suitability by increasing the area with scattered junipers.	The desert dry wash vegetation community provides potential habitat for this species, although it was not observed during surveys. There are CNDDDB (2010) records near Desert Center from 2004.
Black-tailed gnatcatcher <i>Polioptila melanura</i>	A year round resident in southwestern United States and central and northern Mexico, in California the black-tailed gnatcatcher is found in the southeast desert wash habitat	Based on a review of the vegetation community descriptions provided by the Applicant, the Project site contains little, if any, of the dense

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	from Palm Springs and Joshua Tree National Monument south, and along the Colorado River. It is now rare in eastern Mojave Desert north to the Amargosa River, Inyo Co. This species nests primarily in wooded desert wash habitat, but also occurs in creosote bush scrub habitat during the non-breeding season.	scrub habitat preferred by this species. They are known from the area, including from McCoy Spring, Palen Valley, and Chuckwalla Well (Fitton 2008).
Gila woodpecker <i>Melanerpes uropygialis</i>	The Gila woodpecker's range is limited to a small area of southwestern United States and northwestern Mexico. In California, this species is found only along the Colorado River and in small numbers in Imperial County. In southeastern California, Gila woodpeckers were formerly associated with desert washes extending up to one mile from the Colorado River. Currently, they are found only in riparian areas along the Colorado River.	In California, this species is currently known only from the Colorado River; therefore this species is not expected in the Project site. The Project site does not contain suitable nesting habitat for this species. The closest CNDDDB (2010) record for this species is a 1986 record east of the Project site at the Colorado River.
Gilded flicker <i>Colaptes chrysoides</i>	In California, the gilded flicker is known from the southeast; habitat includes stands of giant cactus, Joshua tree, and riparian groves of cottonwoods and tree willows in warm desert lowlands and foothills. Until the mid-1990's, this species was considered a subspecies of northern flicker (<i>C. atratus</i>). This species nests primarily in cactus, but also will use cottonwoods and willows of riparian woodlands. This species may be nearly extinct in California.	This species is not expected to regularly use the Project site due to lack of suitable habitat. The closest CNDDDB (2010) records for this species are along the Colorado River.
Mountain plover <i>Charadrius montanus</i>	Mountain plovers do not breed in California, but are winter visitors primarily from September to mid-March. In California they are found in the Central Valley, Antelope Valley, San Jacinto Valley, Imperial Valley, and Palo Verde Valley. Mountain plover habitat includes short-grass prairie or their equivalents, and in southern California deserts are associated primarily with agricultural areas, though use of these areas is suspected to be because of loss of native grassland and playa habitats.	This species may use the dry lakebed and nearby agricultural areas as winter habitat. The closest CNDDDB (2010) record for this species is in Imperial County at the southern end of the Salton Sea.
Peregrine falcon <i>Falco peregrinus</i>	The Peregrine falcon's year-round range includes coastal and northwestern California and the Sierra Nevada and other California mountains. Additionally, this species winters inland throughout the Central Valley and in northeastern California. They are rare in the arid southeast, but they occur and are suspected to breed in the lower Colorado River Valley. Peregrine falcons require open	This species may forage on the Project site and nest in nearby mountains, but was not observed in the Project site during Project surveys. There are no CNDDDB (2010) records for Riverside County.

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	habitat for foraging, and prefer breeding sites near water. Nesting habitat includes cliffs, steep banks, dunes, mounds, and some human-made structures.	
Purple martin <i>Progne subis</i>	The historical breeding range of the purple martin includes southern California, though populations have shrunk dramatically. Neither the historical or current breeding range, however, includes the Colorado Desert. Purple martins habitat requirements include adequate nest sites and availability of large aerial insects, and therefore are most abundant near wetlands and other water sources. Threats to this species include loss of large tree and snags and competition from European starlings.	This species not expected to occur at the project site due to the lack of suitable foraging habitat. There are six CNDDDB (2010) records for this species from western Riverside County, the most recent of which include nesting records from 1983 and 1993.
Vaux's swift <i>Chaetura vauxi</i>	This species is not known to breed in Riverside County or elsewhere in southern California. Very few nests have been found so their breeding range has been inferred from sightings of birds flying over potential nesting areas during their nesting season, in June and July. Vaux's swifts prefer to nest in the hollows formed naturally inside of large old conifer trees, especially snags, which are entirely lacking from the Project site.	This species was not observed during surveys and is not expected to occur due to a lack of nesting habitat on the Project site, any occurrences are expected to be of migrants only. There are no CNDDDB occurrences within 10 miles of the site.
Vermilion flycatcher <i>Pyrocephalus rubinus</i>	Vermilion flycatchers are rare breeders or residents in localized areas of southern California, including along the Colorado River. They are usually found near water in arid scrub, farmlands, parks, golf courses, desert, savanna, cultivated lands, and riparian woodlands; nesting substrate includes cottonwood, willow, and mesquite.	Within the Project vicinity, occurrences of this species are limited to the Colorado River. This species is not expected in the Project site. The closest CNDDDB (2010) records include a 1983 record from the Blythe golf course.
Yellow warbler <i>Dendroica petechia</i>	Yellow warblers historically bred throughout much of California except for high elevations, the Colorado Desert, and most of the Mojave Desert. Breeding abundance for this species has declined in much of California, as has the breeding range, especially in the Central Valley and parts of Owens Valley. In southeastern California, this species is known only from the lower Colorado River Valley from the middle of San Bernardino County through Riverside and Imperial Counties. Currently, this species no longer breeds in much of the Riverside County segment of the lower Colorado River Valley. This species commonly uses wet, deciduous thickets for breeding, and seeks a variety of	This species was not observed during surveys, and is not expected to nest in the Project site due to lack of suitable habitat. The closest CNDDDB (2010) records for this species are two 1986 records east of the Project site at the Colorado River.

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	wooded, scrubby habitats in winter.	
Yellow-breasted chat <i>Icteria virens</i>	The yellow-breasted chat occurs as a summer resident and migrant in California. In the southeastern California, the yellow-breasted chat breeds primarily in scattered locations in Owen's Valley and the Mojave, from the Salton Sea, and from the lower Colorado River Valley. This species occupies shrubby riparian habitat with an open canopy, and will nest in non-native species including tamarisk. Threats to this species include loss of riparian habitat, and, it is suspected, pressure from cowbird parasitism.	In this region, this species is associated with the Colorado River only. The Project site does not contain suitable habitat for this species. CNDDDB (2010) records in the region are associated with the Salton Sea or the Colorado River. The closest CNDDDB records for this species are two 1986 records east of the Project site at the Colorado River.
Mammals		
Arizona myotis <i>Myotis occultus</i>	This species has been found from southeastern California through Arizona, New Mexico, and south into Chihuahau, Mexico. Arizona myotis is most commonly known from conifer forests from 6,000 to 9,000 feet in elevation, although maternity roosts are known from much lower elevations including areas along the Colorado River in California.	This species is not expected to occur due to lack of coniferous forests and low elevation of the study area. The closest CNDDDB (2010) record is a historical occurrence from 1945 east of the Project site near the town of Ripley.
Big-free tailed bat <i>Nyctinomops macrotis</i>	This species ranges from most of South America northward to include Mexico, Arizona, New Mexico, southern and western Texas, southern California, southeastern Nevada, southern Utah, and north and western Colorado from generally sea level to 8,000 feet in elevation. This species occurs in desert shrub, woodlands, and coniferous forests. It roosts mostly in the crevices of rocks although big free-tailed bats may roosts in buildings, caves, and tree cavities	This species has the potential to forage within the project area. The nearest occurrences for this species in Riverside County are from the vicinity of Palm Springs and Joshua Tree National Park (CNDDDB 2010). There are no CNDDDB occurrences within 10 miles of the site.
Burro <i>Equus asinus</i>	The burro is found mostly in Inyo and San Bernardino counties and in the vicinity of the Colorado River, its range extends into eastern Lassen County, extreme southern Mono County and south to the California/Mexico border. This species occurs in a variety of habitats near water. Such habitats include; sagebrush, bitterbrush, alkali desert scrub, desert scrub, desert succulent scrub, desert riparian, desert wash, Joshua tree, pinyon-juniper, montane chaparral, and pasture.	This species is not expected to occur within the Project area due to the lack of water resources.
California leaf-nosed bat	California leaf-nosed bat is a species of concern and a BLM Sensitive species indicating it is covered under the	All habitats within the Project area are suitable for this species. There are several CNDDDB

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<i>Macrotus californicus</i>	NECO plan. California leaf-nosed bats occur in the deserts of California, southern Nevada, Arizona and south to northwestern Mexico. In California, they are now found primarily in the mountain ranges bordering the Colorado River Basin. In California, the two largest roosts (each sheltering 1,500 bats during winter months) are in mines in extreme southeastern California. This species depends on either caves or mines for roosting habitat. All major maternity, mating, and overwintering sites are in mines or caves (CDD 2002). Radio-telemetry studies of <i>Macrotus</i> in the California desert show that the California leaf-nosed bat forages almost exclusively among desert wash vegetation within 10 km of their roost (WBWG 2005-2009).	records in the vicinity of the Project area. The nearest record is from 1993 near the McCoy Mountains in creosote bush scrub habitat where approximately 300 adults were observed roosting (CNDDDB 2010).
Cave myotis <i>Myotis velifer</i>	The cave myotis occurs from western Texas, to southern Nevada, southeastern California (only along the Colorado River), southward into Mexico, and is also widely distributed in Arizona. This species is found primarily at lower elevations (the Sonoran and Transition life zones) of the arid southwest in areas dominated by creosote bush, palo verde, and cactus. This species is a “cave dweller” and caves are the main roosts although this species may also use mines, buildings, and bridges for roosts.	This species has a potential to occur within the study area, more likely as a foraging species than a roosting bat species. The nearest CNDDDB record for this species is approximately 3 miles east of the Project site, near the McCoy Mountains.
Colorado Valley woodrat <i>Neotoma albigula venusta</i>	Occurs from southern Nevada, southeastern California, northeastern Baja California, to western Arizona. Colorado Valley woodrats are found in a variety of habitats including low desert, pinyon-juniper woodlands, and desert-transition chaparral. Suitable habitat elements for this species include washes where organic debris gathers, areas of prickly pear cactus and mesquite, rocky areas, and crevices in boulders which are used for cover and nest sites.	This species is not expected to occur on the Project site given the lack of suitable habitat. The nearest CNDDDB record is from 1934 near Blythe (CNDDDB 2010).
Hoary bat <i>Lasiurus cinereus</i>	Hoary bat is the most widespread of North American bats and are highly associated with forested habitats in the west. Hoary bats roost are usually located at the edge of a clearing although more unusual roosting sites have been reported in caves, beneath rock ledges, woodpecker holes, squirrel nests, and building sides.	This species may occur in the area as a forager and may roost within the project area. The closest CNDDDB (2010) record is a historical occurrence from the town of Neighbors during 1919.

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Pallid bat <i>Antrozous pallidus</i>	The pallid bat is a California species of concern and a BLM Sensitive species indicating it is covered under the NECO plan. Pallid bats inhabit low elevation (less than 6,000 feet) rocky, arid deserts and canyonlands, shrub/steppe grasslands, but also occur in higher elevation coniferous forests, greater than 7,000 feet in elevation. This species is most abundant in xeric landscapes including the Great Basin, Sonoran, and Mojave deserts (WBWG 2005-2009). Pallid bats are known from Cuba, Mexico, and throughout the southwestern and western United States. Population trends are not well known, but there are indications of decline. Pallid bats roost alone, in small groups (2 to 20 bats), or gregariously (100s of individuals). Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees with exfoliating bark, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG 2005-2009).	This species has a potential to roost and forage within the Project area. The nearest CNDDDB (2010) record is approximately 8 miles north of the Project site near the McCoy Mountains.
Pocketed free-tailed bat <i>Nyctinomops femorosaccus</i>	Pocketed free-tailed bat is a California species of concern. This species occurs in western North America, from southern California, central Arizona, southern New Mexico, western Texas, south into Mexico and Baja, California (WBWG 2005-2009). Despite only a limited number of records, pocketed free-tailed bats are known to occur in the desert from March through August, when they then migrate out of the area. In California, they are found primarily in creosote bush and chaparral habitats in proximity to granite boulders, cliffs, or rocky canyons.	This species has a potential to roost and forage within the Project site based on what is understood of its habitat requirements and roosting habits. The nearest CNDDDB record for this species is from 2002 near the I-15 bridge over the Colorado River in Blythe.
Spotted bat <i>Euderma maculatum</i>	This species is known from all the states west of and including Montana, Wyoming, Colorado, New Mexico and Texas. Although broadly distributed, this species is rarely common, but may occur locally from southern British Columbia, northern Arizona, Arizona/Utah border, and western Texas from below sea level to 8,100 feet above mean sea level. Spotted bats occur in arid, low desert habitats to high elevation conifer forests and prominent	This species has a potential to roost and forage within the Project site based on what is understood of its habitat requirements and roosting habits. The nearest CNDDDB record is a historical occurrence from 1907 in the Colorado Desert near Mecca (CNDDDB 2010).

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
	rock features appear to be a necessary feature for roosting.	
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	This species has been reported in a wide variety of habitat types ranging from sea level to approximately 9,000 feet above MSL. Habitat associations include coniferous forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types. Foraging associations include edge habitats along streams, adjacent to and within a variety of wooded habitats.	This species has a potential to forage within the study area although roosting is unlikely to occur since cave and abandoned buildings do not occur within the study area. There are no CNDDDB occurrences within 10 miles of the site.
Western mastiff bat <i>Eumops perotis</i>	The subspecies that occurs in North America, <i>E. p. californicus</i> , ranges from central Mexico across the southwestern United States including parts of California, southern Nevada, Arizona, southern New Mexico and western Texas. Recent surveys have extended the previously known range to the north in both Arizona with several localities near the Utah border and California. It is found in a variety of habitats, from desert scrub to chaparral to oak woodland and into the ponderosa pine belt and high elevation meadows of mixed conifer forests. Surveys in northern Arizona have documented roosts at approximately 3,600 feet elevation and foraging bat species at 7,500 feet above MSL (WBWG 2005-2009).	The Project site does not support suitable roosting habitat for western mastiff bat but this species may utilize the study area for foraging. There are no CNDDDB occurrences within 10 miles of the site
Yuma mountain lion <i>Puma concolor browni</i>	In the NECO planning area, mountain lions primarily inhabit the low mountains and extensive wash systems in and around Chuckwalla Bench, Chuckwalla Mountains, Chocolate Mountains, Picacho Mountains, Milpitas Wash, Vinagre Wash, and other washes in that area. Mountain lions typically occur in habitat areas with extensive, well-developed riparian or shrubby vegetation interspersed with irregular terrain, rocky outcrops, and community edges. Mountain lions are restricted to the southern Colorado Desert from Joshua Tree National Park south and east to the Colorado River. Burro deer, the primary prey item, are known to spend the hot summer and fall in riparian areas along the Colorado River and in dense microphyll woodlands near the Coachella Canal.	This species likely uses the Project site but no definitive sign for this species was observed during 2009 spring surveys.
Yuma myotis <i>Myotis yumanensis</i>	This species ranges across the western third of North America from British Columbia, Canada, to Baja California	This species has a potential to roost and forage within the Project site. The nearest CNDDDB

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
	and southern Mexico. Yuma myotis is usually associated with permanent sources of water, typically rivers and streams, feeding primarily on aquatic emergent insects, but Yuma myotis also use tinajas in the arid west. It occurs in a variety of habitats including riparian, arid scrublands and deserts, and forests. The species roosts in bridges, buildings, cliff crevices, caves, mines, and trees.	record is from 2002 near the Blythe bridge over the Colorado River where individual bats of this species were detected acoustically during April 2002 (CNDDDB 2010).
Reptiles/Amphibians		
Desert rosy boa <i>Charina (Lichanura) trivirgata</i>	In California, desert rosy boas are found only in the southern part of the state south of Los Angeles, from the coast to the Mojave and Colorado deserts (Zeiner et al. 1990, updated 1997; BLM CDD 2002). It is uncommon throughout its range. Desert rosy boas are found in habitats with moderate to dense vegetation and rocky cover, such as desert canyons, washes, and mountains. They have been found under rocks, in boulder piles and along rock outcrops and vertical canyon walls. Their diet consists of small mammals and birds. Rosy boas are primarily nocturnal, but may be out in the evening or morning in the spring and may appear during the day. The greatest activity occurs in late spring to early or mid-summer. They hibernate in winter. Desert rosy boas are not listed, but are included in the NECO and the Project area is within the range of this species.	There are 4 CNDDDB records of this species from Riverside County, the majority of which are reported from western Riverside County near Cabazon, Lake Matthews, Lake Elsinore, and Hemet areas from disturbed sage scrub habitats with rocky soils and outcroppings. This species was not observed during spring 2009 field surveys; however temperatures may have been too low and therefore not during an optimal time to identify this species in the field. The Project site does not contain the preferred substrate, and therefore the site is not expected to provide important habitat for this species.
Western chuckwalla <i>Sauromalus obesus</i>	This species has no protective status or designation. Western chuckwalla occurs in southeastern California, southern Nevada, southeastern Utah, and western Arizona. Chuckwallas occur in virtually all undisturbed rocky hillsides and often escape into deep rock crevices to evade predators. These areas are typically vegetated by creosote bush and other such drought-tolerant scrub habitats.	This species was detected during spring 2009 field surveys (Solar Millennium 2009a, Volume II, Biological Technical Report). Suitable large, rock outcroppings do not occur within the Project site which is often preferred by this species.

C.2.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

CONSTRUCTION AND OPERATION - DIRECT IMPACTS, INDIRECT IMPACTS, AND MITIGATION

Direct impacts are those resulting from a project and occur at the same time and place. Indirect impacts are caused by a project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the Project.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the desert ecosystems the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). In this analysis, an impact is considered temporary only if there is evidence to indicate that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years.

Summary of Impacts

Biological Resources Table 5 summarizes the direct, indirect, and cumulative impacts to biological resources and includes the proposed conditions of certification that would mitigate these impacts. **Biological Resources Table 6** provides a summary of acreage impacts and recommended mitigation.

**Biological Resources Table 5
Summary of Impacts and Mitigation**

Biological Resource	Impact/Mitigation
Sonoran Creosote Bush Scrub & Associated Wildlife	<p>Direct Impacts: Permanent loss of 1,773^{a,f} acres; fragmentation of adjacent wildlife habitat and native plant communities</p> <p>Indirect Impacts: Disturbance (noise, lights, dust) to surrounding plant and animal communities; spread of non-native invasive weeds; changes in drainage patterns downslope of Project; erosion and sedimentation of disturbed soils.</p> <p>Cumulative Impacts: Contributes 0.8% to cumulative loss from probable future projects within the NECO planning area (Table 18).</p> <p>Mitigation: Off-site habitat acquisition and enhancement (BIO-12); implement impact avoidance and minimization measures (BIO-8) and Weed Control Plan (BIO-14)</p>
Waters of the State & Associated Sensitive Plant Communities	<p>Direct Impacts: Loss of hydrological, geomorphic, and biological functions and values of 91^b acres of State waters(73 acres permanent loss, 18 acres temporary loss) including 16^b acres of microphyll woodland</p> <p>Indirect Impacts: Permanent loss of hydrological connectivity downstream of the Project, including 21^c acres unvegetated ephemeral wash; head-cutting on drainages upslope and erosion/sedimentation downslope; *</p> <p>Cumulative Impacts: Contributes 2.9% to cumulative loss from future projects within the NECO planning area (Table 11); contributes 4.6% to cumulative loss from future projects within the Chuckwalla- Ford Dry Lake watershed (Table 10).</p> <p>Mitigation: Acquisition and enhancement of 132 acres ephemeral desert washes (Table 6), implementation of avoidance and minimization measures to protect state waters (BIO-22); implement Weed Management Plan (BIO-14)</p>
Desert Tortoise	<p>Direct Impacts: Potential take of individuals during operation and construction; permanent loss of 1, 773^{d,f} acres (including 23^d acres of critical habitat) of desert tortoise habitat and fragmentation of surrounding habitat.</p> <p>Indirect Impacts: Increased risk of predation from ravens, coyotes, feral dogs; disturbance from increased noise and lighting; introduction and spread of weeds; increased road kill hazard.</p> <p>Cumulative Impacts: Contributes to cumulative loss of low to moderate value desert tortoise habitat (2.0% to 0.1 habitat value, 2.9% to 0.2 habitat value, 0.1% to 0.3 habitat value) from future projects in the NECO planning area (Table 12);</p> <p>Mitigation: Implement avoidance and minimization measures (BIO-6 through BIO-11) and acquire 1,864 acres of desert tortoise habitat (BIO-12).</p>
Mojave Fringe-Toed Lizard	<p>Direct impacts: Mortality to individuals during construction and permanent loss of 1^{a,f} acres of sand dune habitat and 37 acres of sand drift over playa; increased road kill hazard from construction traffic; potential accidental direct impacts to</p>

Biological Resource	Impact/Mitigation
	<p>adjacent preserved habitat during construction and operation. Indirect impacts: Disruption of sand transport corridor resulting in downwind impacts to 151^e acres; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat; increased road kill hazard from construction and operations traffic; harm from accidental spraying/drift of herbicides and dust suppression chemicals. Cumulative Impacts: Contributes 0.2% to cumulative loss from future projects within the NECO planning area; contributes 1.7% to cumulative loss from future projects within the range of the Chuckwalla Valley population (Table 15). Mitigation: Implement BIO-20, Mojave fringe-toed lizard compensation, and BIO-8, impact avoidance and minimization measures</p>
Couch's Spadefoot Toad	<p>Direct Impacts: loss of breeding and upland habitat, mortality of individuals; disturbance to breeding ponds, Indirect Impacts: reduced flow to breeding areas, increased flow to upland habitat, construction noise could trigger emergence when conditions are not favorable. Cumulative Impacts: Contributes 1.6% to cumulative loss of habitat from future projects within the NECO planning area (Table 15). Mitigation: Conduct surveys and implement impact avoidance and minimization measures, avoidance and protection of breeding habitat BIO-27 (Couch's spadefoot toad impact avoidance and minimization measures).</p>
Western Burrowing Owl	<p>Direct Impacts: Permanent loss of foraging habitat; potential loss of eggs and young; degradation and fragmentation of remaining adjacent habitat from edge effects; disturbance of nesting and foraging activities for nesting pairs near the plant site and linear facilities; Indirect Impacts: increased road kill hazard from operations traffic; potential collision with mirrors; increased predation from ravens; disturbance of nesting activities from operations. Cumulative Impacts: Contributes 0.5% to cumulative loss from future projects within the NECO planning area (Table 15). Mitigation: Implement burrowing owl impact avoidance and mitigation measures, including habitat acquisition if owls are displaced by the Project (BIO 18, Burrowing owl impact avoidance, minimization, and compensation measures)</p>
Golden Eagle	<p>Direct/Indirect Impact: Loss of foraging habitat; potential disturbance to nesting golden eagles during construction if active nests occur within 10 miles of Project boundaries Cumulative Impacts: Contributes 7.4% to cumulative loss of Sonoran creosote bush scrub and 0.2% to loss of dry desert wash woodland, and 0.6% to loss of sand dune foraging habitat from future projects within the NECO planning area within 10 miles of the Project. Contributes 0.8% to cumulative loss of Sonoran creosote bush scrub and 0.03% to loss of dry desert wash woodland, and 0.6% to loss of sand dune foraging habitat from future projects within 10 miles of the nearest</p>

Biological Resource	Impact/Mitigation
	<p>mountains (Table 16).</p> <p>Mitigation: Implementation of Golden Eagle Nest Inventory and Monitoring (BIO-28) and off-site habitat acquisition and enhancement for desert tortoise would protect eagle foraging habitat (BIO-12); additional mitigation may be required pending USFWS guidance.</p>
Special-Status Birds & Migratory Birds	<p>Direct Impacts: Permanent loss of breeding and foraging habitat, including loss of 1, 773^{a,f} acres of Sonoran creosote bush scrub and 16^b acres of microphyll woodland; potential loss of eggs and young; disturbance of nesting and foraging activities for populations on and near the plant site and linear facilities; degradation and fragmentation of remaining adjacent habitat from edge effects.</p> <p>Indirect Impacts: increased road kill hazard from operations traffic and collision with mirrors; increased predation from ravens; disturbance from operations.</p> <p>Cumulative Impacts: Contributes 0.6% to cumulative loss of habitat from future projects within NECO planning area (Table 15, Le Conte's Thrasher).</p> <p>Mitigation: Implement impact avoidance and minimization measures (BIO-8); pre-construction nest surveys (BIO-15); avian protection plan (BIO-16) off-site habitat acquisition and enhancement (BIO-12 and BIO-22)</p>
Desert Kit Fox & American Badger	<p>Direct Impacts: Permanent loss of 1,811^{a,f} acres of foraging and denning habitat; fragmentation and degradation of remaining habitat, loss of foraging grounds, crushing or entombing of animals during construction; increased risk of road kill hazard from construction traffic.</p> <p>Indirect Impacts: Disturbance from increased noise and lighting; introduction and spread of weeds; increased risk of road kill from operations traffic.</p> <p>Cumulative Impacts: Contributes 0.5% to cumulative loss of habitat from future projects within the NECO planning area (Table 15).</p> <p>Mitigation: Implementation of impact avoidance and minimization measures (BIO-8), conduct pre-construction clearance surveys (BIO-17); off-site habitat acquisition and enhancement (BIO-12 and BIO-22)</p>
Nelson's bighorn sheep	<p>Direct Impacts: None</p> <p>Indirect Impacts: harassment from elevated construction noise</p> <p>Cumulative Impacts: None (Table 13 and Table 14)</p> <p>Mitigation: Implementation of noise-related avoidance and minimization measures (BIO-8).</p>
Bats	<p>Direct/Indirect/Cumulative Impacts: Loss of foraging habitat.</p> <p>Mitigation: off-site habitat acquisition and enhancement (BIO-12 and BIO-22)</p>
Special Wildlife Management Areas	<p>Chuckwalla DWMA/Desert Tortoise Critical Habitat: Impacts to 23^d acres</p> <p>ACEC: None</p> <p>WHMA: Impacts to 1,811^{a,f} acres</p> <p>Mitigation: Mitigate loss of critical habitat with acquisition and</p>

Biological Resource	Impact/Mitigation
<p>Special-status Plants</p> <ul style="list-style-type: none"> ▪ Harwood's eriastrum ▪ Harwood's milk-vetch ▪ Ribbed cryptantha ▪ Desert unicorn plant ▪ Late-season special-status plants 	<p>preservation of suitable desert tortoise at a 5:1 ratio (BIO-12).</p> <p>Direct Impacts: Potential impacts to BLM Sensitive Harwood's eriastrum (CNPS 1B) from gen-tie construction near substation; Harwood's milk-vetch (CNPS 2) on linears and solar plant site; desert unicorn plant (CNPS 4) at solar plant site; ribbed cryptantha (CNPS 4) on linears and solar plant site. Potential direct impacts to CNPS 1B, 2, 4 and new taxa detected during late season surveys.</p> <p>Indirect impacts: Fragmentation/isolation and reduced gene flow between isolated fragments of area population; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; potential disruption of sand transport systems that maintain habitat below the Project; alteration of drainage patterns; herbicide drift; disruption of photosynthesis and other metabolic processes from dust. Construction of SCE substation could cause loss of over 1000 individuals of Harwood's eriastrum.</p> <p>Cumulative Impacts: Contributes to cumulative loss of plants and habitat, and indirect effects to Harwood's eriastrum, Harwood's milk-vetch, desert unicorn plant and ribbed cryptantha from other I-10 corridor projects and throughout range. Contributes 0.7% to cumulative loss of Harwood's milk-vetch habitat from future projects within the NECO Planning Area. Contributes cumulative loss of dune-, playa-, and wash habitat for other special-status species in Chuckwalla Valley: 4.6% desert washes in Chuckwalla Valley; 1.7% dunes and sand fields; 0.2% playa (Tables 15,19).</p> <p>Mitigation: Implement BIO-19 - avoidance requirements for Harwood's eriastrum; off-site compensation or restoration mitigation for Harwood's milk-vetch; general avoidance and minimization measures for all special-status plants. Implement late-season surveys and mitigate according to triggers and performance standards in BIO-19. Indirect effects and impacts to habitat also addressed in Weed Management Plan (BIO-14); Best Management Practices (BIO-8); special-status plant impact avoidance and minimization measures and potential habitat compensation (BIO-19), acquisition of sand dune habitat (BIO-20).</p>
<p>Groundwater-Dependent Plant Communities</p>	<p>Direct: None</p> <p>Indirect/Cumulative: Degradation of groundwater-dependent plant communities (e.g., mesquite bosque, bush seep-weed) from water table drawdown</p> <p>Mitigation: Conduct long-term monitoring of groundwater-dependent vegetation (BIO-25) and implement adaptive management, if necessary (BIO-26).</p>

- a. From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities").
- b. From TTEC 2010i (TetraTech memo "Revisions to Jurisdictional Waters for the Genesis Solar Energy Project").
- c. From TTEC 2010j (TetraTech Notification of a Lake or Streambed Alteration Agreement Application, Appendix D).
- d. From TTEC 2009c (TetraTech Application for Incidental Take of Threatened and Endangered Species).
- e. From Soil & Water Appendix A, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.
- f. From TTEC 2010o (Tetra Tech memo "Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility").

**Biological Resources Table 6
Acreage of Direct and Indirect Impacts to Biological Resources and
Recommended Mitigation**

Resource	Acres Impacted	Mitigation Ratio	Recommended Mitigation Acreage
Desert Tortoise Habitat – Direct Impacts			
Within DWMA/Critical Habitat ¹	23	5:1	115
Outside Critical Habitat ^{2,7}	1,749	1:1	1,749
Total Desert Tortoise Mitigation			1,864
Stabilized/Partially Stabilized Sand Dunes – Direct Impacts			
Direct Impacts ^{3,7}	1	3:1	3
Playa and Sand Drifts Over Playa			
Direct Impacts ^{3,7}	37	3:1	111
Indirect Impacts to MFTL Habitat ^{4,8}	151	0.5:1	76
Total Mojave Fringe-toed Lizard Mitigation			190
State Waters* - Direct Impacts⁵			
Microphyllous Riparian Vegetation	16	3:1	48
Unvegetated Ephemeral Dry Wash	74	1:1	74
State Waters- Indirect Impacts⁶			
Unvegetated Ephemeral Dry Wash	21	0.5:1	10
Total State Waters Mitigation			132

1 From Application for Incidental Take Permit (TTEC 2009c).

2 From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities"); includes impacts to Sonoran creosote bush scrub.

3 From CEC 2010d; includes direct permanent impacts to stabilized and partially stabilized sand dunes and sand drifts over playas.

4 From **Soil & Water Appendix A**, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.

5 From TTEC 2010I (TetraTech memo "Revisions to Jurisdictional Waters for the Genesis Solar Energy Project").

6 From Appendix D, Lake and Streambed Alteration Agreement Application (TTEC 2009d).

7 From TTEC 2010o (Tetra Tech memo "Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility").

8 PWA 2010a. (tn pending) PWA memo "Genesis Solar Energy Project, Analysis of Impacts to Sand Transport Corridor"...

* Reflects changes Also, the removal of the 'toe' from the plant site footprint would also reduce impact acreage to state waters; however these reduced impact calculation have not been provided to date and therefore, are not included in this table.

Recent Project Modifications

The Applicant recently proposed some minor modifications to the Project (TTEC 2010o) that were not discussed in their Application for Certification (GSEP 2019a) or analyzed in staff's SA/DEIS. These modifications include a six-pole transmission line extension at the Colorado River Substation and an electrical distribution/telecommunications line.

Six Pole Transmission Line Extension

The transmission line from the Genesis power plant site to the point of interconnect at Southern California Edison's (SCE's) future Colorado River Substation is referred to as

the project's generation or "gen-tie" transmission line and is part of the Genesis project description. SCE's Colorado River Substation is not part of the Genesis project description, but rather is an SCE project for which SCE would obtain a permit, construct, own and operate to serve several projects in the area.

As described in the Application for Certification (GSEP 2009a) the Genesis gen-tie would start at the Genesis power plant site and extend approximately 7 miles southeast until reaching the existing Blythe Energy Transmission Line Project (BETP). From that point, the Genesis gen-tie would be strung eastward along existing BETP poles until it leaves the BETP to enter into the Colorado River Substation. Because the BETP runs immediately to the south of the proposed Colorado River Substation location, the Applicant's original impact analysis (GSEP 2010a) was based on the assumption that the gen-tie would go directly from the BETP poles into the south side of the CRS in a single span. However, SCE recently provided Genesis with a substation design that now requires the gen-tie, after it leaves the existing BETP poles, to come up around the western side of the substation and enter from the north (TTEC 2010o). The Applicant would therefore need to add up to six additional gen-tie poles before entering the CRS.

Construction of six additional poles would result in disturbance to 4.6 acres from construction and laydown areas, conductor pulling areas, and the transmission access road (TTEC 2010o). Within this temporary 4.6-acre impact area 1.2 acres would be permanently affected due to the 6-foot by 6-foot pole construction pad and the 3,700-foot long, 14-foot wide transmission maintenance road.

Staff has no information from the Applicant regarding the habitat types that would be permanently and temporarily impacted by the construction of the six power poles, but infers that the six new poles and the maintenance road would be constructed within sand dune habitat. The basis for this inference is Figure DR-BIO-51-2 from the Data Response submitted for the Blythe Project (AECOM 2010e). This figure shows, at a coarse scale of 1 inch = 6000 feet, the approximate location of the proposed Colorado River Substation and depicted it as being entirely within stabilized and partially stabilized sand dune. Supporting this inference is the Applicant's submittal which included the 2010 preliminary survey results from the Blythe Project (TTEC 2010o, Attachment A) which showed numerous records for species that occur on sand dune habitat (for example Mojave fringe-toed lizard and ribbed cryptantha) in and around the proposed Colorado River Substation location.

Staff does not have sufficient information to revise Table 6, the summary of impacts to different habitat types, or to specify mitigation acreages for the impacts to sand dunes, Sonoran creosote scrub or state waters. Those revisions require specific information as to the extent of impacts to each habitat type. However, staff can provide a qualitative evaluation and can conclude that impacts to biological resources from construction of the six-pole transmission line extension can be mitigated to less than significant levels with implementation of staff's proposed conditions of certification.

A number of sensitive species were observed in the vicinity of the proposed substation during the 2010 surveys, including many Mojave fringe-toed lizards (TTEC 2010o, Attachment A, Figure 4, Incidental Wildlife Observations Spring 2010 Surveys). The transmission line extension construction could therefore result in direct and indirect

impacts to Mojave fringe-toed lizards and to their habitat. This impact would be mitigated to less than significant levels with staff's Condition of Certification **BIO-20**.

No desert tortoise were detected in or within the one-mile buffer around the proposed substation during the 2010 surveys (TTEC 2010o), but given the proximity of good habitat in the immediate vicinity of the proposed substation desert tortoise could occur in or near transmission line construction areas and could be directly or indirectly impacted. Implementation of staff's proposed conditions of certification **BIO-9** through **BIO-12** would reduce potential impacts to desert tortoise to less than significant levels. Construction activities and addition of new perching structures such as poles could result in increased ravens, and hence an increase in desert tortoise predation. This impact would be mitigated with implementation of staff's proposed Condition of Certification **BIO-13**, the Raven Management Plan. Road construction could increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. These impacts could be reduced to less than significant levels with implementation of **BIO-14**, the Weed Management Plan, and **BIO-24**, Revegetation of Temporarily Disturbed Areas. Nesting birds, badger and kit fox, and burrowing owls could all be directly or indirectly affected by construction activities. These impacts would be reduced to less than significant levels with implementation of **BIO-15** (Pre-construction Nest Surveys), **BIO-17** (Badger and Kit Fox Avoidance and Minimization Measures) and **BIO-18** (Burrowing Owl Avoidance and Minimization Measures).

The Applicant's submittal describing the proposed project modifications (TTEC 2010o) did not include information on the presence of state waters in the proposed substation area. However, if ephemeral drainages were impacted in the course of constructing the six-pole transmission line extension, direct and indirect impacts would be mitigated with implementation of staff's proposed Condition of Certification **BIO-22**.

Staff has concluded that direct and indirect impacts to special status plant species is also possible with the construction and operation of the six-pole transmission line because the 2010 surveys revealed many sensitive plants within and near the proposed substation (TTEC 2010o, Attachment A, Figure 2, Preliminary Results, Botany, Rare Plants, Spring 2010 Surveys). Species detected include Harwood's eriastrum, Harwood's milk-vetch, winged cryptantha and ribbed cryptantha. Harwood's eriastrum, a California endemic and BLM Sensitive species, has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations. As described below in the subsection on impacts to special-status plants, direct or indirect impacts to Harwood's eriastrum or Harwood's milk-vetch would be significant. Late summer/fall botanical surveys might also reveal the presence of additional sensitive plant species in the vicinity of the proposed six-pole transmission line. The avoidance, minimization and compensation measures described in Condition of Certification **BIO-19** (Special-Status Plant Mitigation) would minimize the impacts to Harwood's eriastrum, Harwood's milk-vetch, and any other special status plant species to a level less than significant.

For fulfillment of the mitigation measures described above, conditions of certification **BIO-1** through **BIO-8** would also need to be implemented because these conditions provide the appropriate personnel (Designated Biologist and Biological Monitors),

worker training, impact avoidance and minimization measures and monitoring needed to make sure all mitigation is conducted as specified in the conditions.

Distribution and Telecommunications Line

The Genesis Project will need temporary power and communication during construction at the plant site footprint. Although this need was inferred in the Applicant's Application for Certification (GSEP 2009a) it was not identified as a separate feature or analyzed in the SA/DEIS. The Project will need to tap into electrical power from an existing SCE distribution line near I-10. This distribution/ telecommunications line would follow the proposed Genesis linear corridor and access road up to the plant facility (TTEC 2010o). This installation could either be above or below ground based on site conditions and availability of material. The type of material is likely to be single wood poles (TTEC 2010o). Once the construction phase of the project is complete, these lines would likely be left in place to serve the onsite facilities such as offices, warehouse, and a control room. The development of the distribution line would follow the current SCE's standards, guidelines and procedures for installation of electrical distribution power lines (TTEC 2010o).

The distribution/telecommunications line would be built within the disturbed linear corridor and would be adjacent to the final gen-tie line (TTEC 2010o). The Applicant has indicated that the creation of the distribution/ telecommunications line would not create additional impacts other than the physical area needed for the permanent pole pads, and that these impacts would be calculated and quantified in a subsequent document (TTEC 2010o). Staff would need additional information, including a detailed project description and figures showing the location of the proposed line, to reach conclusions about the extent of impacts to biological resources from construction and operation of the distribution/ telecommunications line. However, staff agrees that these impacts are likely to be relatively small, and that staff's proposed conditions of certification would likely be sufficient to reduce impacts to biological resources to less than significant levels.

Waters of the State: Impacts and Mitigation

Biological Resources Table 6 summarizes the direct and indirect impacts to waters of the state as a result of Project construction, and includes recommendations from Energy Commission staff and CDFG for compensatory mitigation ratios for these impacts.

Grading within the Project Disturbance Area and its ephemeral drainages would directly impact 91 acres of state jurisdictional waters, and for 73 of these acres it would permanently eliminate their hydrological, biogeochemical, vegetation and wildlife functions. Eighteen acres of drainages would be temporarily impacted by construction of linear facilities and access roads associated with those facilities.

Desert washes downstream from the Project area, comprising approximately 21 acres of state waters, would also be indirectly impacted as a result of changes to upstream hydrology, with downstream vegetation in washes deprived of flows or receiving lower or higher volumes and velocities of water than current conditions at discharge points along the stormwater conveyance channel. Diversions could significantly alter the

hydrology and wash-dependent vegetation of any features that may occur downstream of the Project area, an effect that is quite apparent below Interstate 10 (I-10) near the Corn Springs Exit. On the northern side of I-10 broad expanses of desert wash trees and shrubs have died in response to the construction of I-10 and the diversion of smaller channels into collector ditches on the southern side of I-10.

The Applicant has provided drainage plans that conceptually discuss how diffusers at the downstream end of the engineered channels would restore sheet flow downslope of the Project Disturbance Area. However, as discussed in the **Soil & Water**, the drainage report does not provide sufficient information to establish the post-Project flooding conditions or to determine the potential impacts to vegetation downstream. Other potential indirect effects of the changed proposed drainage plans are erosion and resulting root exposure leading to the eventual death of vegetation. Washes upstream of the Project area may also be impacted by head-cutting and erosion; however, bank stabilization measures are proposed for the intake portion of the channel that would minimize or avoid this potential effect. Staff assumes that all 21 acres of the ephemeral washes occurring downstream of the Project boundaries would be adversely affected by the proposed Project.

Staff considers direct impacts of the Project to 91 acres of state jurisdictional waters and indirect impacts to as many as 21 acres to be significant. The extensive ephemeral drainage network at the Project site currently provides many functions and values, including landscape hydrologic connections, stream energy dissipation during high-water flows that reduces erosion and improves water quality, water supply and water-quality filtering functions, surface and subsurface water storage, groundwater recharge, sediment transport, storage, and deposition aiding in floodplain maintenance and development, nutrient cycling, wildlife habitat and movement/migration; and support for vegetation communities that help stabilize stream banks and provide wildlife habitat. The Project would eliminate all of these functions and values on at least 73 acres of ephemeral washes, and would temporarily impact these functions on another 18 acres.

To replace the flood conveyance function and some of the biogeochemical functions of the impacted desert washes, the Applicant has proposed to replicate the existing flow patterns and volume with three channels that would be constructed adjacent to, through, or across the site. Channel design, in particular the proposed plans for restoring sheet flow to the terrain downslope of the Project boundaries, has yet to be finalized.

The engineered channels would not replace the biological resource values and functions of the Project's ephemeral washes. Staff and CDFG agree that off-site acquisition and enhancement of off-site state waters would mitigate Project impacts to waters. Staff and CDFG have proposed mitigation at a 1:1 ratio for unvegetated ephemeral drainages, and at a 3:1 mitigation ratio for microphyll woodlands, the higher ratio reflecting the high wildlife values and scarcity of this habitat type. Indirect impacts to state waters would be mitigated at half the ratio of direct impacts, as detailed in **Biological Resources Table 6**. The lesser mitigation ratio for indirect impacts to drainages downgradient of the Project site reflects staff's expectation that while the wash-dependent vegetation downslope of altered drainages would eventually be lost, that loss would be slow and gradual. Staff anticipates that the wash-dependent

vegetation downstream of the Project deprived of flows would continue to provide habitat for years and possibly decades after the Project is constructed, although eventually it would die (if deprived of flows) or be indirectly affected by erosion and sedimentation along reaches below the stormwater channel discharge points.

Staff's proposed Condition of Certification **BIO-22** recommends off site acquisition of 132 acres of waters of the state within the Chuckwalla Valley watershed, with at least 48 acres of that consisting of microphyllous riparian vegetation. This condition also provides the specifics of avoidance and mitigation measures for impacts to ephemeral drainages within and downslope of the Project Disturbance Area. Implementation of Condition of Certification **BIO-22** would reduce Project impacts to state waters to less than significant levels, and would satisfy CDFG codes relating to protection of state waters.

Impacts to Sand Transport Corridor and Mojave Fringe-toed Lizard Habitat

The Project's western solar array is located on land surface units that are relatively geomorphically stable and are not within an active wind transport corridor. As originally configured the eastern solar array of the Project intruded into the outer edges of the Palen-McCoy Valley Sand Transport Corridor, which delivers sand to Mojave fringe-toed lizard habitat downwind. The Applicant estimated that the easternmost end of the Project's eastern solar array extended approximately 1000 feet (19 percent) of the width of this corridor (Worley Parsons 2010c). The Applicant recently revised their Project footprint (TTEC 2010o) to eliminate 41.4 acres of the easternmost array, thus avoiding intrusion into the Palen-McCoy Valley Sand Transport Corridor.

The southwestern corner of the eastern solar array extends into another sand transport corridor, the PDL-Chuckwalla Valley Sand Transport Corridor, which moves sand from northeast to southwest. The intrusion extends into the corridor by approximately 1,600 feet at a point where the corridor is 24,000 feet wide, approximately 7 percent of the width of the corridor (Worley Parsons, 2010c). Staff agrees with the Applicant's estimates on the extent of the Project intrusion into this sand transport corridor.

Staff has concluded that the Project intrusion within the PDL-Chuckwalla Valley Sand Transport Corridor would not result in a substantial reduction in sand transport capacity. However, the presence of the southwestern corner of the eastern solar array would diminish the input of sand to downwind areas, with adverse effects to the active sand layer that is crucial to Mojave fringe-toed lizard habitat. Staff estimates that an area of 151 acres of vegetated sand dune habitat downwind of the intrusion within the PDL-Chuckwalla Valley Sand Transport Corridor would be adversely affected by interference with this sand transport corridor (PWA 2010a). This downwind area would receive reduced sand input because of interference from Project features, deflating downwind sand dunes and gradually diminishing their depth and extent over time as sand output exceeds sand input.

Habitat suitability for Mojave fringe-toed lizards would be gradually degraded as wind-borne sand is depleted and not replaced within these downwind areas. Project impacts to Mojave fringe-toed lizard as a result of these indirect habitat impacts are discussed below in the subsection on Special-Status Species: Impacts and Mitigation.

The Project would also have an indirect impact on the creation and maintenance of sand transport as a result of rerouting of the ephemeral drainages in the Project area. More than a hundred ephemeral washes cross the site from north to south. The boundaries of these shallow channels are typically subtle, and the presence of these channels in areas of desert varnish and soil horizons suggests that these channels are relatively stable (i.e., do not cut and fill vertically) The channels in the western portion of the Project area do not appear to transport much sediment, as evidenced by their shallow depth and the absence of scour features (**Soil and Water Appendix A**). However, larger washes at the eastern side of the Project area have braided channels that show more evidence of active sediment transport, with better-defined banks and some sand in the channel bottom. Unlike the small washes that cross the western solar array site, the larger washes appear to supply a large amount of sand to the surrounding area. The Applicant has not provided a quantitative or qualitative assessment of the changes in fluvial sand transport as a result of re-routing the ephemeral drainages in the project area, but staff anticipates that Project would result in a reduction in the water-borne sand available for transportation to downwind sand dunes systems.

The Project linear facilities would pass through the core of the Palen-McCoy Valley Sand Transport Corridor, where considerable sand transport occurs (Worley Parsons 2010c, Soil and Water Appendix A). Staff has concluded that the Project should be able to avoid or minimize impacts created by the linear facilities within this zone; most wind-borne transport of sand occurs within three feet of the ground, so the buried gas pipeline and at-grade access roads would be flush with the surrounding ground surface and would not create ground level obstructions. Transmission line supports should not pose a problem due to their small surface area at ground level.

Special-status Species: Impacts and Mitigation

Mojave Fringe-toed Lizard

The Genesis Project would directly impact 0.8 acres of stabilized/partially stabilized sand dune habitat and 37 acres of playa/sand drifts over playa (CEC 2010d). In addition to this direct and immediate loss of habitat, the project would indirectly affect 151 acres of Mojave fringe-toed lizard habitat downwind of the Project Disturbance Area (see **Soil & Water Appendix A**; PWA 2010a). As discussed above, the southwestern corner of the eastern solar array extends south into the PDL-Chuckwalla Valley Sand Transport Corridor (Worley Parsons, 2010c).

The Mojave fringe-toed lizard relies on vegetated sand dunes and a regular supply of fine wind-blown sand for its habitat. Active sand dunes (i.e., dunes that have an active layer of mobile sand) exist in a state of dynamic equilibrium, continuously losing sand downwind due to erosion and transport and gaining new supplies from upwind. If the upwind sand supply is cut off the dunes deflate, losing sand downwind and shrinking in size and depth. The finest sand (which is most easily transported) is lost first with coarser sand and gravel being left behind to form an armor or lag. This lag does not support Mojave fringe-toed lizard habitat.

As discussed above, the Project may also have an impact on sand transport and Mojave fringe-toed lizard habitat by eliminating the network of desert washes throughout

the site and replacing them with engineered channels (**Soil & Water Appendix A**). Project construction on the alluvial fans and alteration of stream channels by channelization may reduce the amount of fluvial sediment reaching the depositional areas upwind of sand dunes and Mojave fringe-toed lizard habitat. Similar effects have been observed in the Coachella Valley, with adverse consequences for Coachella Valley fringe-toed lizard habitat (Griffiths et al. 2002). The extent of the Project impact to fluvial sand transport is unknown, but is expected to contribute at least incrementally to loss of Mojave fringe-toed lizard habitat.

Other potential indirect impacts of the Project to Mojave fringe-toed lizards include mortality from vehicle strikes; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat; increased road kill hazard from operations traffic; harm from accidental spraying or drift of herbicides and dust suppression chemicals; and an increase in access for avian predators (such as loggerhead shrikes) due to new perching structures.

As described in subsection C.2.8, Cumulative Impacts, future proposed projects would cumulatively cause losses over a substantial portion of Mojave fringe-toed lizard habitat. Approximately 16 percent of the Mojave fringe-toed lizard habitat in the NECO planning areas would be affected if all proposed projects were constructed (see subsection C.2.8, Cumulative Impacts). The Genesis Project's contribution to the direct loss of habitat for the Chuckwalla Valley population of Mojave fringe-toed lizard is 0.2 percent. These effects are exacerbated when combined with the expected indirect effects to Mojave fringe-toed lizard habitat from interruption of aeolian sand transport; diversions of desert washes and interruption of fluvial transport of sand that contribute to the maintenance of habitat; and the continuing spread of non-native weedy species such as the Sahara mustard and Russian thistle in the Chuckwalla Valley.

The distribution of Mojave fringe-toed lizards is naturally fragmented because of its obligate habitat specificity to a patchy habitat type, and many local populations of this species are quite small, with small patches of sand supporting small populations of lizards. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation (Murphy et al. 2007). The Mojave fringe-toed lizard population in the Chuckwalla Valley, along with a very small population in Joshua Tree National Park's Pinto Basin, represents the southernmost distribution of this species (Barrows pers. comm.). This southern population may represent an important gene pool in light of the likely warming and drying that will occur in this region as a result of climate change; these southernmost lizards that may already be adapted to hotter and drier conditions than those further north and could represent a source of genetic variation that could stave off extinction of this species in selected refugia (Barrows pers. comm.).

The Applicant disagrees with staff's assessment of the indirect impacts to Mojave fringe-toed lizard habitat, and asserts that the downwind "sand shadow" area that staff considered affected by intrusion into the Palen-McCoy Valley Sand Transport Corridor does not provide suitable habitat for Mojave fringe-toed lizards (TTEC 2010n). To support their conclusion the Applicant notes that surveys in 2009 and 2010 did not reveal the presence of Mojave fringe-toed lizards in this area (TTEC 2010n). They further note that ribbed crypstantha, a plant species that requires loose wind blown sand

like Mojave fringe-toed lizards, is also absent from areas that staff have depicted as within a potential sand shadow. However, staff notes that surveys did reveal the presence of at least one ribbed cryptantha in the sand shadow area (TTEC 2010n). Furthermore, the Applicant has provided no information regarding how the Mojave fringe-toed lizard surveys were conducted, and whether the methods used for the 2009 and 2010 surveys were adequate to conclude absence of this species. In addition, the Applicant has provided no site specific information regarding the habitat characteristics of the sand shadow areas compared to those areas in which Mojave fringe-toed lizards were observed.

Staff remains willing to reconsider conclusions about the suitability of the 151 acres indirectly affected for Mojave fringe-toed lizard, but would need additional information to do so. That information would need to include new, systematic survey data that would be adequate to confirm absence of Mojave fringe-toed lizards, or evidence that the surveys conducted in 2009 and 2010 were adequate for such conclusions. In addition, staff would need a detailed description of the habitat within the sand shadow area compared to those areas that support Mojave fringe-toed lizards, particularly with respect to features such as loose, wind-blown sand.

Staff considers the direct, indirect, and cumulative effects of the Project to be significant for the Chuckwalla Valley Mojave fringe-toed lizard population. Indirect effects include the reduction in sand supply to the sand transport corridor from alteration of Project area drainages as well as the sand shadow effect resulting from intrusion of the project into the sand transport corridor. The cumulative impact of all the proposed projects would be to increase the already fragmented distribution of the Mojave fringe-toed lizards, and to increase the risk of extirpation of isolated populations within the Chuckwalla Valley. Staff's proposed Condition of Certification **BIO-20** recommends acquisition and protection of core populations of Mojave fringe-toed lizard habitat elsewhere in the Chuckwalla Valley. Staff proposes compensatory mitigation at a 3:1 ratio for direct impacts to sand dune and sand drifts over playa, as required by NECO. Staff also proposes mitigation at a 0.5:1 ratio for the 151 acres indirectly affected. Staff has concluded that the habitat acquisition and protection proposed in Condition of Certification **BIO-20** would, if implemented, reduce Project impacts to Mojave fringe-toed lizards to less than significant levels.

Desert Tortoise

Direct Impacts

During construction of the Genesis Project desert tortoises may be harmed during clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, and injury or mortality from encounters with worker's or visitor's pets. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could

disturb, injure, or kill individual tortoises. Also, tortoises may seek shade by taking shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved.

The Applicant has recommended impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoise out of construction areas, relocating/translocating the resident desert tortoise from the Genesis Project site, reducing construction traffic and speed limits to reduce the incidence of road kills and worker environmental awareness training programs.

Staff has incorporated these recommendations into conditions of certification. These include staff's proposed Conditions of Certification **BIO-1** through **BIO-5**, which requires qualified biologists, with authority to implement mitigation measures necessary to prevent impacts to biological resources, be on site during all construction activities. Staff's proposed Condition of Certification **BIO-6** requires the development and implementation of a Worker Environmental Awareness Program to train all workers to avoid impacts to sensitive species and their habitats. Staff's proposed Condition of Certification **BIO-7** requires the project owner to prepare and implement a Biological Resources Mitigation Implementation and Monitoring Plan that incorporates the mitigation and compliance measures required by local, state, and federal LORS regarding biological resources. Staff's proposed Condition of Certification **BIO-8** describes Best Management Practices requirements and other impact avoidance and minimization measures.

Staff's proposed Conditions of Certification **BIO-9** through **BIO-11** are specific to desert tortoise; proposed Condition of Certification **BIO-9** would require installation of security and desert tortoise exclusionary fencing around the entire Project Disturbance Area (including access roads), and **BIO-10** recommends the development and implementation of a desert tortoise translocation plan to move the tortoises currently living in the Project Disturbance Area to identified translocation sites. Staff's proposed **BIO-11** requires verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented.

Implementation of staff's proposed Conditions of Certification **BIO-9** and **BIO-10** have inherent risks and could themselves result in direct effects such as mortality, injury, or harassment of desert tortoises due to equipment operation, fence installation activities, removal of tortoise burrows, and tortoise translocation. These impacts are described in more detail below.

Impacts to Critical Habitat

The Project area overlaps with a portion of the 1,020,600-acre Chuckwalla Desert Tortoise Critical Habitat Unit. Critical habitat is defined as the specific areas supporting those physical and biological features that are essential for the conservation of the species and that may require special management considerations or protection (USFWS 2008a). The Project transmission line (2.8 miles), gas line (1 mile) and access road (1.8 miles) would intersect the edge of designated desert tortoise critical habitat (TTEC 2009c). Approximately 23 acres of critical habitat would be directly impacted by construction of these facilities (TTEC 2009c). The Applicant proposed compensation at

a 5:1 ratio for all impacts in critical habitat and/or Desert Wildlife Management Areas. Staff concurs with this recommendation, as described in proposed Condition of Certification **BIO-12**.

Impacts of Relocation/Translocation

Capturing, handling, and relocating desert tortoises from the proposed site after the installation of exclusion fencing could result in harassment and possibly death or injury. Tortoises may die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures, pathogens may be spread among the tortoises, both resident and translocated animals. For those tortoise near but not within the Project Disturbance Area, removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intraspecific competition, and death. Tortoises moved outside their home ranges would likely attempt to return to the area from which they were moved, therefore making it difficult to isolate them from the potential adverse effects associated with Project construction.

The risks and uncertainties of translocation to desert tortoise are well recognized in the desert tortoise scientific community. The Desert Tortoise Recovery Office (DTRO) Science Advisory Committee (SAC) has made the following observation regarding desert tortoise translocations (DTRO 2009, p. 2):

“As such, consensus (if not unanimity) exists among the SAC and other meeting participants that translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted populations in areas containing “good” habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of “depleted” (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition.”

The Applicant has prepared a draft Desert Tortoise Relocation/Translocation Plan as part of the Incidental Take Permit application (TTEC 2010a) which includes measures to avoid and minimize adverse impacts to resident and translocated desert tortoise. This plan would be reviewed and approved by CDFG, USFWS, and Energy Commission staff, and would be implemented to move any tortoises detected during clearance surveys. The Desert Tortoise Relocation/Translocation Plan includes an analysis to determine whether relocation or translocation is an appropriate action; the identification

and prioritization of potentially suitable locations for translocation; desert tortoise handling and transport considerations (including temperature); animal health considerations; a description of translocation scheduling, site preparation, and management; and specification of monitoring and reporting activities for evaluating success of translocation. With implementation of staff's proposed Condition of Certification **BIO-10**, adverse impacts associated with desert tortoise relocation/translocation would be minimized.

Mitigation for Desert Tortoise Habitat Loss

A significant impact of the Genesis Project is loss of approximately 1,773 acres of desert tortoise habitat, including 23 acres of critical habitat. Fragmentation and disturbance to adjacent desert tortoise habitat contributes to the significance of this impact. Desert tortoise are known to use lower-quality intermountain habitat, such as that present across most of the Project area, as dispersal routes over time, providing connectivity between higher-quality habitat areas (Averill-Murray and Averill-Murray 2005).

In consultation with USFWS and CDFG, staff has concluded that habitat compensation at a 1:1 ratio through land acquisitions or an assessed financial contribution based on the final construction footprint would mitigate for desert tortoise habitat loss within the Project Disturbance Area. This mitigation is consistent with measures in Incidental Take Permits issued by CDFG for projects in the region, and with requirements described in the NECO (BLMCCD 2002). The NECO specifies the following desert tortoise compensation requirements (from page D-2, Appendix D, BLM-CCD 2002):

“A mitigation fee based on the amount of acreage disturbed shall be required of proponents of new development. Within Desert Wildlife Management Areas (DWMAs) (Category I) the lands delivered or equivalent fee shall be an amount that achieves a ratio of 5 acres of compensation land for every 1 acre disturbed. Outside DWMAs (Category III) the lands delivered or equivalent fee shall be an amount that achieves a ratio of one 1 acre of compensation land for every 1 acre disturbed. Funds may be expended as approved by the Management Oversight Group in 1991. Lands will be acquired or enhanced within the same recovery unit as the disturbance. CDFG may require additional fees for management of lands and for rehabilitation of lands.”

In its Incidental Take Permit application (TTEC 2009c) the Applicant described the desert tortoise habitat within the Project Disturbance Area as marginal, and did not recommend mitigation for any desert tortoise habitat loss. Instead the Applicant proposed acquisition of off-site habitat to compensate for possible incidental take of six desert tortoises over the course of construction and operation, as well as compensatory mitigation of impacts to portions of the Desert Wildlife Management Area and critical habitat. Staff, CDFG, and USFWS agree that the Project Disturbance Area does not include any high quality desert tortoise habitat, but all of it is suitable for desert tortoise and all could potentially be occupied by this species. The Project would eliminate desert tortoise habitat, fragment adjacent habitat and adversely affect connectivity for desert tortoise and other wildlife. Staff recommends a mitigation ratio of 1:1 for loss of 1,749 acres of Sonoran creosote bush scrub within the Project Disturbance Area, and a 5:1 ratio for the 23 acres within critical habitat.

As specified in staff's proposed Condition of Certification **BIO-12**, acquisition, protection and enhancement of desert tortoise habitat would mitigate Project impacts to desert tortoise. Acquisition of mitigation lands would focus on parcels in critical habitat within the Chuckwalla DWMA as well as securing lands that would promote protection of high quality desert tortoise habitat between the northern portions of the Chuckwalla DWMA and Joshua Tree National Park (see Appendix B for a regional map depicting these targeted acquisition areas). The location of the mitigation lands would also facilitate connectivity between desert tortoise populations in the Chuckwalla and Chemehuevi DWMAs and critical habitat units.

Staff's proposed Condition of Certification **BIO-12**, Desert Tortoise Compensatory Mitigation, specifies security for acquisition of 1,864 acres and provides an estimate of associated costs. These costs include an acquisition fee of \$500 per acre, initial habitat improvement costs at \$330 per acre, and long-term management endowment is estimated at \$1,450 per acre (Nicol pers. comm.). The estimated composite mitigation cost to meet staff's recommendation for establishing the security would be \$2,280 per acre. This security amount may change with an updated appraisal and when a Property Analysis Record is prepared for the parcels that have been selected for acquisition. It is important to note that these are estimates based on current costs; the requirement is defined in terms of acres, not dollars per acre, and actual costs may vary.

Integrating State and Federal Desert Tortoise Mitigation

Staff from BLM, Energy Commission, USFWS, and CDFG agrees that compensatory mitigation at a 1:1 ratio is appropriate for Project impacts to desert tortoise habitat. However, some differences remain between the federal and state approach to desert tortoise mitigation that currently preclude a complete integration of desert tortoise mitigation requirements. One difference is the state requirement for permanent protection of acquired mitigation lands. Energy Commission staff and CDFG require that mitigation lands acquired for endangered species be maintained and protected in-perpetuity for the benefit of those species. The BLM cannot always make the same commitment to protecting acquired mitigation lands because their multiple use mandate restricts their ability to designate lands solely for conservation purposes and to exclude potentially incompatible development and activities.

The REAT Agencies agree that to address the in-perpetuity protection requirement, any lands acquired and subsequently donated to BLM will have either a deed restriction or conservation easement in title that will preclude future development of the land (Fesnock pers. comm., Flint pers. comm.). The REAT Agencies also note that protection could be achieved by buying private in-holdings within designated wilderness or wilderness study areas, being that these areas are congressionally designated and as such preclude any development within them, thus meeting the requirement for in-perpetuity protection. The BLM has an established process for accepting lands with deed restrictions or conservation easements and is working on streamlined version of this process. Staff anticipates that the stream-lined process for in-perpetuity protection of BLM mitigation lands will be established before the end of 2010 (Fesnock pers. comm., Flint pers. comm.).

The BLM has also indicated that for any land enhancement actions or recovery actions implemented on existing BLM-owned lands, BLM would develop a Memorandum of

Understanding (MOU) with CDFG containing provisions for notification of any proposed Projects affecting those lands (BLM 2009a). The BLM agreed that future Projects authorized on these mitigation lands would be compensated at a higher rate (BLM 2009a).

Calculation of Security for Desert Tortoise Compensatory Mitigation

To satisfy section 2081 of the California Endangered Species Act an applicant must provide financial assurances to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures. These financial assurances are generally provided in the form of an irrevocable letter of credit, a pledged savings account, or another form of security prior to initiating ground-disturbing Project activities. Staff's proposed conditions of certification typically specify the dollar amount of the security, and include a provision for adjusting that security amount when parcel-specific information is available. This security amount is calculated by multiplying the acreage of the impact area by the total per acre costs, a figure which represents the sum of the costs required for: (1) land acquisition, (2) initial habitat improvements, and (3) a long-term maintenance and management fee to support long-term management of the acquired lands.

The latter cost for the long-term management endowment is typically the largest component of the mitigation fee. Interest from the endowment creates a funding source that provides enough income to cover annual stewardship costs on the acquired lands and includes a buffer to offset inflation. The amount for the endowment is established by a Property Analysis Record (PAR), a computerized database methodology developed by the Center for Natural Lands Management (<www.cnlm.org/cms>) which calculates the costs of land management activities for a particular parcel. These activities include development of a desert tortoise management plan tailored for each parcel of mitigation land to assess habitat status, identify desired conditions, and develop plans to achieve conditions that would best support desert tortoise. Once the management plan is developed and approved by the appropriate resource agencies, implementation of enhancement actions such as fencing, road closure, weed control, habitat restoration as well as monitoring can begin. The goal of these activities is to increase the carrying capacity of the acquired lands for desert tortoise and increase their population numbers by enhancing survivorship and reproduction.

Funding for the initial habitat improvements supports those actions needed immediately upon acquisition of the property to secure it and remove hazards. These activities might include fencing or debris clean-up, or other urgent remedial action identified prior to when the parcels were acquired. When the management plan is completed for the acquired parcel activities like these are thereafter funded from the interest produced by the long-term management maintenance fee described above.

Staff's proposed Condition of Certification **BIO-12** specifies acquisition of 1,864 acres and provides an estimate of associated costs. These costs include acquisition fees of \$500 per acre, a figure that reflects recent land sale in the Chuckwalla Bench area (Nicol pers. comm.). Initial habitat improvement costs (for example, fencing, debris removal) are estimated at \$330 per acre, and long-term maintenance and management is estimated at \$1,450 per acre based on a Property Analysis Record prepared for land in the Chuckwalla area (Nicol pers. comm.) The estimated composite mitigation cost to

meet staff's recommendation for establishing the security would be \$2,280 per acre. This security amount may change when an updated appraisal is made and a Property Analysis Record is prepared for the parcels that have been selected for acquisition. It is important to note that these are estimates based on current costs; the requirement is defined in terms of acres, not dollars per acre, and actual costs may vary. If the security proves to be inadequate to secure the necessary acreage because of increases in land costs, the project owner would need to make up the difference. Similarly, if the security was an overestimate the project owner would be refunded the excess.

In contrast to the state mitigation approach, the BLM does not require a long-term maintenance and management fee or other funding to manage the acquired desert tortoise mitigation lands because they pursue recovery goals through implementation of region-wide management plans and land use planning as described in the NECO and the Desert Tortoise Recovery Plan rather than through parcel by parcel acquisitions and management. The BLM typically requires a cash payment (proffer) prior to initiating ground-disturbing activities, which generally includes a per acre cost reflecting current land value and recent purchase prices, as well as additional acquisition and indirect costs and funding for appraisals, environmental site assessments, property cleanup, and an inflation contingency. However, as noted by the REAT agencies, other methods may be employed which would satisfy both BLM and the state agency legal requirements.

Indirect Impacts

Ravens and Other Predators

Construction and operations activities associated with the Genesis Project could provide food or other attractants in the form of trash, road-killed animals, and water, which would draw unnaturally high numbers of desert tortoise predators such as the common raven, kit fox, and coyote to the Project area. Project structures would also provide new nesting and perching sites for ravens such as new transmission line towers and perimeter fencing. Development of new elevated perching sites as a result of Project construction could increase raven numbers locally, including the probability that young ravens remain in the area after maturing, which, in turn, could result in increased predation on desert tortoise in the vicinity of the Project Disturbance Area.

Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990, USFWS 2008a) and one of many anthropogenic contributors to desert tortoise population declines.

In addition to ravens, feral dogs have emerged as major predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994; Evans 2001). Dogs brought to the Project site with visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely in occupied desert tortoise habitat. The worker environmental awareness training (**BIO-6**) and restrictions on pets being brought to the site required of all personnel (**BIO-8**) would reduce or eliminate the potential for these impacts.

Construction and operation of the Genesis Project would increase raven and coyote presence in the Project area. Ravens capitalize on human encroachment and expand into areas where they were previously absent or in low abundance. Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources that are introduced or augmented by human encroachment. Road kill along I-10 provides an additional attractant and subsidy for opportunistic predators/scavengers such as ravens. Road kills would mount with increased Genesis Project construction and operations traffic, further exacerbating the raven/predator attractions and increasing desert tortoise predation levels. Staff's proposed Condition of Certification **BIO-8** provides measures to minimize the number of road-kill that might attract desert tortoise predators.

Regional Approach to Raven Control

The USFWS has developed a comprehensive, regional raven management and monitoring program in the California Desert Conservation Area to address the regional, significant threat that increased numbers of common ravens pose to desert tortoise recovery efforts (USFWS 2010). The Regional Raven Management Program will implement recommendations in the USFWS *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008). To mitigate the Genesis Project's contribution to cumulative and indirect impacts on desert tortoise from raven predation, staff proposes that the applicant contribute toward implementation of the USFWS Regional Raven Management Program (USFWS 2010), as described in Condition of Certification **BIO-13**. The applicant's payment would support the regional raven management plan activities focused within the Colorado Desert Recovery Unit, which would be adversely affected by increases in raven subsidies attributable to the proposed Project. The fees contributed by the Applicant would fund staff who would implement the raven removal actions, education and outreach efforts, and surveying and monitoring activities identified in the Environmental Assessment (USFWS 2008). Staff has concluded that that implementation of these actions would be an effective means of reducing the Project's cumulative contributions to desert tortoise predation from increased raven numbers.

The draft Common Raven Monitoring, Management and Control Plan (TTEC 2010k) includes methods and best management practices to avoid and minimize raven attractants and subsidies on the project site, and these methods and practices have been incorporated into staff's proposed Condition of Certification **BIO-13**. The Applicant's Common Raven Monitoring, Management and Control Plan would involve identifying and preventing conditions that might attract or support ravens (for example, eliminating food sources such as garbage or roadkill, minimizing creation of structures that could provide ravens perches, nests or roosts), monitoring the effectiveness of raven management and control measures, and then implementing additional adaptive management measures to make sure that the Project does not result in an increase in raven numbers. Implementation of measures in **BIO-13** would avoid or minimize the contributions of the Project to increased desert tortoise predation from ravens to less than significant levels.

Increased Risk from Roads/Traffic

Vehicle traffic would increase as a result of construction and improvement of access roads, increasing the risk of injuring or killing desert tortoise. The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest though tortoises on dirt roads may also be affected depending on vehicle frequency and speed. Census data indicate that desert tortoise numbers decline as vehicle use increases and that tortoise sign increases with increased distance from roads (Nicholson 1978; Hoff and Marlow 2002). Additional unauthorized impacts that may occur from casual use of the access roads in the Project area include unauthorized trail creation.

To minimize the risks of increased traffic fatality and other hazards associated with roads at the Genesis Project site, the Applicant has proposed a variety of minimization measures which staff has incorporated into staff's proposed Condition of Certification **BIO-8**. These measures include confining vehicular traffic to and from the Project site to existing routes of travel, prohibiting cross country vehicle and equipment use outside designated work areas, and imposing a speed limit of 25 miles per hour.

Impacts to Wildlife from Noxious Weeds

Sahara mustard (*Brassica tournefortii*) is regarded as one of the most invasive wildland pest plants in the Colorado and Mojave deserts, one of the most common invasive plants in desert tortoise habitat, and capable of dominating entire desert landscapes if no control actions are taken. Left uncontrolled, it out-competes and ultimately replaces native wildflowers that provide valuable forage for the desert tortoise. It forms dense thickets that can increase the frequency, intensity, and size of desert fires, increasing the threat to native plant communities, the desert tortoise, and other wildlife (Brooks 2010). In areas where Sahara mustard is particularly dense it may also impede desert tortoise movement (Berry pers. comm.). In the Colorado and Mojave Deserts, a single tortoise was necropsied that had died from renal failure, related to renal oxalosis, and the crystals present in the kidneys were identified as oxalates (Jacobson et al. 2009). One additional tortoise was later necropsied that died of oxalosis in the same region (Berry pers comm. 2010). Although many native plants in the Mojave and Colorado deserts contain oxalates, the oxalate-containing weed Sahara mustard is one of the most common invasives in desert tortoise habitat and is a suspected cause of the renal failure (Berry pers comm).

Sahara mustard spreads explosively during wet years but even during a 12-year drought in Riverside County (1989-1991), the population of Sahara mustard increased by nearly 35 times. Densities equivalent to as high as three million plants per acre have been recorded at Lake Mead National Recreation Area (Graham et al. 2003).

The spread of Sahara mustard from increased vehicle use of the area roads and from transmission construction (Berry pers comm)—its primary conduit for spread—may affect Mojave fringe-toed lizard and other wildlife by altering the availability of forage plants and characteristics of their habitat structure. For example, the Coachella Valley fringe-toed lizard (*Uma inornata*) is a dune-dependent species that requires fine, loose, windblown (aeolian) sand for survival (Zeiner et al. 1990). Much of the ephemeral sand field community within the Coachella Valley has become increasingly less fine and

more gravelly over the past 25 years while there has also been a decline in Coachella Valley fringe-toed lizard populations over the past two decades (Barrows et al. 2010). Barrows et al. (2009) found the Coachella Valley fringe-toed lizard to be the only animal species of five vertebrates evaluated to demonstrate a negative response to Sahara mustard abundance.

Other Indirect Impacts

In addition to construction-related introduction of invasive plants that out compete native plants, other indirect impacts to desert tortoise could result from an increased incidence of accidental wildfires. This could be caused by construction or downed new transmission wires, but the potential for this is low due to the relatively small length of transmission lines proposed as part of the Project. With the addition of hundreds of new jobs, there will be an increased use of area roads that can increase the risk of ignition on roadsides. Both of these impacts could reduce adjacent habitat quality for desert tortoise. Potential deposition of sediment loads as a result of construction-related sediment mobilization during heavy rain events and flooding downstream would impact existing desert tortoise burrows outside of the Project Disturbance Area.

Conclusion – Impacts and Mitigation for Desert Tortoise

Staff's proposed Conditions of Certification **BIO-6** through **BIO-11** describe measures that would avoid and minimize direct impacts to desert tortoise and other sensitive biological resources, and staff has concluded that implementation of these measures would reduce potential direct impacts to less than significant levels. To address the loss of 1,773 acres of desert tortoise habitat, including impacts to 23 acres of critical habitat, and associated fragmentation and loss of connectivity, staff's proposed Condition of Certification **BIO-12** requires acquisition and enhancement of 1,864 acres of desert tortoise habitat within the Colorado Desert Recovery Unit. Staff recommends a 5:1 compensatory mitigation ratio for impacts to desert tortoise critical habitat, and 1:1 for the 1,749 acres of Sonoran creosote bush scrub within the Project Disturbance Area. The compensatory mitigation acquisitions must be in areas that have potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise populations. Staff has concluded that these mitigation measures would reduce impacts to desert tortoise to less than significant levels.

Couch's Spadefoot Toad

Couch's spadefoot toads were recorded breeding in a pond south of I-10 near Wiley Well Road (Dimmitt 1977) that apparently overlaps with the Project's proposed transmission line corridor; in the absence of survey information indicating otherwise, staff considers this species to be extant at this location. Couch's spadefoot toads require aquatic habitat for breeding and upland habitat for burrowing. This species does not breed every year, and therefore potential breeding habitat does not necessarily need to sustain surface water for an extended period of time (minimum approximately 9 days) every year. Burrowing habitat is considered any area with friable soil within the adult or juvenile dispersal distance for this species. This dispersal distance is largely unknown, though there is one record from Mayhew (1965) of a juvenile 0.25 miles from the closest breeding pond. Therefore, in the absence of more conclusive information, upland Couch's spadefoot toad habitat is considered to be all areas with friable soils within 0.25 miles of a potential breeding pond and other observations place them at

least one mile from ponds (Dimmitt, pers. comm.). While little is known about the location and proximity of subterranean refuge sites, there is some indication that they are widely distributed and that breeding pond habitat is the limiting factor in their distribution (Dimmitt, pers. comm.).

Impacts to Couch's spadefoot toads could include loss of breeding habitat and direct mortality during grading or construction. Disturbance to breeding ponds, including new ponds incidentally created during construction activities, could also impact this species. In addition, construction, maintenance, and operation traffic could result in direct mortality on Project area roads. Indirect impacts could result from hydrology changes that reduce flow to breeding areas. In addition, construction noise could trigger emergence when conditions are not favorable. As discussed above, the Project transmission line corridor overlaps a recorded breeding site. While the exact location of the breeding pond is unknown, a review of aerial photos and a site visit identified a pond southwest of the intersection of Wiley Well Road and I-10 the area mapped in Dimmitt (1977). In addition, staff has reviewed aerial photos of the linear route and solar facility site north of I-10. Staff agrees with the Applicant that it is unlikely the solar facility site supports breeding pond habitat though it may provide habitat for subterranean burrows if there is a breeding pond within dispersal distance. Staff has identified areas along the linear route, however, that need further study to determine whether these areas are capable of sustaining surface water and therefore provide breeding habitat.

Without species-specific survey results and with limited occurrence information, it is difficult to assess the potential for direct and indirect impacts to Couch's spadefoot toads. However, based on a known occurrence in the Project area, and surface water visible in Project aerials and verified in the field, staff concludes that the pond southwest of Wiley Well Road and I-10 is breeding habitat for Couch's spadefoot toad. Further, based on a review of aerial photography staff believes that additional breeding habitat for this species may occur north of I-10 along the proposed linear facility route.

The Genesis Project is located at the western border of the Couch's spadefoot toad range. Staff considers the impacts to one of the few known breeding ponds for this species at the western boundary of its range to be a significant impact. Staff's proposed Condition of Certification **BIO-27** requires development and implementation of a Couch's Spadefoot Toad Protection and Mitigation Plan, which requires avoiding impacts to all spadefoot toad breeding habitat along the Project linear corridors, or requires construction of replacement habitat if impacts are unavoidable. In order to complete this plan, habitat surveys in 2010 would be required to identify potential spadefoot toad breeding habitat along the linear alignment. Staff will work with the Applicant to develop the appropriate survey methods and gain appropriate approvals prior to survey initiation from agency staff. Elements to consider in developing the survey methods would include a discussion of available food sources, identifying potential breeding pond characteristics, and an appropriate buffer to protect these potential breeding sites.

Staff anticipates that construction activities could avoid the known breeding pond south of I-10 near Wiley Well Road. The Protection and Mitigation Plan would provide detailed guidance to implement the protection of the I-10 pond during Project construction and operation, and would extend that protection to any other ponds detected during habitat

surveys conducted north of I-10 along the linear corridor. Staff's proposed Condition of Certification **BIO-27** also requires that the new breeding pond habitat be created if ponds are impacted during construction. The avoidance, minimization and compensatory mitigation described in **BIO-27** would reduce Project impacts to Couch's spadefoot toad to less than significant levels.

Western Burrowing Owl

The 2009 biological field surveys indicated two burrowing owls were present within the Study area and burrowing owl sign (burrows, whitewash, feathers, and pellets) was observed at several locations throughout the Study area (GSEP 2009a, Appendix C). However, the 2009 surveys did not reveal the presence of burrowing owls or active burrows within in the Project Disturbance Area. Since owls and owl sign were found just outside of the Project Disturbance Area, staff has concluded that there is some potential for burrowing owls to move into Project site to nest, and therefore could be directly impacted. In addition, burrowing owls near but not within construction areas could be impacted during construction activities. The potential for direct impacts to burrowing owl includes the loss of nest sites, eggs, and/or young (unless the birds are evicted prior to construction); permanent loss of breeding and foraging habitat; and disturbance of nesting and foraging activities for burrowing owl pairs within the Project site, buffer, or immediately surrounding area. Indirect impacts to burrowing owls during construction and operation can include increased road kill hazards, modifications to foraging and breeding activities, and loss of prey items and food sources due to a decreased number of fossorial mammals.

If burrowing owls were detected nesting within the Project Disturbance Area, they would need to be relocated prior to the nesting season to avoid direct impacts. There is much debate among state, federal, local, and private entities over the most practicable and successful relocation/translocation methods for burrowing owl. When passive relocation is used solely as an impact avoidance measure, it is generally only effective when burrowing owl nesting territories are directly adjacent to permanently protected lands (i.e. military reservation, airport, wildlife reserve, agricultural reserve with appropriate crop type such as alfalfa) (Bloom 2003). Passive relocation has been criticized as a relocation method because relocated or displaced owls are tenacious about returning to their familiar burrows and are inclined to move back to the impact site if the impact site is still visible to the owl and/or if the impact site is not completely graded (Bloom pers. comm.). Burrowing owls are put at increased risk when they are introduced to a new environment. The owls are naturally preyed upon by numerous diurnal and nocturnal avian and mammalian species and evicting owls from their familiar burrow, territory, and home range without a safe opportunity to become familiar with their new habitat increases the potential for predation (Pagel pers. comm.). Thus, many burrowing owls likely die during passive relocations used for permanent owl eviction.

For successful active or passive relocation, breaking the owl's site fidelity is of utmost importance (Bloom 2003). The off-site location for the relocated owls should ideally have an existing burrowing owl colony and a large ground squirrel colony. Should neither colony already exist at the translocation site, artificial burrows should be installed if significant grassland or appropriate agricultural crop type is present (Bloom 2003). Active translocation of owls involves trapping owls, temporarily holding them in

enclosures with supplemental feeding, and releasing at a suitable off-site location with existing or artificial burrows prior to breeding.

While active translocation might be a better solution than passive relocation for moving owls from large sites like the Genesis Project site, California Fish and Game Code 3503.3 prohibits the active relocation of burrowing owls unless the effort is designed as a research project. Staff therefore recommends implementation of passive relocation if burrowing owls are detected within the Project Disturbance Area and need to be relocated to avoid direct impacts. Staff requests that the applicant coordinate with CDFG on the approval of the color-banding of any burrowing owls to be passively relocated (in accordance with the guidance provided by USGS bird banding lab (<http://www.pwrc.usgs.gov/bbl>) in order to document the success of the burrowing owl relocation and monitoring program. Staff would also support a cooperative research effort with the Applicant, CDFG and USFWS to develop a research protocol to assess the efficacy of an active translocation program. The California Burrowing Owl Consortium (CBOC 1993) guidelines state that offsite suitable habitat for use by burrowing owl must be acquired at one of the following ratios:

- Replacement of occupied habitat with occupied habitat at 9.75 acres (6.5 acres times 1.5 acres) per pair or single bird;
- Replacement of occupied habitat with habitat contiguous to currently occupied habitat at 13.0 (6.5 acres times 2) acres per single pair or single bird, or;
- Replacement of occupied habitat with suitable unoccupied habitat at 19.5 (6.5 acres times 3) acres per pair or single bird.

The USFWS notes that the above guidelines were developed for owls nesting in coastal habitats, and their efficacy in desert environments has not been ascertained (Sorenson pers. comm.). No documentation is available to statistically evaluate the success of passive relocation in southern California. Passive relocations in Western Riverside County have not involved banded birds, so information on rates of success and direct/indirect mortality are not available. Reports elsewhere (Trulio 1995; 1997) do not provide long term analyses associated with passive relocation efforts to determine if passively relocated burrowing owls are present in the area after one or more years. The lack of documented success of passive translocations raises concerns regarding the fate of evicted owls.

Acquisition of the appropriate amount of offsite habitat for burrowing owl should take into consideration the number of owls being displaced as a result of the Project, the amount of foraging habitat being impacted by the Project, and the average home ranges and foraging distances of breeding and non-breeding owls. Diurnal home range for owls can be 150 feet on both sides of burrow. Nocturnal home range is much larger, 1 square mile per owl pair, and several owls can overlap in that 1 square mile (Bloom pers. comm.). The mean home range for 11 male burrowing owls in 1998 and 22 males in 1999 was 177 ha (437 acres) and 189 hectares (467 acres), respectively, at naval Air Station in Lemoore, California which is located south of Fresno (Bloom 2003). Male burrowing owls often move greater than 1,000 meters when foraging in the breeding season and home ranges can often times overlap (Bloom 2003).

Staff has concluded that while no burrowing owls were detected in the Project Disturbance Area during the 2009 surveys, they could be found there when construction occurs because they have been recorded nearby. Staff has proposed Condition of Certification **BIO-18** (Burrowing Owl Impact Avoidance and Minimization Measures) which requires a pre-construction survey to determine the current number of owls occupying the Project Disturbance Area and surrounding buffer area. **BIO-18** recommends avoidance and minimization measures to protect owls nesting near but not within the Project Disturbance Area. In addition, staff has conservatively assumed that one burrowing owl pair might occur within the Project, and has required acquisition of up to 19.5 acres per owl acres of compensatory mitigation to offset the loss of habitat if pre-construction surveys indicate that owls are using the Project site for breeding. If no burrowing owls are detected nesting within the Project Disturbance Area during pre-construction surveys, then the recommendation for acquisition of 19.5 acres per owl of burrowing owl habitat would not apply. With implementation of **BIO-18**, direct and indirect impacts to burrowing owls resulting from construction of the Project would be mitigated to less than significant levels through pre-construction surveys and acquisition of compensatory habitat if it is determined that owls will be displaced as a result of construction following surveys.

Golden Eagle

Golden eagles can be extremely susceptible to disturbance during the breeding season (Anderson et al. 1990; USFWS 2009b), and adverse effects are possible from various human activities up to (and in some cases exceeding) one mile from a nest site (Whitfield et al. 2008). While golden eagles are known to occur in the region, there are no known nests within 14 miles of the Project site (BLM 1999) and this species was not incidentally observed during avian point count surveys or field surveys conducted for other plant and wildlife species (GSEP 2009a). Golden eagle inventories are currently being conducted using methods recommended by USFWS (Pagel et al. 2010) and will cover all potential nesting habitat within 10 miles of the Project boundaries.

Without Project-specific survey results, staff made a general evaluation of the potential for the Project to injure or disturb breeding or wintering golden eagles with the assumption that an active golden eagle territory might occur within 10 miles of the Project boundaries.

Based on guidance provided by the USFWS (72 FR 31132, June 5, 2007) staff defined disturbance as an activity that would result in injury to an eagle or which would substantially interfere with normal breeding, feeding, or sheltering behavior. For example, a nestling being knocked from the nest by a startled adult would be considered an injury. A nestling fed inadequately because adults were agitated in the vicinity of the nest due to construction-related noise and activity would also be considered substantial interference, as would a situation in which nestlings starve because the adults were excluded from their familiar foraging grounds and could not provide adequate food to their young.

Staff concluded that Project construction activities could potentially injure or disturb golden eagles if nests were established sufficiently close to Project boundaries to be affected by the sights and sounds of construction. Staff considers these potential impacts unlikely, but if active golden eagle were established within 10 miles of the

Project boundaries, disturbance to nesting activities would be avoided with implementation of Condition of Certification **BIO-28** (Golden Eagle Inventory and Monitoring). This condition recommends that during construction, golden eagle nest surveys be conducted in accordance with USFWS guidelines to verify the status of golden eagle nesting territories within 10 miles of the project boundaries. If active nests are detected, **BIO-28** recommends monitoring guidelines, performance standards, and adaptive management measures to avoid adverse impacts to golden eagles from Project construction. Implementation of **BIO-28** would reduce potential impacts of Project construction on nesting golden eagles to less than significant levels.

Staff also assessed the impacts of the Project to golden eagle foraging habitat, and concluded that this Project would contribute to the cumulative loss of golden eagle foraging habitat within the NECO planning area. The Project would reduce the availability of foraging habitat in the Project area and could degrade foraging habitat by the introduction and spread of noxious weeds and an increase in human activity in the area. As discussed in the cumulative impact subsection, the Project contributes 0.7 percent to cumulative loss of Sonoran creosote bush scrub habitat within 10-miles of potential nest habitat from future projects (see **Biological Resources Table 15**). The potential for impacts to golden eagle foraging habitat can be minimized by the implementation of staff's proposed Conditions of Certification **BIO-12** (acquisition of desert tortoise compensatory mitigation lands), **BIO-22** (acquisition of state waters compensatory mitigation lands) **BIO-14** (implementation of Weed Management Plan). As described in **BIO-12**, the acquisition of desert tortoise mitigation lands would be targeted for areas within and near the Chuckwalla Bench and the Chuckwalla DWMA. Because these targeted areas are also within 10 miles of potential nesting sites for golden eagles, acquisition of these desert tortoise mitigation lands would also provide protected golden eagle foraging grounds.

Migratory/Special-status Bird Species

Several special-status species, such as black-tailed gnatcatchers, yellow warblers, and crissal thrashers, breed in the region, but would not breed on the site due to lack of suitable habitat. This region does not provide breeding habitat for Swainson's hawks, northern harriers, short-eared owls, ferruginous hawks, or Brewer's sparrows but may provide overwintering habitat or the species may be present during migration. The Project impacts to Sonoran creosote bush scrub and microphyll woodland would contribute to loss of foraging habitat, cover, and roost sites for these species on their migratory or wintering grounds, but would not contribute to loss of breeding habitat. The Project would have more substantial adverse effects to the resident breeding birds at the site, which include loggerhead shrike, California horned lark, and Le Conte's thrasher among others. These species would be adversely affected by the loss of 16 acres of microphyll woodland and 1,773 acres of Sonoran creosote bush scrub. Le Conte's thrasher, loggerhead shrikes and other wash-dependent species would in particular be affected by the loss of the cover, foraging and nesting opportunities provided by the structurally diverse and relatively lush dry washes and microphyll woodland. Dry washes contain less than five percent of the Sonoran Desert's area, but are estimated to support ninety percent of Sonoran Desert birdlife (CalPIF 2006). As discussed in the cumulative impact subsection, staff considers the Genesis Project to be a substantial contributor to the cumulative loss of the NECO Planning Area's

biological resources, including habitat for these special-status birds. Staff's proposed Condition of Certification **BIO-12**, the desert tortoise compensatory mitigation plan and **BIO-22**, mitigation for impacts to state waters, would offset the cumulative loss of habitat for these species.

The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503, which protects active nests or eggs of California birds. The Applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds that have been incorporated into staff's proposed Conditions of Certification including: **BIO-8** (Impact Avoidance and Minimization Measures); **BIO-15** (Pre-construction Nest Surveys); which describes guidelines for performing pre-construction surveys and **BIO-16** (Avian Protection Plan) which provides a mechanism to monitor for bird collisions and implement adaptive management measures to minimize impacts. Implementation of staff's proposed conditions of certification would avoid direct impacts to nests, eggs, or young of migratory birds, and would minimize the impacts to less than CEQA significant levels for construction disturbance to resident and migratory birds.

Bats

The Project site supports foraging and roosting habitat for several special-status bat species. Roosting opportunities for bats are available in tree cavities, soil crevices and rock outcroppings primarily within dry desert wash woodland habitats. Bats likely utilize habitats throughout the study area for foraging but forage more commonly when water is present within the desert washes when insects are more abundant. Implementation of the Project would result in loss of these foraging and roosting habitat opportunities for special-status bats that might occur in the Project area.

As discussed in the cumulative impact subsection, staff considers the Genesis Project to be a substantial contributor to the cumulative loss of in the NECO Planning Area's biological resources, including habitat for these special-status bats. Staff's proposed Condition of Certification **BIO-12**, the desert tortoise compensatory mitigation plan and **BIO-22**, mitigation for impacts to state waters, would offset the cumulative loss of habitat for these species.

American Badger and Desert Kit Fox

Construction of the Project could kill or injure American badgers by crushing with heavy equipment or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. Like badgers, desert kit fox are burrow dwellers and are similarly at risk of death or injury from construction activities. The desert kit fox is not a special-status species, but it is protected under Title 14, California Code of Regulations (section 460), and potential impacts to individuals of this species must be avoided. Badger burrows and kit fox burrow complexes were detected within the Project Disturbance Area, and the site includes suitable foraging and denning habitat for these species. Construction activities could also result in disturbance or harassment of individuals. Staff's proposed Condition of Certification **BIO-17** requires that concurrent with the desert tortoise clearance survey, a qualified biologist perform a preconstruction survey for kit fox dens and American badgers in the Project area, including areas within 250 feet of all Project facilities, utility corridors, and access roads.

The Genesis Project would permanently remove approximately 1,811 acres of foraging and denning habitat for American badgers and kit foxes and would fragment and reduce the value of foraging and denning habitat adjacent to the Project site. This habitat loss and degradation could adversely affect American badger and kit fox populations within the NECO Planning Area. As discussed in the cumulative impact subsection, staff considers the Genesis Project to be a substantial contributor to the cumulative loss of the NECO Planning Area biological resources, including American badgers and kit fox. Staff's proposed Condition of Certification **BIO-12**, the desert tortoise compensatory mitigation plan, and **BIO-22**, compensatory mitigation for state waters, could offset the loss of habitat for this species and reduce the impact to less-than-significant.

Nelson's Bighorn Sheep

The Project site is south of a bighorn sheep connectivity corridor between the Palen and McCoy Mountains, identified in the NECO (BLM CDD 2002). However because the distance from the mountain ranges, and the width of the valley at the Project site, staff agrees with the Applicant that the Project site is not expected to be an important movement corridor for this species. The Society for Conservation of Bighorn Sheep has recommended a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat. The Genesis Project site is over one mile from the base of either the McCoy Mountains or Palen Mountains, and the Project site is not expected to provide spring foraging habitat.

Also of interest are the potential impacts from Project groundwater extraction to seeps, springs, or other water resources that are currently available to bighorn sheep that occupy the Palen Mountains or could occupy the McCoy Mountains in the future. The Applicant has provided information (GSEP 2009f) about the closest water features, and has concluded that groundwater extraction for the Project would not affect these features. After reviewing the data provided in the Data Responses, staff agrees with the Applicant that the Project is unlikely to affect springs and seeps available for use by bighorn sheep.

As discussed in the Cumulative Impact subsection C.2.9, the Genesis Project would not directly affect habitat within any NECO connectivity corridors and would not conflict with Desert Bighorn Sheep Conservation goals and objectives outlined in the NECO. In addition, staff has concluded that the Genesis Project site does not represent significant direct or indirect impacts to bighorn sheep habitat connectivity or foraging. Bighorn sheep may be impacted by construction noise, as discussed in the Construction Noise subsection below.

Construction Noise

Construction activities would result in a temporary, although relatively long-term (37 months) increase in the ambient noise level. Animals rely on hearing to avoid predators, obtain food, and communicate. Excessive construction noise could interfere with normal communication, potentially interfering with maintenance of contact between mated birds, obscuring warning and distress calls that signify predators and other threats, and affecting feeding behavior and protection of the young. High noise levels may also render an otherwise suitable nesting area unsuitable. Behavioral and physiological responses to noise and vibration have the potential to cause injury, energy loss (from

movement away from noise source), a decrease in food intake, habitat avoidance and abandonment, and reproductive losses (Hunsaker 2001; National Park Service 1994).

The Palen/McCoy Wilderness Area, immediately north of the proposed Project, and a bighorn sheep Wildlife Habitat Management Area (WHMA), approximately four miles north of the proposed Project, are especially sensitive noise receptors due to the presence of breeding wildlife (e.g., migratory birds and Nelson's bighorn sheep). Sensitive bird nesting habitat also occurs in the adjacent creosote bush scrub to the south and east of the Project site as well as in the desert dry wash woodland approximately one mile east of the Project site. Studies have shown that noise levels over 60 A-weighted decibels (dBA) can result in nest abandonment by birds and intense, long-lasting noise can mask bird calls, which can reduce reproductive success (Dooling and Popper 2007; Hunsaker 2001). Noise impact studies on bighorn sheep have not identified numerical noise impact thresholds. Weisenberger et al. (1996) found that bighorn sheep responded to aircraft over-flights (92-112 dBA) with increased heart rates and altered behavior; however, animal response decreased with increased exposure.

Assuming an average construction noise of 93 dBA at 50 feet from the noise center (the upper range of noise levels for construction equipment), project construction noise would attenuate to 30 dBA at a distance of five miles from the noise center (GSEP 2009a). Using sound extrapolation, project construction noise should attenuate to 60 dBA at approximately 2,300 feet (0.43 mile) from the noise center of construction activities (Bright pers. comm.). The loudest proposed construction activity would be the steam blows required to prepare a steam turbine for startup during the final phase before operation. This process cleans the piping and tubing which carry steam to the turbines; starting the turbines without cleaning these systems would destroy the turbine. A continuous low-pressure technique would be used for steam blows, which would release steam over a continuous period of about 36 hours and would result in noise levels of about 80 dBA at 100 feet. Another relatively loud and short-term construction activity is pile driving. If required, noise from this activity could be expected to reach 101 dBA at a distance of 50 feet and attenuate to 47 dBA at distance of five miles from the project site.

The majority of the construction activities would occur within the powerblocks located approximately 3,200 feet (0.6 mile) from the project boundary. Therefore, it is anticipated that construction noise levels would typically be less than 60 dBA in the Palen/McCoy Wilderness Area and surrounding the project site. The infrequent occasions when construction activities would occur near the project boundary and resultant noise levels would be temporarily elevated beyond 60 dBA surrounding the project would not significantly impact sensitive wildlife.

For a complete analysis of construction noise impacts, refer to the **Noise** section.

Noxious Weed Spread Due to Construction and Increased Vehicle Traffic

Construction activities and soil disturbance could introduce new noxious weeds to lands adjacent to the Genesis Project plant site and its linear facilities, and could further spread weeds already present in the Project vicinity. The spread of invasive plants is a major threat to biological resources in the Colorado Desert because non-native plants

can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species. Vehicles are the primary conduit for the spread of many invasive weeds, including Sahara mustard. (*Brassica tournefortii*). It is also spread along transmission corridors, due to a combination of soil disturbance during construction, road construction and maintenance, and increased vehicle use in previously inaccessible areas.

Sahara mustard is regarded as one of the most invasive wildland pest plants in the Colorado and Mojave deserts, one of the most common invasive plants in desert tortoise habitat, and capable of dominating entire desert landscapes if no control actions are taken. Left uncontrolled, it out-competes and ultimately replaces native wildflowers that provide valuable forage for the desert tortoise. It forms dense thickets that can increase the frequency, intensity, and size of desert fires, increasing the threat to native plant communities, the desert tortoise, and other wildlife (Brooks 2010). In areas where Sahara mustard is particularly dense it may also impede desert tortoise movement (Berry pers. comm.). In the Colorado and Mojave Deserts, a single tortoise was necropsied that had died from renal failure, related to renal oxalosis, and the crystals present in the kidneys were identified as oxalates (Jacobson et al. 2009). One additional tortoise was later necropsied that died of oxalosis in the same region (Berry pers comm. 2010). Although many native plants in the Mojave and Colorado deserts contain oxalates, however, the oxalate-containing weed Sahara mustard is one of the most common invasives in desert tortoise habitat and is a suspected cause of the renal failure (Berry pers comm).

Salt cedar, Russian thistle, Sahara mustard, and Mediterranean grass are already present in the Project vicinity and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of these and other non-native species has dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not an important part of the Colorado Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either. The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire, and the effects to these poor-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Burned creosote bush and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986).

To avoid and minimize the spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The Applicant has submitted a draft Weed Management Plan (TTEC 2010g) to avoid and minimize the spread of noxious weeds. Staff has incorporated recommendations from the Applicant into proposed Condition of Certification **BIO-14** (Weed Management Plan). The Weed Management Plan includes a discussion of weeds targeted for eradication or control and a variety of weed prevention measures such as establishing weed wash stations for construction vehicles and revegetation of disturbed areas with native seed mix. The final plan shall only include weed control measures for target weeds with a demonstrated record of success, based on the best available information

from The Nature Conservancy's The Global Invasive Species Team, California Invasive Plant Council, and the California Department of Food & Agriculture Encyclopedica.

To ensure that weed management does not have unintended adverse effects on special-status species (or their pollinators), **BIO-14** includes guidelines that the final Weed Management Plan must include detailed specifications for safe use of herbicides in natural areas consistent with avoiding herbicide and soil stabilizer drift, consistent with The Nature Conservancy guidelines, available online:

<http://www.invasive.org/gist/products/library/herbsafe.pdf> . The methods used must meet the following criteria:

1. **Manual:** well-timed removal of plants or seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner.
2. **Chemical:** Herbicides known to have residual toxicity, such as pre-emergents and pellets, shall not be used in natural areas or within the engineered channels. Only the following application methods may be used: wick (wiping onto leaves); inner bark injection; cut stump; frill or hack & squirt (into cuts in the trunk); basal bark girdling; foliar spot spraying with backpack sprayers or pump sprayers at low pressure or with a shield attachment to control drift, and only on windless days, or with a squeeze bottle for small infestations (see Nature Conservancy guidelines described above);
3. **Biological.** Biological methods may be used subject to review and approval by CDFG and USFWS and only if approved for such use by CDFA, and are either locally native species or have no demonstrated threat of naturalizing or hybridizing with native species;
4. **Mechanical:** disking, tilling, and mechanical mowers or other heavy equipment shall not be employed in natural areas but hand weed trimmers (electric or gas-powered) may be used. Mechanical trimmers shall not be used during periods of high fire risk and shall only be used with implementation of fire prevention measures (GSEP 2009a).

Staff believes that implementation of **BIO-14** would reduce potential impacts from introduction and spread of noxious weeds to less than significant levels under CEQA.

Construction Impacts of Dust on Plants

Disturbance of the soil's surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001). Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on both foraging and burrowing potential for Mojave fringe-toed lizards. The impacts of increased dust and other construction impacts can be minimized with implementation of staff's proposed Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures). This

condition includes measures to limit areas subject to disturbance, erosion control measures, and vehicular speed limits, all of which would help minimize dust associated with construction and operation of the Project.

Additional Operation Impacts

Operation Lighting

Collision hazards at the Genesis Project site would include several ancillary buildings (e.g., water treatment building, administration building, control room, steam turbine generator building) that range in height from 30 to 50 feet. The structures would be located within the power block, approximately in the center of each solar field and surrounded by solar arrays. The solar collection assemblies would vary in height depending on their position while tracking the sun; the tallest configuration would be approximately 25 feet tall. The tallest proposed structures are the transmission line monopoles, which are approximately 75 feet tall.

Operation of the Genesis Project would require onsite nighttime lighting for safety and security at the site. Existing sources of artificial lighting at night in the project vicinity include intermittent vehicles traveling along Interstate 10 as well as fixed light sources at the California State Prisons south of I-10 at the Wiley's Well Road Exit and at the Wiley's Well Rest Stop. Given the lack of night lighting in this remote area, the overall change in ambient lighting conditions at the Project site may be substantial when viewed from nearby offsite locations. Night lighting close to the ground at the Genesis Project site could disturb the resting, foraging, or mating activities of wildlife and make wildlife more visible to predators.

To reduce lighting impacts, the applicant proposed several design features (GESP 2009a, Visual Design Feature 5). Lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be shielded and oriented to focus illumination on the desired areas and minimize additional nighttime illumination in the site vicinity (GESP 2009a). Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security. Implementation of these applicant-proposed measures would allow areas surrounding the project to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible off site and minimizing the potential for lighting impacts to proximate wildlife. These features have been incorporated into Condition of Certification **VIS-3** (Temporary and Permanent Exterior Lighting) and BIO-8. Staff concludes that bird collisions occurring at night would be less than significant and no mitigation is proposed.

Collisions

Bird collisions with structures typically result when the structures are invisible (e.g., bare power lines or guy wires at night), deceptive (e.g., glazing and reflective glare), or confusing (e.g., light refraction or reflection from mist) (Jaroslow 1979). Collision rates generally increase in low light conditions, during inclement weather (e.g., fog, which is rare in the desert), during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing from danger, or diving after prey. Numerous golden

eagle fatalities have been documented near transmission lines where collisions apparently occurred from striking unmarked wires while diving for prey (Kerschner pers. comm.).

Lighting plays a substantial role in collision risk because lights can attract nocturnal migrant songbirds and major bird kill events have been reported at lighted communication towers (Manville 2001) with most kills from towers taller than 300 to 500 feet (Kerlinger 2004). Many of the avian fatalities at communication towers and other tall structures have been associated with steady-burning, red incandescent L-810 lights, which seem to attract birds (Gehring et al. 2009). Longcore et al. (2008) concluded that use of strobe or flashing lights on towers resulted in less bird aggregation, and, by extension, lower bird mortality, than use of steady-burning lights.

As described above, operation of the Genesis Project would require onsite nighttime lighting for safety and security at the site. The transmission line support structures would not be lit and no red incandescent lighting is proposed. With implementation applicant-proposed visual design features and staff-proposed conditions of certification (i.e., **VIS-3** and **BIO-8**) pertaining to minimization of night lighting, lighted Project facilities would not pose a significant collision hazard at night.

However, relative to nighttime collisions with lighted facilities, the risk of bird collisions and other injuries from solar facilities during daytime is unstudied. In particular, bird response to glare from the proposed solar trough technology is not well understood. Although the proposed Project facilities are significantly shorter than 350 feet (the height above which is considered a collision danger for migrating birds), there is concern that the mirrors may appear to a bird as a no-hazard flight area. The mirrors reflect light and take on the color of the image being reflected (Ho et al. 2009). When viewed from an angle near the current direction of the sun, at a distance or an elevated position, the solar field at its most reflective point may appear like a waterbody or lake (GSEP 2009a). Diurnal birds could also be at risk of injury and fatality from burns if they flew into the reflected sunlight between parabolic troughs or landed on the collector tubes of heat transfer fluid.

Staff has concluded that the risk of such impacts is probably low, although very little research has been conducted on the risks of bird collisions at solar facilities. The only such research available is the bird fatality studies at the Solar One facility near Daggett, San Bernardino County (McCrary et al. 1986). Results of that study indicated that much of the bird mortality consisted predominantly of collisions with mirrors, in large part resulting from increased numbers of birds attracted to the adjacent evaporation ponds and agricultural fields. For the Genesis Project, staff has concluded that without such a nearby attractant, bird numbers, and hence likelihood of bird collisions, would be low.

Although staff does not think it likely that mirrors and other structures within the Project Disturbance Area pose a significant collision risk to resident or migratory birds at the Project site, there is insufficient information available to conclude with certainty that the Genesis Project would not be an ongoing source of mortality to birds for the life of the project. Given the lack of research-based data on the impacts of glare and collision threats to birds, staff has proposed Condition of Certification **BIO-16**, which requires implementation of an Avian Protection Plan. The Avian Protection Plan would provide

the information needed to determine if operation of the Project posed a collision risk for birds, and would provide adaptive management measures to mitigate those impacts to less than significant levels.

Lighting – Glare

The proposed solar mirrors and heat collection elements (HCEs or receiver tubes) are sources of bright light caused from the diffuse reflection of the sun. Glint and glare studies of solar trough technology found that pedestrians standing within 20 meters (60 feet) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see a light intensity equal or greater to levels considered safe for the human retina (URS 2008). Staff concludes that any wildlife on the ground at a distance of 20 meters or closer could experience similar hazards from unsafe light intensity. Slatted fencing is recommended in the **Visual Resources** section of this analysis to mitigate the problem of bright spots on motorists. Implementation of Condition of Certification **VIS-4** (Reduction of Glint and Glare), which requires that slatted fencing be used as the perimeter fencing primarily to mitigate for impacts to motorists, would prevent glare exposure to wildlife on the ground within 20 meters of the project boundary, thereby reducing the potential for a significant impact. For a complete analysis of glare impacts, refer to the **Visual Resources** section.

Electrocution

Large raptors such as golden eagle, red-tailed hawk, and great horned owl, can be electrocuted by transmission lines if the bird's wings simultaneously contact two conductors of different phases, or a conductor and grounded hardware. This happens most frequently when a bird attempts to perch on or take off from a structure with insufficient clearance between these elements. The majority of bird electrocutions occur on distribution lines between 1- and 60-kV; however, configurations greater than 60 kV typically do not present an electrocution potential because phase-to-phase and phase-to-ground clearances for lines greater than 60-kV are typically sufficient to prevent bird electrocution (APLIC 2006). The proposed transmission lines would be 230 kV; therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to avoid bird electrocutions.

Potential impacts to wildlife resulting from electrocution by transmission lines would be minimized by incorporating the construction design recommendations provided in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006). Specifically, the phase conductors shall be separated by a minimum of 60 inches and bird perch diverters and/or specifically designed avian protection materials should be used to cover electrical equipment where adequate separation is not feasible (APLIC 2006). This is further described in staff's proposed Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures); with implementation of Condition of Certification **BIO-8** staff concludes that the proposed transmission lines would not pose a substantial electrocution threat to birds.

Operation Noise

The majority of operational noise would originate from the power blocks, which would be roughly centered at each site and surrounded by solar fields; this creates a buffer for noise to attenuate before reaching the Genesis Project property boundary and the

Palen/McCoy Wilderness Area. Other minor operational noise sources include mirror rotation and maintenance activities (e.g., mirror washing). Excessive noise could disrupt the nesting, roosting, or foraging activities of sensitive wildlife. The Palen/McCoy Wilderness Area, immediately north of the proposed Project, is an especially noise-sensitive biological receptor.

Because the proposed project is located more than nine miles from a human noise-sensitive receptor, the applicant determined that a full acoustic modeling analysis of project operations was not warranted (GSEP 2009a). However, data provided for nearby proposed solar projects of similar size and technology (i.e., Palen and Blythe Solar Power Projects) serve as a proxy for anticipated operational noise levels of the Genesis Project. As such, operational noise is expected to typically range from 90dBA and for certain equipment to approximately 50 to 60 dBA at greater linear distances from the power generation equipment (GSEP 2009a). Based on these estimates, staff concludes there would be no significant impacts to surrounding wildlife from increased operational noise and no mitigation is proposed. For a complete analysis of operation noise impacts, refer to the **Noise** section.

Evaporation Ponds

The proposed Project includes six, eight-acre evaporation ponds that would collect blowdown water from the cooling towers (GSEP 2009a). A variety of waterfowl and shorebirds seasonally inhabit or utilize evaporation ponds as resting, foraging, and nesting areas. Evaporation ponds in the Sonoran Desert pose several threats to wildlife. First, creation of a new water source to an area where water is scarce would attract ravens to the Genesis Project, potentially increasing predation rates on juvenile desert tortoise in adjacent habitat. Second, waterfowl, shorebirds, and other resident or migratory birds that drink or forage at the ponds could be harmed by selenium or hyper-saline conditions resulting from high total-dissolved-solids concentrations (EPTC 1999; Lemly 1996; Windingstad et al. 1987). Staff, CDFG, and USFWS are concerned about these threats to wildlife posed by the evaporation ponds.

Dry cooling is being evaluated by staff as an alternative to wet cooling (refer to the **Alternatives** section of this Staff Assessment) and zero liquid discharge (ZLD) remains a viable wastewater disposal alternative to evaporation ponds. These alternatives would eliminate impacts from wildlife exposure to the evaporation ponds and is recommended by staff, CDFG, and USFWS. If either of these alternatives is not adopted and evaporation ponds would be constructed for the Genesis Project, staff proposes Condition of Certification **BIO-21**, which requires installation of netting over the evaporation ponds to exclude birds and other wildlife as well as a monitoring program to ensure the effectiveness of exclusion. Implementation of this measure would reduce evaporation pond impacts to birds to less-than-significant levels.

Special-status Plant Species

Regional Overview

The Sonoran Desert region of southeastern California, a region bounded by the Mojave Desert to the north and by the higher elevations of the Peninsular Ranges to the west, has a uniquely 'tropical' warm desert climate influenced by the addition of monsoonal

summer rains; a contrast to the dry summer Mediterranean climate that characterizes much of California. This under-surveyed southeastern corner of California has a bi-modal rainfall pattern, with cooler late fall and winter rains that originate in the North Pacific Ocean, and tropical summer storms from southern Mexico (Conservation Biology Institute 2009).

The unique position of the region at the junction with the Neotropic ecozone to the south contributes to the presence of a number of rare and endemic plants and vegetation communities specially adapted to this bi-modal rainfall pattern, and not found elsewhere in California. These include microphyll woodlands, palm oases, and a number of summer annuals that only germinate after a significant warm summer rain.

This distinctive bi-modal climate of the Sonoran Desert distinguishes it, floristically, from other deserts, including the Mojave Desert, and from the rest of California, which is characterized by warm dry summers and a single rainy season in winter. In addition to being hotter and drier, the Sonoran Desert region also rarely experiences frost. Although the region supports numerous perennial species, including a wide variety of cacti, more than half of the region's plant species are herbaceous annuals, which reveal themselves only during years of suitable precipitation and temperature conditions.

This region also occupies an important biogeographic location and zone of ecological transition on the Pacific coast of North America, and so its floristic diversity includes many widespread taxa on the edge of their range. This includes all of the CNPS List 2 plants occurring in the region—species that are more common outside of California but here they represent geographically marginal, peripheral populations on the frontiers of their range. The evolutionary significance—and therefore the conservation value—of peripheral populations are well documented, as is their greater risk of extirpation (Leppig & White 2006).

Summary of Project Impacts and Mitigation

Spring 2009 and 2010 surveys of the Project transmission gen-tie line and the proposed SCE Colorado River Substation (AECOM 2010d) indicate that construction of the Project would directly impact four special-status plant species:

- Harwood's eriastrum (also sometimes referred to as Harwood's phlox), (*Eriastrum harwoodii*), a BLM Sensitive species, CNPS List 1B (rare, threatened, or endangered throughout its range);
- Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*), a CNPS List 2 (rare, threatened, or endangered in California but more common elsewhere);
- Desert unicorn plant (*Proboscidea althaeifolia*), a CNPS List 4 (limited distribution; a 'watch list'), and
- Ribbed cryptantha (*Cryptantha costata*), also a CNPS List 4.

The spring surveys also detected a single plant of Las Animas colubrina, a CNPS List 2; however, it occurs approximately one mile north (upstream) of the Project site and no significant direct or indirect effects are expected. Staff concludes that the Project's direct, indirect, and cumulative impacts to two special-status species—Harwood's eriastrum (a BLM Sensitive species) and Harwood's milk-vetch—are significant. Staff

concludes that although the impacts of all present and reasonable foreseeable future projects in the NECO planning area (see **Biological Resources Table 9**), and projects throughout their range in California, to both plants and the desert washes that support them, are cumulatively considerable. Staff concluded that impacts to ribbed cryptantha are less-than-significant because many occurrences representing tens of thousands of ribbed cryptantha have been documented during the spring surveys of three projects in the vicinity. Staff concludes that although the direct effects of the Project on desert unicorn plant are minor, the impacts of all present and reasonable foreseeable future projects in the NECO planning area (see **Biological Resources Table 9**) on plants or on the sandy washes that support the species are cumulatively considerable.

Based on consultation with recognized experts in the flora of the California Desert region (J. Andre, T. LaDoux, D. Silverman, A. Sanders, pers. comm.) staff has also concluded that potentially significant impacts to special-status plants could be missed unless additional late season surveys are conducted. Late-season plants regarded as having a moderate to high potential for occurrence in the Project area (including the proposed Colorado River Substation site) include the three species listed below; however, the under-surveyed and poorly-understood nature of the region suggests that unanticipated finds are also likely (Andre pers. comm.), including Arizona species not currently known to occur in California (Silverman pers. comm.):

- Abram's spurge (*Chamaesyce abramsiana*) – CNPS List 2.1, NatureServe rank G4/S1.2;
- Flat-seeded spurge (*Chamaesyce platysperma*) – BLM Sensitive, CNPS 1B.2, NatureServe rank G5/S1.2; and
- Lobed ground cherry (*Physalis lobata*) – CNPS List 2.3, NatureServe rank G5/S1.3.

Several additional late-season species were identified with potential to occur; however, their blooming seasons overlap the spring survey window and it is expected that they could have been detected during a spring survey, if present. Nevertheless, summer-fall survey crews should be trained to recognize the following additional species: glandular ditaxis; California ditaxis; jack-ass clover, and Palmer's jack-ass clover (a proposed addition to the CNPS Inventory and known to occur at Palen Dry Lake in marginal dune habitats). Descriptions of these additional species are provided in the subsection C.2.4.1 of this section. Desert unicorn plant is typically easier to detect during late season surveys and impacts to this species are discussed below under the discussion of the spring survey results.

Staff's proposed Condition of Certification **BIO-19** (Special-Status Plant Mitigation) includes a requirement to conduct late-season surveys in summer-fall 2010 to ensure that any plants missed during the spring surveys would be detected and any impacts mitigated. Triggers and performance standards for mitigation of impacts are also included in **BIO-19** to ensure that impacts to any special-status plants found during the late season surveys are mitigated to a level less than significant. Implementation of the avoidance and minimization measures contained in Section A of **BIO-19** and **BIO-20** (Compensatory Mitigation for State Waters) would reduce the Project's contribution to cumulative effects to desert unicorn plant to a level less than significant. The avoidance and minimization measures, combined with the compensatory mitigation standards

described in Section D of **BIO-19**—acquisition and enhancement (restoration)—would reduce the impacts to Harwood’s milk-vetch to a level less than significant and would ensure a no-net-unmitigated loss for the BLM Sensitive Harwood’s eriastrum. The avoidance and minimization measures would be applied to all avoided special-status plants, including ribbed cryptantha.

Assessment Methodology and Analytical Tools

Staff’s determinations of significance were based on the following considerations:

- Proportion of occurrences affected by the Project relative to the total number of documented occurrences in California;
- NatureServe 2009 rank (which encompasses rarity, threats, and population trend);
- Impacts to the local (Chuckwalla Valley or Palo Verde Mesa) population from all proposed projects;
- Impacts to hydrologic or geomorphic processes necessary to sustain the habitat (e.g., diversion or alteration of desert washes, altered sediment transport, interrupted wind transport of dune-maintaining sands);
- Ecological integrity of affected and remaining habitat;
- Cumulative effects and threats to remaining occurrences;
- Ownership and management threats to remaining occurrences;
- Status as a peripheral or disjunct population (or position within the species range);
- Indications of any other population characteristics that may assign it local or regional significance;
- Other potential indirect effects of fragmentation (and its effects on gene flow), invasive plants, increased risk of fire, OHV use of new access roads, operation impacts (dust, chemical drift), and climate change; and
- Intrinsic vulnerability of the species.

In addition to state and federal-listed plant species, and BLM sensitive species, staff’s definition of special-status plants also included CNPS List 1B, 2, 3 and 4 plants, and a few currently unlisted plants that are proposed additions to the CNPS Inventory. Additionally, a potentially new un-described taxon of saltbush (*Atriplex*) was discovered on the marginal dunes of Palen and Ford Dry Lakes in spring 2010, underscoring the region’s under-surveyed and poorly understood flora. CNPS List 3 plants (plants of questionable taxonomic status) may be analyzed under CEQA if sufficient information is available to assess potential impacts to such plants. CNPS List 3 and 4 may be considered regionally significant if, for example, the occurrence is located at the periphery of the species’ range, exhibits unusual morphology, or occurs in an unusual habitat/substrate.

Staff consulted with several recognized experts in the region’s rare plant flora during the preparation of the data requests and its analysis of impacts to special-status plants (J. Andre, T. LaDoux, D. Silverman, A. Sanders, pers. comm.). Other sources consulted include the CNDDDB (CNDDDB 2010), the CNPS online inventory (CNPS 2009) and the

BLM Palm Springs occurrence records (unpublished). The Consortium of California Herbaria (CCH 2010) was reviewed to determine if there were additional documented occurrences that were not already included in CNDDDB. To improve its analysis, staff loaded the occurrence data into an ESRI GIS-based web application that allowed staff to view all CNDDDB and CCH occurrences overlain on various jurisdictional, biological, landform, utility, USGS topographic maps and aerial imagery. This allowed staff to better understand a species' threats and management vulnerabilities relative to probable future renewable energy projects throughout their range, their distance and proximity to projects or features, their peripheral status, potential for fragmentation and other indirect effects from nearby development, ownership and management threats to remaining occurrences and to see the variety of habitats and landforms associated with a given species' occurrences. The following is a list of datasets that were utilized in staff's analysis:

- PLATTS Transmission Data: licensed 3-rd party commercial transmission data);
- CA State County boundaries: <http://atlas.ca.gov/download.html?sl=casil>
- CNDDDB RareFind: http://www.dfg.ca.gov/biogeodata/cnddb/cnddb_info.asp
- BLM Renewables Projects: BLM online solar and wind project data:
<http://www.blm.gov/ca/gis/>
- CA STATSGO Soils: NRCS soil mapping from <http://SoilDataMart.nrcs.usda.gov/>
- CA Cities boundaries: Part of PLATTS Transmission Data delivery
- CA State Parks boundaries: <http://atlas.ca.gov/download.html?sl=casil>
- Federal Wilderness boundaries: <http://www.blm.gov/ca/gis/>
- Federal Lands ownership boundaries: <http://www.blm.gov/ca/gis/>
- CA GAP Vegetation:
http://www.biogeog.ucsb.edu/projects/gap/gap_data_state.html
- Landforms NECO: from BLM Palm Springs Office – no Metadata – based on CA GAP but improved by BLM for NECO area
- Landforms MDEP: Mojave Desert Ecosystem project:
<http://www.mojavedata.gov/datasets.php?&qclass=geo>
- Aerial Imagery – ESRI Data from ArcGIS.com
- USGS Topo – ESRI Data from ArcGIS.com

Impacts to Special-Status Plants Found During Spring 2009 and 2010 Surveys

This section addresses the direct and indirect effects of the Project to plants found within the Project Disturbance Area and one-mile buffer during the spring 2009 or 2010 surveys. The spring 2009 surveys encompassed the entire Project Disturbance Area and the survey results are presented in the Biological Resources section of the AFC (GSEP 2009a). The tabular results and raw GPS data from the spring 2010 surveys of previously un-surveyed areas were submitted in May 2010 (TTEC 2010m) and are reflected in this analysis. The new areas surveyed during 2010 include the transmission line and surrounding buffer area, southward to the gen-tie location with the Blythe

Energy Transmission Line Project and the SCE Colorado River Substation which was surveyed during 2010 for the Blythe Solar Power Project (AECOM 2010d). In addition to state and federal-listed plant species, and BLM Sensitive species, staff's definition of special-status plants also includes CNPS List 1B, 2, 3 and 4 plants, as well as unlisted plants with local or regional significance as defined in the 2009 CDFG protocols for botanical assessments (CDFG 2009).

Harwood's Eriastrum

Harwood's eriastrum, also sometimes referred to as Harwood's phlox or Harwood's woollystar, is a BLM Sensitive species, and CNPS List 1B.2 species, which indicates it is rare, threatened, or endangered throughout its range. It has a NatureServe (CNDDDB) rank of 2, meaning it is an imperiled species. This spring annual is associated with sandy plains or dunes, but typically semi-stabilized habitat (versus active dunes) (CNPS 2010). Its global distribution and range is restricted to 14 known locations in San Diego, Riverside, and San Bernardino counties, typically in dunes associated with the margins around dry lakes such as Dale, Cadiz, and Soda lakes. Recently, surveys conducted in spring of 2010 for the Blythe Solar Project located this plant primarily in the sandy areas south of I-10, where 2,134 plants were located and mapped (AECOM 2010d, TTEC 2010o). The majority of these plants occur at the proposed Colorado River Substation site; however, plants could also be directly and indirectly affected by construction of the Project's gen-tie line in the vicinity of the substation.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 new occurrences that were not in the CNDDDB (CCH 2010). Both of these are historical records from 1939 and 1958. Of the total of 14 occurrences in California (12 CNDDDB plus two additional historic records), 3 of these are protected under National Park Service or State Park ownership. A total of three records are historical records. Four of these occurrences have documented threats, including OHV and non-native plant impacts.

Staff does not have site-specific or construction details for the construction of the Project gen-tie line in the vicinity of the proposed Southern California Edison Colorado River Substation, where Harwood's eriastrum were detected during 2010 surveys for the Blythe Project (TTEC 2010o). Thus staff cannot quantify the impacts of the Gen-tie line or the substation extension on Harwood's eriastrum except to conclude that temporary direct impacts from construction of these facilities are likely, that permanent direct impacts are possible, and that indirect effects are likely. Indirect Project effects to Harwood's eriastrum in the vicinity of the Project gen-tie line include the spread of the non-native Sahara mustard across its dune habitat, which also degrades the habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also impact Harwood's eriastrum.

BLM requests 100 percent on-site avoidance for BLM Sensitive plants like Harwood's eriastrum, although the level of avoidance would be decided on a case-by-case basis (Lund pers. comm.). Staff's proposed Condition of Certification **BIO-19** requires the Project owner to incorporate site design modifications to minimize impacts and meet the avoidance standard along the Project linears. Such avoidance could include: using

existing roads to limit new road construction; limiting the width of the work area, adjusting the alignment of the Project gen-tie line, and driving and crushing vegetation as an alternative to blading spur roads to access pole locations. With implementation of the avoidance and minimization measures described in Condition of Certification **BIO-19**, impacts to Harwood's eriastrum would be reduced to less than significant levels.

Harwood's Milk-Vetch.

Harwood's milk-vetch is a CNPS 2.2 species, a rank that indicates it is fairly threatened in California but more common elsewhere. It is also a covered species under NECO. It is found in desert dunes and sandy or gravelly areas in portions of Imperial, Riverside, and San Diego counties (CNPS 2009). Herbarium collections occur for this species from Ogilby Road in Imperial County and three locales west of Blythe, the Pinto Basin, and Chuckwalla Basin in Riverside County. Harwood's milk-vetch has also been reported from Baja California, Sonora Mexico, and portions of Yuma County, Arizona (Reiser 1994). There are several CNDDDB records for this species within the Project area (CNDDDB 2010) and a 10-mile radius of the Project area. There is a record in the Consortium of California Herbaria database from Wiley's Well Road between McCoy and Mule Mountains from 400 feet elevation (CCH 2010). The Harwood's milk-vetch populations on the southern deserts are presumed stable given limited disturbance to their desert habitats (Reiser 1994), but the recent push for renewable energy development threatens a large portion of its habitat in Chuckwalla Valley and the broader NECO planning area. What remains of the Chuckwalla population will be fragmented by the many future projects proposed and subject to the indirect effects of invasive pest plants, which quickly colonize.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 3 new occurrences that were not in the CNDDDB. All of these are historical occurrences. Of the total 46 occurrences in California (CNDDDB plus new additional occurrences), 9 of these are protected under National Park Service or State Park ownership. A total of 11 records are historical records. Sixteen of these occurrences have documented threats including development, OHV, agriculture, transmission lines, road maintenance, and trash dumping.

Spring 2010 surveys identified several hundred (700+) plants of Harwood's milk-vetch along the transmission line and buffer area (TTEC 2010m). In addition, several Harwood's milk-vetch occurrences of unknown size were identified in the vicinity of the proposed SCE Colorado River Substation, south of I-10 at the southeast end of Chuckwalla Valley. Spring 2009 surveys identified twelve plants of Harwood's milk-vetch within the study area, only two of which occurred within the plant site Disturbance Area, and 10 plants within linear Disturbance Area. Significant indirect effects anticipated include alteration of the hydrology and sediment transport of the desert washes, as well as spread of Sahara mustard across its habitat, which also degrades its habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas are also likely. Global warming is also anticipated to adversely affect this and other desert annuals by delaying the fall rains beyond the optimum germination temperatures for many desert annuals in the Sonoran Desert region. Although many new occurrences have been found around the Chuckwalla Valley and Palo Verde mesa,

many are also impacted by renewable energy projects, which fragment the remaining habitat, disrupt gene flow, and render the remaining occurrences more vulnerable to future impacts.

Staff concludes that the direct, indirect, and cumulative impacts of the Project to Harwood's milk-vetch are significant. Staff recommends the following mitigation to minimize the direct, indirect, and cumulative impacts to Harwood's milk-vetch to a level less than significant:

1. Implement avoidance and minimization measures for avoided plants as described in **BIO-19**;
2. Incorporate site design modifications to minimize impacts where feasible to minimize impacts along the linears, such as limiting the width of the work area and minor adjustments to the alignment of the linears or placement of poles (within the constraints of the ROW or utility easement), and
3. Off-site mitigation through compensation (acquisition) or restoration and enhancement as described in **BIO-19**.

Desert Unicorn Plant

Desert unicorn plant is documented from at least 37 occurrences in Riverside, Imperial, San Bernardino, and San Diego Counties, several of which are from the Chuckwalla Mountains and Desert Center area; however, occurrences are relatively small and many of the local occurrences may be directly or indirectly affected by proposed solar Projects between Blythe and Desert Center. Staff concludes that although the direct effects of the Project on desert unicorn plant are minor, the impacts of all present and future projects (see **Biological Resources Table 9**) on sensitive plants or on the sandy washes and important sediment transport that support the species on desert washes along the eastern base of the McCoy Mountains and the Palo Verde Mesa are cumulatively considerable. Indirect impacts to off-site (downstream) occurrences are also expected to indirectly affect the species habitat by altering the hydrology and sediment transport processes. Staff recommends implementation of avoidance and minimization measures for avoided plants as described in **BIO-19** to reduce the Project's contribution to cumulative effects to less than significant levels.

Ribbed Cryptantha

Ribbed cryptantha is a CNPS 4.3 species, meaning that it has limited distribution in California; however it is not very threatened in California. There are 116 records of this species from several locations throughout Riverside, Imperial, San Diego, and Imperial counties in the Consortium of California Herbaria database; the nearest collection is from the Palen Valley approximately three miles east of the Desert Center Airport (CCH 2010).

Spring 2009 surveys identified a single population of a few ribbed cryptantha northwest of the Wiley's Well rest area at approximately 380 feet elevation from an area of mixed sand drifts, hummocks with Patton tank tracks with widely scattered shrubs (GSEP 2009f). Preliminary survey findings from spring 2010 estimated that several tens of thousands of individual plants and large populations of ribbed cryptantha along the

transmission line and buffer area (TTEC 2010m). In addition, several ribbed cryptantha plants and a large occupied habitat area of this species were identified within the six-pole extension area needed for the gen-tie transmission line associated with the SCE Colorado River Substation site (TTEC 2010o).

Many similarly large occurrences of ribbed cryptantha have been found during the spring surveys for at least three projects, totaling over 100,000 plants and possibly many more. Staff has concluded that because of the local abundance of this species in the Project vicinity and its apparently stable population in its range in California, that the impacts of the Genesis Project are less-than-significant. However, staff recommends that the avoidance and minimization measures contained in **BIO-19** be applied to all avoided special-status plants to ensure that the Project does not result in unanticipated indirect impacts.

Impacts to Special-Status Plants That May Be Detected During the Summer-Fall 2010 Surveys

Within the larger group of plants that can only be identified during late season surveys, there are two subgroups: 1) annuals that are triggered by warm summer rains of subtropical origin (typically minimum 10mm events), and 2) perennials that bloom regardless of the summer rain, and are triggered instead by the appearance of cooler storms that originate in the Pacific northwest. This discussion includes an analysis of impacts to 'potentially occurring' late-season special-status plants and the triggers for mitigation and specific mitigation measures. These triggers were designed to ensure that any anticipated or unanticipated species detected during the summer-fall 2010 surveys will be mitigated to levels less than significant. This mitigation would be achieved through a variety of avoidance and minimization measures, restoration (enhancement projects), and compensatory mitigation through the acquisition and protection of other occurrences and their habitat.

It has been estimated that 30 to 40 percent of the species in the California Desert flora reach their reproductive maturity in late summer or fall (J. Andre pers. comm.). However, there is a long-standing precedent of spring season surveys for special-status plants in California, based on the dry summers and summer-dormant flora of the Mediterranean climate that dominates California. There are exceptions, of course, for late-season blooming species, but the plant survey effort in California typically consists of a major spring survey with narrowly focused summer surveys for any late season species that may occur in the region. Regional botanical experts (J. Andre, T. LaDoux, D. Silverman, A. Sanders, pers. comm.) have concluded that significant finds could be missed in the absence of an additional late season botanical survey.

Because the region's flora is so under-surveyed and poorly understood relative to other parts of the desert or state, and because its flora is so intertwined with its variable and unpredictable climate, it is difficult to predict accurately what special-status plants have potential to occur in this region. This is evidenced by the discovery of a potentially new taxon of saltbush on Palen Dry Lake (Andre pers. comm.), a new undescribed species of lupine on a renewable energy project near Barstow, a recent discovery of a new perennial spurge in the Orocochia Mountains by Victor Steinmann (LaDoux pers. comm.), and several unanticipated range extensions of special-status plants have been

found, such Utah vining milkweed, and a slight range extension for Harwood's eriastrum. Additionally, some rare plants have been found in habitats not previously known to occur in. For example, lobed ground cherry was recently discovered growing outside of its characteristic playa margin habitat in uplands (Andre pers. comm.).

Several late-season special-status plants were identified with moderate to high potential for occurrence based on the presence of suitable habitat and known occurrences in the region; their rarity, status, and known distribution are discussed below (Abram's spurge, flat-seeded spurge, and lobed ground cherry). However, staff understands that range extensions and new species are also possible in this under-surveyed region and has addressed this potential with specific triggers for mitigation, based on rarity and status, with provisions for a variety of possible scenarios. The triggers are described under "Discussion of Mitigation", following this discussion of late-season species known from the region.

Several additional perennial species were identified with potential to occur; however, their bloom seasons overlap the spring survey window and it is expected that they could have been detected during a spring survey, if present. Nevertheless, summer-fall survey crews should be trained to recognize the following additional species: glandular ditaxis; California ditaxis; jack-ass clover, and Palmer's jack-ass clover (a proposed addition to the CNPS Inventory and known to occur at Palen Dry Lake in marginal dune habitats).

Abram's Spurge

Abram's spurge (CNPS List 2) has a NatureServe rank of G4/S1.2; i.e., it is 'critically imperiled' within its range in California. It is a summer annual that is triggered to germinate by significant summer monsoonal rains; consequently, its year-to-year population size is highly variable. It was not detected during the 2009 or 2010 spring surveys; however, the washes and other low-lying areas could support this species. This species is known to occur in halophytic flats, playas, and along inlets and floodplains of playas. It tends to prefer the lower floodplain ecotone but can also extend higher up along the washes that feed the playa (Silverman, pers. comm.). The blooming period is described in the CNPS Inventory (CNPS 2009) as September through November but it could be detected earlier if significant (>0.10mm) summer rain event occurred in June. On average, August receives the most rainfall, but the warm monsoonal rains sometimes overlap the start of the fall-winter rains of Pacific Northwest origin.

Staff concludes that if present, impacts to Abram's spurge would be considered significant unless only a minor portion of its local population was affected. Even if found off-site in the playa margins, it could be indirectly affected by the diversion of the channels that support it, and the alteration of the site hydrology and sediment transport in the channels, which provide fresh, loose seed beds for many of the areas rare species. Global warming is expected to adversely affect annual species like Abrams spurge in the Sonoran Desert as rains are predicted to occur later in the fall when temperatures are cooler and not adequate for germination.

The CNDDDB (CNDDDB 2010) lists 15 occurrences of this plant in Riverside, Imperial, San Bernardino, and San Diego counties in California, east through Nevada to Arizona, and as far south as Baja California, Mexico. Of the total of 15 occurrences in California, 7 of these are protected under Park Service, CDFG, or State Park ownership. A total of 4 records are historical (pre-1972) that have not been confirmed since collected. One of these occurrences is described as threatened by grazing. A recent 2000 CNDDDB record is from a location approximately 0.50 mile east of Ford Dry Lake on Gasline Road just south of I-10 and the occurrence was reported as a “substantial population” (CNDDDB 2010).

If present, implementation of the off-site mitigation measures described in **BIO-19**, and the avoidance and minimization measures would be required to mitigate effects to Abram’s spurge to a level less-than-significant. Under certain conditions (see **BIO-19**), the level of protection would be increased and some onsite avoidance may be required.

Atriplex sp. nov

A potentially new taxon of saltbush (*Atriplex*) was discovered on the saline playa margins of Palen Dry Lake last year by a botanist with the U.C. Reserve System (Andre and La Doux, pers comm). The BLM State Botanist and Plant Conservation Program Lead (Lund pers comm) indicated that BLM would treat all new taxa as BLM Sensitive species. The new taxon was not detected during the Project spring 2010 surveys but it is not clear whether it was included by field crews as a potentially occurring special-status plants. It could be detected during the summer-fall 2010 surveys, if present. No suitable habitat is present for this taxon in the solar fields but it could be indirectly affected by alterations of the surface drainage patterns between the solar fields if it occurs in the playa margins of Ford Dry Lake. If present, **BIO-19** (Section A) directs the Project owner to avoid direct impacts according to direction by the BLM State Botanist and modify the engineered channel discharge to ensure that any special-status plants occurring downstream are not affected by alterations of the surface drainage patterns. . If indirect effects cannot be avoided, compensatory mitigation shall be required as described in Section D of **BIO-19**. Staff directs the Applicant to ensure that all field crews employed for the summer-fall 2010 surveys are trained to detect the new taxon, and to conduct the surveys consistent with guidelines in Section B of **BIO-19**. Section C of **BIO-19** would ensure that impacts to any new taxa are mitigated to a level less than significant.

Flat-seeded Spurge

Flat-seeded spurge is a CNPS List 1 B.2 species, meaning it is rare, threatened, or endangered throughout its range and it is fairly threatened in California. It is also a BLM Sensitive species and has a NatureServe rank of G3/S1.2. Some experts have speculated that it may be a “waif” in California, or a species that is not naturalizing, and note that it is more common in Arizona and Mexico (CDFG 2010). If present, impacts to flat-seeded spurge would be considered significant unless only a minor portion of its local population was affected.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 1 new occurrence that was not in the CNDDDB. This occurrence is a historical record from 1933. Of the total five occurrences in California (CNDDDB plus new

additional occurrences), only 1 of these are protected under State Park ownership. A total of three records are historical records. None of these occurrences have documented threats and the threat rank indicates that its distribution in California is relatively stable at this time. Likely indirect effects include the spread of Sahara mustard and Russian thistle across its habitat, and the premature stabilization of the dunes that support it. Channel diversion and the interruption of aeolian and fluvial sediment transport are also likely, if detected in the Project area. Global warming is expected to disproportionately (and adversely) affect low elevation annual species like flat-seeded spurge in the Sonoran Desert.

BLM requests 100 percent on-site avoidance for BLM Sensitive plants but the BLM State Botanist will decide the level of avoidance on a case-by-case basis, if present. Implementation of the Avoidance and Minimization measures in **BIO-19** would be required to protect avoided plants.

Lobed Ground Cherry

Lobed ground cherry is a CNPS List 2.3 species, meaning that is rare, threatened, or endangered in California, but more common elsewhere; the threat rank indicates that it is not very endangered in California. It has a NatureServe rank of G5/ S1.3, indicated that it is very rare in California but relatively stable outside of California. It occurs largely on alkaline dry lake beds but it has also been found in drier, less saline-alkaline environments on decomposed granitic soils in Mojave desert scrub habitat.

Staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 new occurrences that were not in the CNDDDB. Both of these are more recent occurrences, including one from Joshua Tree National Monument and one in the eastern Mojave Desert. Of the total 6 occurrences in California (CNDDDB plus new additional occurrences), none of these are protected under Park Service or other agency land ownership. None of these are historical records and none have documented threats.

Staff would consider that impacts to this very rare species in California would be significant, unless only a minor portion of its local population was affected. Such an occurrence would also represent a significant range extension. Likely indirect effects, if present, would include the spread of Russian thistle across its habitat and potential OHV impacts from the creation of new access roads into its habitat. Even if found off-site in the playa margins, it could be indirectly affected by the diversion of the channels that support it, and the alteration of the site hydrology and sediment transport systems that support the dunes. Additionally, global warming is expected to adversely affect this annual species as rains are predicted to occur later in the fall (and thus in cooler temperatures not adequate to germinate many of the desert annuals). Implementation of the off-site mitigation measures described in **BIO-19**, and the avoidance and minimization measures would be required to mitigate the effects to a level less-than-significant. Under certain conditions (see **BIO-19**), the level of protection would be increased and some onsite avoidance may be required

Indirect Impacts to Special-Status Plants

The anticipated indirect impacts to special-status plants, i.e., impacts outside the Project Disturbance Area or that occur following construction include: introduction and spread of invasive plants; alteration of the surface hydrology and basic geomorphic processes that support rare plants and their habitat (e.g., disrupted aeolian and fluvial sand transport processes from obstructions and diversions); population fragmentation and disruption of gene flow; potential impacts to pollinators; increased risk of fire; erosion and sedimentation of disturbed soils which render the habitat vulnerable to invasion by pest plants; disturbance of the structure and ecological functioning of biological soil crusts which affect seed germination, reduce soil nutrition, carbon sequestration, and render the soil vulnerable to water and wind erosion (Belnap & Eldridge 2001); herbicide and other chemical drift; and disruption of photosynthesis and other metabolic processes from fugitive dust during construction and operation of the Project.

Following construction, exotic species are characteristically opportunistic and could occupy disturbed soils within the Project Disturbance Area and spread into adjacent vegetation communities. Invasive weeds with severe ecological impacts such as Sahara mustard can quickly colonize disturbed soils following construction. The primary conduit for spread, however, is along roads and transmission corridors. The dramatic increase in vehicle use of the Project vicinity roads and construction of transmission corridors and new roads is expected to increase the spread of this highly invasive wildland pest. Sahara mustard has shown a clear negative impact on native flora (Barrows et al. 2009). Sahara mustard can form dense stands and potentially crowd out native annual plants. Sahara mustard plants growing early in the season may dominate available soil moisture which may adversely affect native annuals which start growing a little later in the season (Barrows et al. 2009). Barrows et al. (2009) found that native annuals growing under a canopy of Sahara mustard were often taller and were etiolated, at the expense producing branches, flowers, and fruits. This led to a shift in the dominance of the following year's species composition from native annuals to Sahara mustard.

Tamarisk, Russian thistle, Sahara mustard and Mediterranean grass are already present in the Project area and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of many non-native plants has dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not an important part of the Mojave Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either. The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire, and the effects to these poor-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Burned creosote and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986). The spread of invasive plants is a major threat to biological resources in the Colorado Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species.

Wildfires (caused by construction or downed transmission lines) are rare but the increase in daily vehicle use in the area from an anticipated 200 new jobs during operation and up to 1,000 jobs during construction will significantly increase the risk of ignition. Other temporary and permanent impacts from the Project could occur to surrounding vegetation communities from grading activities creating air-borne, fugitive dust, sedimentation, and erosion, which disruption of photosynthesis and other metabolic processes. The destruction of plants and soil crusts by windblown sand and dust also exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Discussion of Mitigation

Triggers for Mitigation for Impacts to Late-Season Plants. In recognition of the unpredictability of the region's rare plant flora, staff has incorporated into **BIO-19** specific triggers for mitigation that are designed to address any unanticipated special-status plants detected during the late season surveys and thus ensure that any unforeseen finds are adequately mitigated. The triggers are based on the internationally accepted Natural Heritage Methodology, available online at: <http://www.natureserve.org/prodServices/heritagemethodology.jsp>. Included in this methodology is the NatureServe global and state ranking process (www.natureserve.org/explorer/ranking) which provides an estimate of extinction risk worldwide and in California. An explanation of the rankings is provided in the explanation of status codes as a footnote to **Biological Resources Table 3**. The triggers assign a threshold for mitigation based on the NatureServe Global and State Rank, and the portion of the total documented occurrences that are affected by the project.

The triggers for mitigation are also based—in concept—on The Nature Conservancy (TNC) Sonoran Desert Region conservation goals (Randall pers. comm.), a set of peer-reviewed goals which are also based on the NatureServe ranking protocol. Staff increased the rank-based conservation goals to reflect their use as a trigger for mitigation for any special-status plants detected in the 2010 summer-fall surveys, and to incorporate consideration of various threats or scenarios not already inherent in the NatureServe rank.

The State rank, and the assessment of threats (inherent in the threat rank), is conducted by the CNDDDB botanist using NatureServe protocol, and includes a more detailed threat ranking. A detailed explanation of the ranking process is available at: www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf. Factors considered in the designation of global and state ranks include: range extent; area of occupancy; population size; number of occurrences; the percent of occurrences with good viability/ecological integrity; environmental specificity; long-term and short-term population trend. Energy Commission staff are coordinating with CNDDDB to run an updated NatureServe rank to conform with the new 2009 NatureServe conservation status ranking protocol, which combine rarity, threats, and trend into a single ranking and consider many new subcategories. The new system eliminates the decimal threat add-on rank (e.g., S2.2) and incorporates the threats into the overall rank. Thus, if much of the BLM land within a species range is threatened by energy development, OHV, grazing, and other incompatible land uses that must be protected under its multi-use

zoning (outside of DWMAs), then these threats would be captured in the new rank. The threats to species with many occurrences on private land (versus protection on National Park Service lands) would be similarly reflected in the new rankings. A species that is not as rare in numbers, but has many occurrences that are threatened, or an overall downward trend, then it could potentially move an S2-ranked species to an S1, for example. Conversely, if many new occurrences have been found as a consequence of the many new surveys being conducted in the region (e.g., for renewable energy projects), then the rank could conceivably be downgraded.

The accounting or inventory of the species' total known or documented occurrences shall be based on the following sources: CNDDDB processed and unprocessed data; California Consortium of Herbaria and other herbaria records; BLM records; survey data from other renewable energy projects and other related projects for which survey data is available; and reported occurrences by qualified botanists accompanied by a completed CNDDDB or similar field form (with or without voucher specimens). Data considered unreliable include records for which the range is implied in literature but without collection numbers or specific location information, and anecdotal reports without documentation or from non-credible sources. Occurrences based on historic (pre-CEQA, or pre-1972) collections that have not since been verified will not be considered as a documented occurrence.

The triggers for mitigation also include a provision for requiring on-site avoidance of any particularly significant finds that cannot be adequately mitigated off-site. The triggers also include provisions for upgrading the mitigation requirements for an occurrence with 'local or regional significance'. Local and regional significance is defined by CNPS 2001 guidelines and in the CDFG 2009 guidelines for assessing impacts to special-status plants, and include a threat rank of 1 or 2 (threatened and very threatened), and significant cumulative effects. New undescribed species and proposed additions to the CNPS Inventory would be treated as a CNPS List 4 (state rank 3) unless recommended otherwise by the CNDDDB or CNPS Rare Plant Botanist after the initial phase of the peer-review process. There is also a provision to encompass the special needs of state- or federal-listed species.

Compensatory Mitigation for Significant Impacts to Spring and Late-Season Plants. BLM requests 100 percent on-site avoidance for BLM Sensitive plants but the level of avoidance is decided on a case-by-case basis (Lund, pers comm). On-site avoidance is also for non-BLM Sensitive species with a NatureServe Global Rank of G1 or G2 if the impact exceeds 10 percent of the species' known and documented occurrences. For non-BLM Sensitive species, the Project owner would be required to avoid a minimum of 75 percent of the total population. For perennial taxa the percent avoidance would be measured based on the percentage of the total individuals affected; for annuals the percent avoidance would be measured based on the total area occupied by the occurrence plus any additional habitat deemed critical for maintenance of the population (e.g., the upstream reach of a wash for wash-dependent species). For these very rare and critically imperiled species, the Project owner would be required to incorporate site design modifications to minimize impacts and meet the avoidance standard, including using existing roads to limit new road construction; limiting the width of the work area; adjusting the alignment of the Project linears, or the locations of poles and spur roads, driving and crushing vegetation as an alternative to blading temporary

roads to preserve the seed bank, and, if necessary, reducing or reconfiguring the layout of the solar arrays to facilitate greater avoidance.

For all other significant impacts, Condition of Certification **BIO-19** allows for compensatory mitigation through land acquisition or qualifying habitat enhancement (restoration) projects. This is consistent with the CEQA definition of “mitigation” (14 Cal. Code Reg. 15370 of the CEQA Guidelines): avoiding; minimizing; rectifying; reducing or eliminating the impact over time; and compensating by providing replacement or substitute resources or environments. **BIO-19** allows for the compensatory mitigation to occur anywhere within the species’ range in California, as threats are documented throughout their range. However, most of the species are restricted to the Sonoran Desert region and portions of the eastern Mojave Desert. **BIO-19** includes specific triggers for mitigation of late-season plants detected during the required summer-fall surveys, and specific performance standards and criteria for habitat acquisition and enhancement.

In Condition of Certification **BIO-19**, staff has identified options for mitigation that meet the CEQA definition of mitigation by rehabilitating, repairing, or restoring the affected environment of a resource. Qualifying ‘enhancement’ options must be designed to ‘rescue’ an off-site occurrence that is currently assessed with either: a) a long-term population or area decline >30%; b) exhibit an immediate threat that affects >30% of the population, or c) has an overall threat impact that is High to Very High (see NatureServe Threat Ranking system, available online at:

www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf). To demonstrate or achieve a ‘rescue’ of a threatened or declining population, the proposed enhancement must achieve an improvement in the occurrence trend to “stable” or “increasing” status, or downgrading of the overall threat rank to slight or low (from “High” to “Very High”).

The impacts of stressors (such as the spread of invasive plants, hydrologic and geomorphic alterations, etc.) on special-status plants are well-documented in the literature. The benefits of restoration and enhancement to rare plant populations have been demonstrated in a variety of projects conducted by public and private land managers, including BLM, National Park Service, The Nature Conservancy, U.S. Forest Service, California State Parks, and the California Native Plant Society. **BIO-19** also includes detailed and specific guidelines for the preparation of enhancement plans. Qualifying enhancement projects include:

1. Controlling unauthorized vehicle or pedestrian use within or adjacent to a special-status plant occurrences. This enhancement project could prevent the direct loss of plants and protect the occurrence from the introduction and spread of noxious weeds (which are typically introduced by vehicles), trampling, soil compaction and its effects on regeneration, or by preventing soil erosion/sedimentation associated with OHV use.
2. Controlling noxious weeds or other invasive pest plants. The spread of non-native plants in wildlands is second only to habitat loss as a primary cause of decline of many special-status plants. Weeds out-compete, and eventually displace native plants for moisture and nutrients or impact them through shading or allelopathic chemicals, or increases in the frequency and intensity of fires. They can also affect

rare plants indirectly by stabilizing dune habitats prematurely and disrupting the geomorphic and hydrologic processes that support them.

3. Eliminating grazing by wild burros or livestock. This land use directly harms rare plant occurrences through trampling and soil compaction, encouraging the spread of invasive or non-native plants, and altering hydrology by eroding and incising washes.
4. Restoring critical lost or degraded hydrologic or geomorphic functions to known special-status plant occurrences that have lost historic sheet flow or instream flows, as a result of diverting washes upslope by roads or ditches. In addition to the loss of water, the loose sands and natural disturbance process may be equally important for germination. Obstruction of the aeolian (wind-blown) sand transport systems from artificial structures (buildings, fences) indirectly but acutely impacts rare plants dependent on fine wind-blown sands and the natural disturbance process.

In lieu of acquiring lands or implementing enhancement projects itself, the Project owner (subject to approval by the Compliance Project Manager) may satisfy the requirements of the mitigation measure for acquisition by depositing funds (equivalent to the cost of acquisition or enhancement) into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF) or other qualified third party. The Project owner must commit to the terms and conditions of **BIO-19**, and the Energy Commission, through the Compliance Project Manager, would be responsible for enforcement of the mitigation according to the timeline, monitoring, and reporting requirements specified in the condition. Staff has also included **BIO-29** which allows the Project owner to choose to satisfy its mitigation obligations by paying an in lieu fee instead of acquiring compensation lands for special-status plant species.

Avoidance and Minimization Measures for All Special-Status Plants. Condition of Certification **BIO-19** includes detailed measures for avoiding and minimizing accidental impacts and indirect impacts to avoided plants, including CNPS list 4 (State rank 3) species, during construction, operation, and closure.

Other Mitigation Measures to Address Indirect Effects. A number of additional conditions of certification are required that would minimize direct and indirect impacts to special-status plants. **BIO-14** requires finalizing and implementing the detailed Weed Management Plan, the guidance for which was based on a hybrid of BLM, The Nature Conservancy, USFS, and NatureServe guidelines for management of invasive plants. The avoidance and minimization measures contained in **BIO-1** through **BIO-8** would also benefit special-status plants by protecting the avoided occurrences of Harwood's milk-vetch, Harwood's eriastrum, ribbed cryptantha, desert unicorn plant, and other avoided special-status plants from accidental effects during construction. **BIO-20** requires compensation for impacts to Mojave fringe-toed lizard habitat; the dunes and sand fields that support this species also support several special-status plants. **BIO-22** (Mitigation for Impacts to State Waters) requires acquisition of desert washes and desert wash woodland and permanent protection of the acquired habitat from future development. Desert washes provide essential habitat for a number of late-season special-status plants. **BIO-7** (preparation of BRMIMP) would ensure implementation of

all mitigation measures under a mitigation monitoring plan and enforced under the authority of the CPM.

Staff's Condition of Certification **BIO-24** requires the applicant prepare a Revegetation Plan to restore all areas subject to temporary disturbance to pre-Project grade and conditions. To the extent practical and as part of this Revegetation Plan, the Applicant would salvage native desert plants during construction of the Project and would use the salvaged plants for revegetation of temporarily disturbed areas. The Revegetation Plan would address the salvaging of cacti, native trees, and topsoil during initial vegetation grubbing of the Project site, as well as proper storage of salvaged plant material and seed collection, replanting of salvaged materials, and monitoring parameters including revegetation success criteria and performance standards for salvaged materials.

Cacti, Yucca, and Native Trees

The 2009 and 2010 surveys also included an inventory of native cacti, succulents and native trees that are not considered rare (e.g., they are not tracked by CNDDDB or included on the CNPS special-status plant lists) but the harvesting of these native plants is regulated under the California Native Plant Protection Act (Fish and Game Codes 1900-1913) and the California Desert Native Plant Act of 1981 (i.e. Food and Agricultural Code 80001, et . seq. and Fish and Game Codes 1925-1926), and prevent unlawful harvesting of non-listed native desert plants of the state (see **Biological Resources Table 1**).

The Applicant conducted stratified sampling plots for cacti, yucca, and native trees in the Study area and found that two cacti species (beavertail cholla and Wiggins cholla, although the latter is no longer believed to be a valid taxon) and three tree species (palo verde, cat-claw acacia, and ironwood) occur within the Project area. Other cacti and native trees identified during field surveys include buckhorn cholla (*Cylindropuntia acanthocarpa*), silver cholla (*C.=Opuntia echinocarpa*), pencil cholla (*C.=Opuntia ramosissima*), ocotillo (*Fouquieria splendens*), fish-hook cactus (*Mammillaria tetrancistra*), honey mesquite (*Prosopis glandulosa*), and smoke tree (*Psoralea argophylla*) (GSEP 2009a, Appendix C Biological Resources Technical Report). To the extent practical, the Applicant would salvage native desert plants during construction of the Project and would use the salvaged plants for revegetation of temporarily disturbed areas. The Applicant has prepared a draft Revegetation Plan that addresses the salvaging of cacti and native trees during initial vegetation grubbing of the Project site, as well as proper storage of salvaged plant material and seed collection, replanting of salvaged materials, and monitoring parameters including revegetation success criteria and performance standards for salvaged materials (TTEC 2010i). Staff's Condition of Certification **BIO-24** requires the applicant to prepare and implement a Revegetation Plan which would address the salvaging of topsoil and native desert plants to aid in the revegetation of temporarily disturbed areas following Project construction.

Impacts to Groundwater-Dependent Vegetation During Construction and Operation

Project pumping during construction and operation could lower groundwater levels (**Soil and Water Resources**, Section C.7.4.2.3) which could have a significant impact if it lowered the water table below the reach of the deep-rooted, groundwater-dependent

plants (“phreatophytes”) that are within the Project pumping impact zone. This zone includes an area extending 2 to 3 miles from the Project pumping well during construction and approximately 10 miles by the end of Project operation (Worley Parsons 2009, Figure 3).

The Applicant predicted that the maximum drawdown in the shallow water table (the water table that supports phreatophytes) associated with the Project is approximately 0.3 feet in the area of the pumping well. The area where drawdown exceeds 0.25 foot is limited to within approximately 2.5 to 3.5 miles of the Project wells (see **Soil and Water Figure 16**). The Applicant’s analysis showed a minor drawdown in the deep water aquifer of 0.5 foot as much as 10 miles away at the end of Project operation (33 years); drawdown in the shallow aquifer would be considerably less (Worley Parsons 2009, Figure 3).

The proposed groundwater pumping is not expected to significantly affect the health or status of the creosote bush scrub, which dominates the drier portions of the valley floor and surrounding alluvial fans and pediments, because this plant community is hundreds of feet above the groundwater level. These drought-adapted and shallow-rooted species are supported by precipitation, not shallow or deep groundwater. The phreatophytic communities potentially affected by the proposed Project are described below.

Groundwater-Dependent Plants and Communities in the Project Pumping Zone

Phreatophytes are groundwater-dependent plants with deep root systems that can extend tens of feet below the ground surface to the underlying water table. The communities of desert phreatophytes found in the 10 mile radius around the Project pumping well include mesquite bosques, bush seep-weed-dominant chenopod scrubs (succulent chenopod scrubs), and ironwood and palo verde woodlands (microphyll woodlands). The dune scrubs occurring in areas of near-surface groundwater may also be affected by lowered groundwater tables. All of these communities are designated as rare natural communities by the CNDDDB (CDFG j2003) and the desert dry wash woodland (a microphyll woodland), chenopod scrubs, and dune habitats are recognized sensitive plant communities in the BLM NECO Plan (BLM CDD 2002).

Ground waters are important to sustain vegetation for wildlife habitat in some areas where surface waters are not present (RWQCB 2006). Special-status wildlife has been documented within these phreatophytic communities in the Project area and around Palen Dry Lake including Mojave fringe-toed lizard, American badger, western burrowing owl, desert kit fox, and loggerhead shrike (GSEP 2009a; Solar Millennium 2009a). Two special-status plants, jack-ass clover and Palmer’s jack-ass clover, occur among the mesquite dunes around Palen Dry Lake and are known from only a few occurrences in California (CNDDDB 2010; Silverman pers. comm.). Numerous rare plants were observed in the playa dunes and drifts at the southern tip of the lake (AECOM 2010d), including a new species of saltbush (*Atriplex* sp. nov. J. Andre).

The Applicant based its assumptions that no phreatophytes would be affected on the results of a reconnaissance-level assessment of the large stand of mesquite bosque at the northeast end of Palen Lake (TTEC 2009d). However, staff found documentation of smaller stands of mesquite bosque at the southwest end of the lake (Evans & Hartman 2007) and observed the mesquite stands on recent aerial photos. Additionally,

phreatophytic plant communities dominated or co-dominated by bush seep-weed (a phreatophyte) are found south of Palen Lake sporadically along the southwest margins of Ford Dry Lake (AECOM 2010a) within the end-of-operation Project pumping zone, a 10-mile radius around the Project well. Staff expects that the effects of the proposed Palen project pumping well (AECOM 2010a) would be greater and be felt as much as a decade sooner than the end-of-operation effects of the Genesis Project.

Closer to the Project around Ford Dry Lake, the Applicant noted communities co-dominated by bush seep-weed and allscale (a xerophyte), with scattered woody phreatophytes such as blue palo verde and ironwood (TTEC 2009d). It is uncertain whether the phreatophytes around Ford Dry Lake are supported by the basin aquifer (from which the Project would draw its water) or mountain front aquifer, which the Applicant has stated would be essentially unaffected by pumping from the deeper—and at least partially contained—basin aquifer. Shallow water tables at Ford Dry Lake were measured at 80 feet in depth in the test well on site. Almost 10 miles away at Palen Dry Lake, the groundwater is considerably shallower, particularly at the northeast end of the lake. At the old growth ironwood forest in the Palen wash, approximately 5 miles north of the Project site, the predicted water table drawdowns are in the range of 0.05 to 0.2 feet (See **Soil and Water Figure 16**).

Groundwater can also be held near the ground surface in dune systems through capillarity and can influence both the vegetative cover and the morphology of the dunes. Recent research in New Mexico has confirmed that groundwater is one feature that influences dune morphology; dune fields are shaped by feedback between aeolian dynamics and groundwater chemistry (Langford et al. 2009). Consequently, some dune scrubs, if present in the dunes off the northeast corner of the Palen project where the groundwater is much nearer to surface than Ford Dry Lake, could also be affected by a drop in groundwater levels if the levels drop below the effective rooting depth of these shallower rooted species.

Preliminary investigations conducted at the Project site suggest that the aquifer that is proposed for development is under confined to semi-confined conditions and is separated in part from the shallow alluvial groundwater system by low permeability sediments (Worley Parsons 2009). Correspondingly, the Applicant's assessment of impacts to these layers is based on the assumption that the confining layers are laterally continuous and maintain hydraulic separation away from the proposed pumping wells. Staff, however, is concerned about the level of uncertainty in such a prediction and the potential influence of groundwater pumping in the shallow aquifer if the low permeability layers are fractured, as they often are (Deacon et al 2007).

Groundwater-Dependent Plant Responses to Lowered Groundwater Levels

A plant affected by competition for water displays signs of stress (e.g. Manning and Barbour 1988), and stress can be manifested as anything from diminished physiological processes to plant death. Shallower rooted herbs are the first affected and least able to withstand drought-stress; deep-rooted woody phreatophytes (such as mesquite) can take decades to die. Staff expects that stress to woody species, such as mesquite, from declines in groundwater levels would be detected in measures of plant vigor, such as die-back, long before plant cover changes might be measurable in an aerial photo. As

Elmore et al. (2006) and Manning (2007) show, total live plant abundance (plant cover) on a site decreases as the water table is lowered. This in turn increases wind and water erosion to soil, and the void left behind by the receding native plants is often colonized by invasive exotic plants (Patten et al 2007; Lovich 1999; Manning 2006). Lowering the local water table from groundwater pumping has also been demonstrated to induce habitat conversions (Manning 2006; 2007). Even modest drawdowns of 0.3 feet can adversely affect vegetation if groundwater drops below the effective rooting level; if the drop is sustained (so that plants never have an opportunity to recover); or if the groundwater lowering occurs not just in summer (when plants are dormant) but also occurs throughout early spring when plants need and utilize water most (Manning pers. comm.).

Increased soil erosion induced by the decreasing vegetative cover leads to a loss of nutrients, minerals, and the structure necessary for seed germination of plants that are adapted to prior groundwater conditions on the site. Non-native opportunistic “weed” species (e.g., Russian thistle) are better adapted to nutrient-poor soils and a wider variety of soil moisture regimes or conditions, and demonstrate a competitive edge. Animals, including mammals, reptiles, birds, and invertebrates, who may require certain plant species or a certain vegetation structure, may no longer find suitable food or living space. Local extirpations are compounded if the displaced animal is an important food source for another animal. The complex below-ground systems of bacteria, algae, and fungi, which provide many valuable ecosystem services (e.g. breakdown of organic matter, nitrogen fixation, carbon storage, and recycling of nutrients), are also disrupted when water tables are lowered. Ultimately, when groundwater levels are lowered beyond the normal reach of groundwater-dependent ecosystems, the decline in plant cover and change in species abundance can result in severe consequences, depending on the organism(s) involved or the prevailing ecosystem processes.

Importance of Spring Water Table in Maintaining Groundwater Dependent Plant Communities

The Applicant stated that water table drawdowns of 0.3 feet or less are similar to or less than expected normal climatic, seasonal, or diurnal water table fluctuations (Worley Parsons 2009). However, inter-annual measurements or averages of water table fluctuations are misleading in predicting the effects of water level declines to groundwater-dependent plant communities, and do not take into account the ecological and physiological traits of arid region plant communities. In forecasting a plant community’s response to lowering groundwater tables, it is necessary to identify the quantity and timing of water availability necessary for healthy ecologic functioning (Eamus and Froend 2006). The extent to which water tables drop during the summer and fall dormant seasons is irrelevant for such forecasts; the only relevant measure of a plant community’s ability to withstand water table declines is the annual water table year-to-year fluctuations in early spring because the growing season is when plants need and utilize water most. In arid regions, most plants are dormant in summer and fall, and measures of fluctuating groundwater levels made during this time will not provide information about the ability of groundwater dependent plant communities to withstand reduced water tables. If, for example, water tables in April were reduced to the low levels associated with summer and fall (as a result of groundwater pumping), then adverse consequences would be expected (Manning pers. comm.) Groundwater

dependent ecosystems experience measurable plant losses and other adverse changes when water tables fail to fully.

Conclusions and Mitigation

As discussed in subsection C.7.4.2 in the **Soil and Water** section, the calculations and assumptions used to evaluate potential Project impacts to groundwater levels are imprecise and have limitations and uncertainties associated with them. It is also unclear how extended droughts associated with climate change could exacerbate the effect of the Project's drawdown. Given the uncertainties associated with groundwater analyses, particularly those based on a small dataset, and the combined effect of droughts and the Project's drawdown, the magnitude of potential Project impacts that could occur to groundwater dependent plant communities cannot be determined precisely. To ensure that the Project's proposed use of groundwater does not significantly impact the groundwater levels in the Project area to the extent that biological resources are significantly and adversely affected, staff recommends that the Project owner monitor the groundwater-dependent vegetation within the 10-mile zone of effect. Proposed Condition of Certification **BIO-25** includes detailed specifications for the design and implementation of a Groundwater-Dependent Vegetation Monitoring Plan (Plan). Aside from the monitoring requirements in **BIO-25**, no mitigation is proposed unless adverse effects are detected. Triggers for mitigation and performance standards are specified in Condition of Certification **BIO-26**. -

The "Project pumping zone at end of Project Operation" depicted in Figure 3 of the cumulative effects analysis in the technical memorandum *Groundwater Resources Cumulative Impact Analysis for Genesis Solar Power Project, Riverside County, CA* (Worley Parsons 2009), is an approximate 10-mile radius area centered on the Project pumping well. After reviewing the groundwater analysis and pumping zone for the Palen Solar Power Project, it appears there may be an overlap between the Project's pumping zone and the northeast corner of the Palen Project's pumping zone (AECOM 2010a, Figures DR-ALT-207-1 & 2). The overlap occurs in close proximity to the proposed Palen Solar Power Project pumping well, and thus the impacts of the Palen Solar Power Project are likely to be felt a decade or more before the impacts of the Genesis Solar Energy Project pumping manifest in an area nearly 9 miles from its pumping well. Staff therefore concludes that the monitoring and adaptive management requirements it has recommended for the Palen Solar Power Project (CEC 2010e) for the same area are adequate to ensure that the groundwater-dependent vegetation at the south end of Palen Lake (near the Palen Solar Power Project) would not be significantly affected. Those measures include detailed specifications and performance standards for annual monitoring to ensure early detection and remedial action in the event that adverse effects are detected.

Project effects would be distinguished from the effects of drought or climate change by comparing monitoring data collected within the area of potential effect (Near-Project Monitoring Sites) to data collected at controls sites in areas not affected by groundwater pumping or hydrologic alterations (Reference Monitoring Sites). The Reference Monitoring Sites would be established within the Sonoran or Colorado Desert regions of California (i.e. regions with similar bi-modal precipitation pattern) and in areas containing examples of the target groundwater-dependent plant communities. Mesquite,

ironwood, and palo verde stands along rivers or dependent on surface flows would not be included, and bush seep-weed communities would only be selected where they occur in sinks on or around the margins of playas. Reference Monitoring Sites should not be selected in areas influenced by groundwater pumping or altered hydrology; national park lands, monuments, and other private and public preserves are good sources for Reference Monitoring Sites.

Baseline data would be collected at all sites prior to the start of pumping, and then data collected annually for the life of the project. A statistician shall be retained to use the first year of baseline data to conduct a “prior power analysis” and evaluate the adequacy of the sampling design. The results of the first year baseline data, prior power analysis, and recommended changes shall be submitted for approval to the CPM by December 31 of the first baseline year.

Staff Condition of Certification **BIO-25** provides guidelines for the development of a detailed, objective-driven Groundwater-Dependent Vegetation Monitoring Plan. **BIO-25** specifies that the Plan be prepared by a qualified plant ecologist and be consistent with guidelines contained in *Measuring and Monitoring Plant Populations* (Elzinga et al. 1998), including: sampling objectives (target/threshold, change/trend-based); attributes measured; field techniques; minimum standards for monitoring personnel; data management; statistical analysis; monitoring schedule; reporting requirements, and responsible parties. Field techniques for measuring drought response include: percent dieback; live crown density; percent cover of live (versus dead) vegetation, percent cover/frequency of associated phreatophytic species; changes over time in percent composition of native versus non-native species, and facultative wetland plants present. Conditions of Certification **SOIL&WATER-3** through **SOIL&WATER-5**, provided in Section C.7.12, specifies sampling and reporting guidelines for groundwater level monitoring. The primary objective for the monitoring is to establish pre-construction and Project related groundwater levels and water quality trends that can be quantitatively compared against observed and simulated trends near the Project pumping wells and near potentially impacted existing wells. **SOIL&WATER-5** also specifies monitoring of area seeps and springs within a mile of the Project well.

Water table depths must be measured in early spring (March 15- April 1) to assess water table conditions, project summer vegetation conditions, and compare the effects of pumping or runoff from one year to the next (Manning 2006). Normal year-to-year variability in spring water tables can be projected from a review of historical data from area well logs. The analysis would also compare estimated to actual water table declines and perform a statistical trend analysis to refine future predictions of effect. If a decline in plant vigor (that is not also detected at the Reference Monitoring Sites) and changes in the spring groundwater levels and are detected, then remedial action would be implemented according to the specifications in staff proposed Condition of Certification **BIO-26**. The threshold for remedial action would be based on an analysis of: 1) groundwater-dependent vegetation (measures of plant vigor, compared against the control sites); 2) data on water usage and its effects on the water table at the Project pumping well, and; 3) the indirect effects of project pumping on water tables from area wells within the Project pumping zone.

If the analysis detects: 1) declining spring water tables—in any amount greater than the normal year-to-year variability—combined with 2) indicators of a decline in plant vigor, that 3) are not detected in the Reference Monitoring Sites, then the Applicant would prepare a detailed proposal for remedial action. The analysis and proposal must restore the spring groundwater tables to a baseline level to sustain healthy ecological functioning in the affected plant communities, as defined by the trigger described above, and informed by data on Project water usage. The Applicant may choose the most feasible method of accomplishing this, providing it meets the performance standard above. Remedial measures must include one of the following measures to meet the performance standard of restoring the spring groundwater tables to baseline levels: 1) Relocating the Project pumping well to another location farther from the groundwater-dependent vegetation (and where the dependent vegetation is no longer within the drawdown cone of depression), or—alternatively—constructing a new well farther away and reducing water usage in the well closest to the dependent plant communities; 2) Reducing the Project water usage through water conservation methods or new technologies.

Relocating the Project pumping well farther from the affected groundwater-dependent vegetation would address the impact by reducing or eliminating groundwater use in the vicinity of the phreatophytic communities; the influence of the well on groundwater decreases with distance. There is relatively little vegetation of this kind in the valley as it occurs only in areas with a relatively shallow water table (e.g., less than approximately 100 feet in depth). It occurs around the margins of the two dry lake beds. Staff does not expect that the groundwater usage would affect the ironwood forest in Palen Wash, or the ironwood and Palo Verde trees that occur along the many washes leading to the lakebeds; however, staff has insufficient data on which to base such an assumption. Staff therefore recommends that the monitoring of vegetation prescribed under **BIO-25** include a representation of the ironwood and Palo Verde stands in the valley and on Palen Wash, where they occur within the estimated 9 to 10-mile zone of potential effect (at end of operation).

Based on the performance standards for remedial action described above, staff has concluded that with implementation of Conditions of Certification **BIO-25** and **BIO-26**, impacts to groundwater-dependent plant communities would be reduced to less than significant levels.

Project Closure and Decommissioning

The Applicant submitted a Draft Decommissioning and Closure Plan (Worley Parsons 2010b) in response to staff's data request for a conceptual decommissioning plan that addressed the fate of the engineered channels and reclamation of the site to native plant communities (CEC 2009d). Staff requested a conceptual plan for filling the re-created channels and restoring drainages on the Project site, including a description of a revegetation plan for restoring the function and values of the ephemeral drainages. Staff also requested a cost estimate, adjusted for inflation, for implementing the closure, including the revegetation component of the closure activities for the drainages, and asked for a conceptual plan and funding mechanism for monitoring and maintenance of the ephemeral drainages until existing functions are reestablished.

The Applicant's Draft Decommissioning and Closure Plan (Worley Parsons 2010b) provides some of the information requested by staff, but does not include a conceptual revegetation plan that could be used to guide reclamation of the Project site after closure and decommissioning, nor does it provide sufficient information to develop an estimate of the funding needed for those activities.

Regulations promulgated by BLM at 43 CFR 3809.550 et seq. require a more detailed reclamation plan and a funding estimate. Page 5 of BLM's Instructional Memo for Oregon/Washington BLM Policy for 43 CFR 3809 Notice and Plan-level Occupations, 43 CFR 3715 Use and Occupancy and Reclamation Cost Estimates (BLM 2009b) lists the requirements for a reclamation plan as follows:

“(c) Reclamation Plan. A plan for reclamation to meet the standards in §3809.420 with a description of the equipment, devices, or practices proposed for use including, where applicable, plans for:

- i. drill-hole plugging;
- ii. regrading and reshaping;
- iii. mine reclamation, including information on the feasibility of pit backfilling that details economic, environmental, and safety factors;
- iv. riparian mitigation;
- v. wildlife habitat rehabilitation;
- vi. topsoil handling;
- vii. revegetation;
- viii. isolation and control of acid-forming, toxic, or deleterious materials;
- ix. removal or stabilization of buildings, structures, and support facilities; and
- x. post-closure management.”

Page 3 of the same document also explicitly requires an estimate of the costs of reclamation, as follows:

“Reclamation Cost Estimate. An estimate of the cost to fully reclaim disturbances created during the proposed operations as required by §3809.552. The reclamation cost estimate must be developed as if the BLM were to contract with a third party to reclaim the operations according to the reclamation plan.”

Staff's proposed Condition of Certification **BIO-23** requires the Applicant to develop a Decommissioning and Closure Plan and cost estimate that meets the requirements of BLM's 43 CFR 3809.550 et seq. Staff acknowledges the uncertainty in planning for conditions 30 to 50 years in the future, but the Decommissioning and Closure Plan cannot defer establishing reasonable performance standards and goals until that time. The plan must explicitly state that the goals of reclamation include restoration of the site's topography and hydrology to a relatively natural condition and restoration of native

plant communities. The plan must also provide guidelines for developing milestones and specific, quantitative success criteria for parameters such as native plant density and diversity and percent cover for weeds, thresholds that would trigger remedial actions, and information about what those remedial actions would be. The plan should also provide an approximate outline and schedule for monitoring the success of the reclamation effort. Staff recommends that the reclamation plan establish at least a 10-year monitoring period to achieve revegetation success criteria because of the slow pace of restoration in a desert environment.

Reasonably Foreseeable Development Scenario: Southern California Edison Colorado River Substation

This subsection provides an overview of potential impacts to biological resources from construction of Southern California Edison's (SCE's) proposed 230 kV expansion of the already-permitted (but not yet constructed) 500 kV Colorado River Substation. Unlike the transmission line that would go from the Project power plant to the Colorado River Substation (the "gen-tie") SCE's Colorado River Substation is not part of the Genesis project description. Rather, SCE would acquire a permit from the California Public Utilities Commission, and would construct, own and operate the Colorado River Substation to serve several projects in the area. SCE would provide an analysis of impacts to biological resources and mitigation for those impacts resulting from construction of the Colorado River Substation. However, because the proposed expansion of the Colorado River Substation is a reasonably foreseeable development, a description of the expansion and potential impacts to biological resources is included here. The purpose of the discussion in this subsection is to inform all interested parties of the potential for impacts to biological resources that may result from other actions related to the Genesis Project.

Project Description

Southern California Edison (SCE) proposes to construct the Colorado River Substation Expansion to interconnect solar development projects in the Blythe area to SCE's previously approved Colorado River Substation. The substation site was one of three sites analyzed in the Devers – Palo Verde No. 2 500 kV Transmission Line Final Environmental Impact Statement /Environmental Impact Report, which was approved by the California Public Utilities Commission in January 2007 (TTEC 2010p). The Colorado River Substation would be located on an approximately 140-acre parcel of land with the substation generally located in the eastern portion of the parcel (TTEC 2010p).

The Colorado River Substation Expansion Project involves expanding the already approved 500 kV switchyard, which would occupy approximately 45 acres, into a full 500/220 kV substation on approximately 90 acres of land (TTEC 2010p). The expansion project would involve site preparation by clearing existing vegetation and grading, and may involve redirecting surface flows around one side of the substation (TTEC 2010p). No final drainage or grading plans have yet been prepared, but it may be necessary to redirect surface water flow around one side of the substation (TTEC 2010p). These drainage alterations would potentially disturb an area approximately 80 feet wide around three sides of the fenced in substation, resulting in a total permanent disturbance area of approximately 20 acres (TTEC 2010p). Internal surface runoff would be directed towards an approximately 120-foot by 200-foot detention basin located at the south end

of the substation. An approximately 10-acre staging area adjacent to the expansion site may be necessary for construction (TTEC 2010p). Although detailed engineering, grading and drainage plans are not yet available, it is estimated that the total area subject to permanent disturbance from construction of the substation expansion would be approximately 65 acres (45 acres for substation grading, 20 acres for drainage/side slopes), plus temporary disturbance resulting from a 10-acre staging area (TTEC 2010p, Table 2).

Impacts to Biological Resources from Colorado River Substation Expansion

Staff has little project-specific information regarding the habitat types that would be permanently or temporarily impacted by the Colorado River Substation expansion, but infers that it would be constructed within sand dune habitat. The basis for this inference is Figure DR-BIO-51-2 from the Data Response submitted for the Blythe Project (AECOM 2010e). This figure shows, at a scale of 1 inch = 6000 feet, the approximate location of the proposed Colorado River Substation and depicts it as being entirely within stabilized and partially stabilized sand dune. Supporting staff's inference that the substation expansion will be in sand dunes is the Applicant's submittal which included the 2010 preliminary survey results from the Blythe Project (TTEC 2010o, Attachment A). This submittal showed numerous records for species that occur on sand dune habitat (for example Mojave fringe-toed lizard and ribbed cryptantha) in and around the proposed Colorado River Substation location.

Based on the information from the Blythe Project 2010 surveys (TTEC 2010o, Attachment A, Figure 2 - Preliminary Results Botany Rare Plants Spring 2010 Surveys, and Figure 4 - Incidental Wildlife Observations Spring 2010 Surveys) staff has concluded that Mojave fringe-toed lizards and a number of other sensitive sand dune-dependent species are likely to be directly impacted by expansion of the Colorado River Substation. Many Mojave fringe-toed lizards were detected in and near the proposed Colorado River Substation, as well as numerous rare plants, including Harwood's eriastrum, Harwood's milk-vetch, winged cryptantha and ribbed cryptantha.

Harwood's eriastrum, a California endemic and BLM Sensitive species, has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations. As described above in the subsection on impacts to special-status plants, direct or indirect impacts to Harwood's eriastrum or Harwood's milk-vetch would be significant. Late summer/fall botanical surveys might also reveal the presence of additional sensitive plant species in the vicinity of the proposed substation expansion. BLM requests 100 percent avoidance for BLM sensitive species such as Harwood's eriastrum (Lund pers. comm.).

Even if the substation expansion avoided direct impacts to these sensitive sand dune species, indirect impacts are also likely to occur. Alterations in drainages could adversely affect special-status plant populations that occur downstream of the project area. Other indirect effects include the spread of the non-native Sahara mustard and other non-native invasive species, which degrade sand dune habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also adversely affect sand dune dependent plant and animal species.

No desert tortoise were detected in or within the one-mile buffer around the proposed substation during the 2010 surveys (TTEC 2010o), but given the proximity of good habitat in the immediate vicinity of the proposed substation desert tortoise could occur in or near the proposed substation expansion and could be directly or indirectly impacted. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could result in increased disturbance from human intrusions and increased risk of mortality from vehicle strikes and crushing of burrows. Construction activities and addition of new perching structures such as transmission poles and lines could result in increased raven numbers, and hence an increase in desert tortoise predation. Road construction could also increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. Nesting birds, badger, kit fox, and burrowing owls could also be directly or indirectly affected by construction and operation of the expanded substation. Staff does not have information about the presence of ephemeral washes, desert dry wash woodland and other waters of the state in the proposed substation expansion area. The proposed expansion and associated drainage modifications could result in direct and indirect impacts to state waters.

Staff has concluded that SCE's proposed expansion of the Colorado River Substation has the potential to result in significant direct, indirect and cumulative impacts to biological resources, in particular for sensitive dune-dependent plant species such as Harwood's eriastrum. Avoidance, minimization and compensation measures such as those described in staff's proposed Conditions of Certification **BIO-19** could potentially reduce these impacts to less than significant levels. However, implementation of the avoidance measures described in these conditions of certification would require site-specific information about the location of proposed project features in relation to sensitive plant species. Staff does not currently have that project-specific information and therefore cannot address the feasibility of implementing effective avoidance measures as a means of reducing significant impacts.

C.2.5 REDUCED ACREAGE ALTERNATIVE

The Reduced Acreage Alternative would essentially be Unit 1 of the Proposed Project, including a 125 MW solar facility located within the boundaries of the Proposed Project as defined by NextEra. This alternative is analyzed for two major reasons: (1) it eliminates about 50 percent of the Proposed Project area so all impacts are reduced, and (2) by eliminating the eastern solar field, it would reduce the water required for wet cooling by 50 percent. The boundaries of the Reduced Acreage Alternative are shown in **Alternatives Figure 1** in the Alternatives section.

The Reduced Acreage Alternative would have a net generating capacity of approximately 125 MW and would occupy approximately 1,080 acres of land. This alternative would retain 50 percent of the Proposed Project's generating capacity, and would affect 50 percent of the land affected by the Proposed Project. Specifically, the alternative would retain the Unit 1 solar field, including the construction parking, construction trailers, and temporary construction laydown area; the administration building and warehouse; the solar collector assembly area; the western evaporation pond area (approximately 24 acres); and the land farm area (approximately 10 acres).

The alternative would require relocating the switchyard, from the Unit 2 power block to the Unit 1 power block. The eastern evaporation pond area (approximately 24 acres) that corresponds with Unit 2 would not be included in the Reduced Acreage Alternative. This area could be used for the relocated gas yard if needed.

Similar to the Proposed Project, the Reduced Acreage Alternative would transmit power to the grid through the Colorado River Substation. It would require infrastructure including groundwater wells, transmission line, road access, administration building, and evaporation ponds. The required infrastructure and transmission line for the Reduced Acreage Alternative would follow the routes defined for the Proposed Project, even though Unit 1 would not be constructed. The linear facilities would require approximately 90 acres. The gas pipeline would be approximately 1 mile longer than for the Proposed Project.

Dry cooling is being evaluated as an alternative to the Proposed Project, so could also be used with this configuration; however, if wet cooling were retained, water usage for the Reduced Acreage Alternative would be approximately 822 acre-feet per year.

C.2.5.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the boundaries of the Proposed Project. It simply eliminates approximately 800 acres from the Proposed Project. As a result, the environmental setting is similar to that of the Proposed Project (see **Biological Resources Table 7**). There are fewer acres of unvegetated ephemeral dry wash, stabilized and partially stabilized sand dune, and Sonoran creosote bush scrub plant communities. However, there are similar acres of playa and microphyll woodland, in part because the linear facilities route is the same for the Proposed Project and the alternative.

C.2.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The smaller Reduced Acreage Alternative would have smaller impacts on many of the biological resources within the Project area, including desert tortoise habitat, unvegetated ephemeral dry washes, and migratory birds. The Reduced Acreage Alternative would have substantially less impact on Mojave fringe-toed lizard habitat both because of a decrease in impacts to stabilized and partially stabilized sand dunes and because the Reduced Acreage Alternative does not extend into the sand transport corridor, and therefore has no indirect downwind impact to sandy habitats outside of the Disturbance Area (**Biological Resources Table 8**). In addition, the Reduced Acreage Alternative would use approximately 50 percent less groundwater than the Proposed Project, though it would still use a substantial amount. Both the Proposed Project and the Reduced Acreage Alternative would impact groundwater-dependent ecosystems through this use of groundwater. Because the linear facilities for the Proposed Project and the Reduced Acreage Alternatives share the same route, impacts associated with this corridor are very similar. Impacts to Couch's spadefoot toad and microphyll woodland remain the same for both the Proposed Project and this alternative for this reason. In addition, although the Reduced Acreage Alternative does represent fewer acres of impacts, it is the same overall length as the Proposed Project, and therefore indirect impacts to desert washes that currently flow through the area remain similar.

Staff considers direct, indirect, and cumulative impacts from the Proposed Project and the Reduced Acreage Alternative similar (aside from differences in impact acreage) for most impacts associated with the Proposed Project including to desert tortoise habitat, Couch's spadefoot toad, microphyll woodland, and migratory birds. While impacts from the Reduced Acreage Alternative are substantially less to Mojave fringe-toed lizard habitat and desert wash, these impacts would still be considered significant under this alternative as well as under the Proposed Project and Dry Cooling Alternative. Staff currently has insufficient information to fully assess indirect and cumulative impacts to groundwater-dependent vegetation, but these impacts may be considered significant under the Proposed Project and the Reduced Acreage Alternative.

Proposed conditions of certification under the Reduced Acreages Alternative are identical to those for the Proposed Project, except that the compensatory mitigation acreages recommended for desert tortoise habitat (staff's proposed Condition of Certification **BIO-12**), western burrowing owl (staff's proposed Condition of Certification **BIO-18**), sand dunes (staff's proposed Condition of Certification **BIO-20**), Mojave fringe-toed lizards (staff's proposed Condition of Certification **BIO-20**), and state waters (staff's proposed Condition of Certification **BIO-22**) are adjusted to reflect the reduced areas of impacts. Aside from the pending issue related to groundwater-dependent ecosystems, staff concludes that with implementation of these conditions, impacts from this alternative, as with the Proposed Project, would be less than significant.

C.2.5.3 CEQA LEVEL OF SIGNIFICANCE

Direct, indirect and cumulative impacts of the Reduced Acreage Alternative to desert tortoise, Mojave fringe-toed lizard, and other special-status species, as well as sensitive biological resources such sand dunes and desert washes are significant, as with the Proposed Project.

**Biological Resources Table 7
Comparison of Impacts to Vegetation Communities from the Proposed Project
and Reduced Acreage Alternative***

	Proposed Project/Dry Cooling Alternative (acres)	Reduced Acreage Alternative (acres)
Riparian – Direct Impacts¹		
Microphyll woodland	16	16
Unvegetated, ephemeral dry wash	74	51
Riparian – Indirect Impacts²		
Unvegetated, ephemeral dry wash	21	21
<i>Total State Waters</i>	<i>111</i>	<i>88</i>
Upland^{3,4}		
Sonoran creosote bush scrub	1,773	1,039
Playa and sand drifts over playa	37	44
Stabilized and partially stabilized desert dunes	1	1.3
<i>Total Upland</i>	<i>1,811</i>	<i>1,083</i>

* Reflects revised acreage impacts from TTEC 2010o

1 **Proposed Project:** From the memo "Revisions to Jurisdictional Waters for the Genesis Solar Energy Project" (TTEC 2010l).
Reduced Acreage Alternative: Estimate only - from TTEC 2010l, with the area impacted by Unit 2 removed.

2 **Proposed Project:** From Appendix D, Lake and Streambed Alteration Agreement Application (TTEC 2009d); the Reduced Acreage Alternative intercepts the same features as the Proposed Project, and therefore indirect impacts would be the same.

3 **Proposed Project:** From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities").
Reduced Acreage Alternative: Estimate only - from **Biological Resources, Appendix A** and linear facility acreages included in CEC 2010d).

4 From TTEC 2010o (Tetra Tech memo "Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility").

**Biological Resources Table 8
Comparison of Mitigation Requirements for Proposed Project and Reduced
Acreage Alternative***

Resource	Mitigation Ratio	Proposed Project/Dry Cooling Alternative (acres)	Reduced Acreage Alternative (acres)
Microphyll woodland – Direct Impacts	3:1	48	48
Unvegetated, ephemeral dry wash – Direct Impacts	1:1	74	51
Unvegetated, ephemeral dry wash – Indirect Impacts	0.5:1	10	10
Total state waters mitigation		132	109
DT habitat within CHU ¹	5:1	115	115
DT habitat outside CHU ²	1:1	1,749	1,016
Total desert tortoise mitigation		1,864	1,131
MFTL habitat (sand dunes) – Direct Impacts ³	3:1	3	4
MFTL habitat (playa and sand drifts over playa) – Direct Impacts	3:1	111	132
MFTL habitat (sand dunes, playa, other) – Indirect Impacts ⁴	0.5:1	76	0
Total sand dune/MFTL mitigation		190	136

*Reflects revised acreage impacts from TTEC 2010m

1 From Application for Incidental Take Permit (TTEC 2009c).

2 **Proposed Project:** From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities").
Reduced Acreage Alternative: Estimate only, from **Biological Resources, Appendix A** and TTEC 2009d.

3 Stabilized and partially stabilized sand dunes, see source information for **Biological Resources Table 7**

4 From **Soil and Water, Appendix A** and PWA 2010a.

C.2.6 DRY COOLING ALTERNATIVE

There are two types of dry cooling systems: direct dry cooling and the lesser used indirect dry cooling. In both systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (instead of once-through cooling or evaporative heat transfer). In the direct dry cooling system, also known as an air-cooled condenser (ACC), steam from the steam turbine exhausts directly to a manifold radiator system that rejects heat to the atmosphere, condensing the steam inside the radiator. Direct dry cooling is analyzed as alternative to the wet cooling proposed by NextEra for the Proposed Project.

Dry cooling is the best choice of cooling technologies for a steam power plant to conserve water and minimize wastewater. However, this technology can create both environmental and economic concerns, depending on the location and specific situation.

Advantages and Disadvantages of Dry Cooling

The following is a general list of the general advantages and disadvantages of dry cooling.

Advantages of Dry Cooling Systems

Dry cooling:

- allows a power plant location to be independent of a water source. It has essentially no water intake or water discharge requirements;
- minimizes the use of water treatment chemicals;
- minimizes the generation of liquid and solid wastes;
- does not generate visible plumes that are commonly associated with wet cooling towers;
- eliminates impacts to aquatic biological resources;
- eliminates the need for discharge permits;
- eliminates the need for disturbance of wetland/aquatic substrate habitat.

Disadvantages of Dry Cooling Systems

- Dry cooling requires air-cooled condensers that could have negative visual effects;
- Dry cooling requires the disturbance of a larger area for the air-cooled condensers than that required for cooling towers.
- Dry cooling can have noise impacts that are greater than once-through or wet cooling systems because of the number of fans and the considerably greater total airflow rate. New quieter fans and other mitigation measures are available to reduce these impacts.
- Dry cooling can slightly reduce the power plant steam cycle efficiency and output, depending on site conditions and seasonal variations in ambient conditions. Also, extra power is needed to operate the cooling fans.

- Capital costs for building air-cooled condensers are generally higher than capital costs for once-through cooling.
- While the area required for a dry cooling system would require about 40 to 50 percent more land area than the proposed wet cooling system, from the site layout, it appears that such a system would fit in the approximate current Project location as there is unused space between the power block and the solar collector assembly (GSEP 2009a). This unused space would have been previously graded as it is designed to be used for construction parking and construction trailers. Therefore, this alternative could be located entirely within the boundaries of the Proposed Project.

C.2.6.1 SETTING AND EXISTING CONDITIONS

This alternative is located entirely within the boundaries of the Proposed Project. It simply eliminates the use of wet-cooling towers and incorporated the use of air-cooled condensers in the same location. As a result, the environmental setting would be the same as for the Proposed Project.

C.2.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Because this alternative would occupy the same footprint as the Proposed Project, the impacts remain the same between the two except for impacts to groundwater-dependent ecosystems. The Dry Cooling Alternative would use over 95% less groundwater than the Proposed Project. Indirect impacts to groundwater-dependent ecosystems under the Proposed Project are expected to be significant if the water tables drop below the baseline spring water table levels necessary for healthy ecological functioning. Under the Dry Cooling Alternative, staff expects that impacts to groundwater-dependent vegetation would not be significant.

Staff considers that the direct, indirect, and cumulative impacts from the Proposed Project to desert tortoise habitat, Couch's spadefoot toad, microphyll woodland, and migratory birds would be the same as the impacts to these resources under the Dry Cooling Alternative.

Proposed conditions of certification under the Dry Cooling Alternative are identical to those for the Proposed Project, except that proposed Condition of Certification **BIO-25** (monitoring Project impacts to groundwater-dependent vegetation) and **BIO-26** (Remedial action for adverse effects to groundwater-dependent biological resources) would not be required. Staff concludes that with implementation of these conditions, impacts from the Proposed Project would be less than significant with mitigation. Staff concludes that impacts to groundwater-dependent vegetation under the Dry Cooling Alternative are not significant and no mitigation is recommended.

C.2.6.3 CEQA LEVEL OF SIGNIFICANCE

Direct, indirect and cumulative impacts of the Dry Cooling Alternative to desert tortoise, Mojave fringe-toed lizard, and other special-status species, as well as sensitive biological resources such sand dunes and desert washes are significant, as with the Proposed Project.

C.2.7 NO PROJECT/NO ACTION ALTERNATIVE

C.2.7.1 NO ACTION ON PROPOSED PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the Proposed Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site, and no impacts to sensitive biological resources. However, the land on which the Project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects may have some similar impacts in other locations.

C.2.7.2 NO ACTION ON PROPOSED PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the Proposed Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, sensitive biological resources would be impacted from the Proposed Project. Different solar technologies require different amounts of land, placement, grading and maintenance; however, it is expected that all the technologies would require a large use of land. As such, this No Project/No Action Alternative could result in biological resource impacts similar to the impacts under the Proposed Project.

C.2.7.3 NO ACTION ON PROPOSED PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the Proposed Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended. Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, new impacts to biological resources would not occur, as such, this No Project/No

Action Alternative would not result in impacts to biological resources that would occur under the Proposed Project. However, in the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects may have some similar impacts in other locations.

C.2.8 CUMULATIVE IMPACT ANALYSIS

C.2.8.1 CEQA AND NEPA DEFINITIONS

A cumulative impact analysis is required under both CEQA and NEPA. “Cumulative impact” is the impact on the environment which results from the incremental impact of the proposed Project when considered with other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 CFR §1508.7).

Under CEQA Guidelines, “a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts” (Title 14 Cal Code Regs §15130(a)(1)). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is “cumulatively considerable” (Title 14 Cal Code Regs §15130(a)). Such incremental effects are to be “viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” (Title 14 Cal Code Regs §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR §1508.7). Under NEPA, both context and intensity are considered. When considering intensity of an effect, we consider “whether the action is related to other actions with individually minor but cumulatively significant impacts. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.” (40 CFR §1508.27(b)(7))

Analysis of Cumulative Effects to Biological Resources

Staff used the following steps to develop the cumulative effects analysis described in this subsection:

- Identified the biological resources to consider in the analysis from a review of the impact analysis;
- Defined the geographic Study area for each resource;
- Described the current health and historical context for each resource;
- Identified direct and indirect impacts of the proposed project that might contribute to a cumulative impact;
- Identified other reasonably foreseeable projects that affect each resource;
- Assessed potential cumulative impacts;
- Reported the results; and
- Assessed the need for mitigation.

C.2.8.2 GEOGRAPHIC SCOPE

This cumulative impact analysis includes a broad, regional evaluation of the impacts of existing and reasonably foreseeable future projects that threaten plant and animal communities within the context or geographic scope of the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) (BLM-CDD 2002). The NECO planning area is located in the southeastern California Desert Conservation Area (CDCA). It occurs primarily in the Sonoran Desert region, but includes a smaller portion of the southern Mojave Desert region. For some resources, a different geographic scope was warranted, such as the use of watershed boundaries to analyze cumulative effects to desert washes, or the Chuckwalla Valley region of the I-10 corridor for populations or dune systems restricted to that geographic area.

C.2.8.3 REGIONAL OVERVIEW

This overview of regional impacts is followed by a more detailed discussion of the effects of past, present, and future projects to biological resources of the Project vicinity, with an emphasis on resources found within the Chuckwalla Valley of eastern Riverside County.

The California Desert remained a desolate area for the first few decades of the 20th century. Disturbance was more or less restricted to highways, railroad, and utility corridors, scattered mining, and sheep grazing. In the 1940s, several large military reservations were created for military training, testing, and staging areas. The deserts of eastern Riverside County comprise 40 percent of the County's land area but less than 1 percent of its population. Outside of the small urban-agricultural center of Blythe, near the Colorado River and Arizona border, there are only a few scattered, small residential and agricultural areas between Indio (to the west) and Blythe; most of the lands are in BLM ownership.

Populations of many of the desert's sensitive plants and animals were considered relatively stable until recently, as the push for renewable energy development has placed many populations at risk. Climate change is inarguably one of the biggest environmental challenges of our time and energy developers have submitted project applications that would collectively cover more than one million acres of the region (BLM 2010). However, renewable energy development has its own ecological consequences and portions of the Sonoran and Mojave deserts of California are bearing the brunt of these effects. Poorly planned development could contribute to habitat loss and fragmentation and barriers to species movement and gene flow. Although project permitting and regional planning evaluate basic environmental impacts of such projects, rarely do they consider impacts on connectivity or conduct thorough cumulative effects analyses.

Some of the many sensitive biological resources at risk in the areas identified for renewable energy development in the NECO planning area include desert washes and desert dry wash woodland, desert tortoise habitat, foraging habitat for golden eagle, Mojave fringe-toed lizard, western burrowing owl, American badger, riparian habitat for Le Conte's thrasher and other desert birds in decline, fragile dune ecosystems, burro deer range, the special-status plants *Las Animas colubrina* and Harwood's milk-vetch, and groundwater dependent vegetation. The Project also lies within a proposed Wildlife

Habitat Management Area (Palen-Ford Wildlife Habitat Management Area). These resources will not only be affected by significant direct and indirect effects from the proposed Project, but will experience similar effects from over 20 reasonably foreseeable future projects within the NECO planning area alone.

The incremental, direct loss of habitat and individuals is more significant when considered with the significant indirect effects of fragmentation, disrupted wildlife movement and connectivity, introduction and spread of non-native plant species, and increases in predators such as ravens. These effects have contributed to population declines and range contractions for many special-status plant and animal species (Boarman 2002a). Combined with the effects of historical grazing and military training, agriculture, and highway and aqueduct construction, the proposed wind and solar energy projects have the potential to further reduce and degrade native plant and animal populations.

C.2.8.4 MAKING CONCLUSIONS ABOUT THE SEVERITY OR SIGNIFICANCE OF THE EFFECT

“No net loss” does not necessarily mean there are no cumulative impacts; the analysis of each resource also describes the indirect and cumulative effects that cannot be quantified through a Geographic Information System (GIS) analysis of habitat impacts. Similarly, even seemingly minor impacts can be significant if they affect an extremely rare or limited resource, and the cumulative impact may be substantial.

For each cumulative effect the following factors were considered in making conclusions about the severity or significance of an effect:

- The health, status, or condition of the resource as a result of past, present, and reasonably foreseeable impacts;
- The contribution of the proposed Project to the overall cumulative impact to the resource;
- The Project’s mitigated effect, when added to the effects of these planned future projects; and
- Impact avoidance and minimization: any project design changes that were made, or additional opportunities that could be taken, to avoid and minimize potential impacts in light of cumulative impact concerns.

The standard for a cumulative impacts analysis is defined by the use of the term “collectively significant” in the CEQA Guidelines section 15355; the analysis must assess the collective or combined effect of development. The objective is to avoid underestimating the severity of impacts which, when taken in isolation appear insignificant, but when viewed together appear significant. Cumulative impact assessments cannot conclude that contributions to cumulative impacts are not significant merely because the contributions represent a small percentage of the overall problem. Doing so could improperly omit facts relevant to an analysis of the collective effect that the Project and other related projects would have upon biological resources. The result could be approval of projects based on an analysis that avoided evaluating the severity of impacts which, when taken in isolation appear insignificant, but when viewed together appear significant.

C.2.8.5 ANALYTICAL TOOLS AND STUDY LIMITATIONS

This cumulative effects analysis employed a combination of quantitative and qualitative analyses; a Geographic Information System (GIS)-based quantitative analysis for assessing the direct cumulative effects to habitat loss, and a qualitative analysis of the cumulatively considerable indirect effects, based on consultations with agency biologists and regional experts, as well as a literature review of the threats to species and their habitats.

GIS-Based Quantitative Analysis of Habitat Loss

The GIS-based analysis of direct habitat loss was used for this cumulative effects analysis to:

- Identify the overlap between existing and future projects and various biological data layers (e.g. landforms, soils, species occurrences, hydrographic data, vegetation mapping, wildlife habitat models, ownership and management layers);
- Compile digital map information about each resource for purposes of display and analysis; and
- Create statistical tables to summarize the direct impacts to these resources from existing and anticipated future projects, and the Project's contribution to those effects. Information on the datasets used, the sources of the data, and any limitations of the data, are provided in each biological resource section.

Qualitative Analysis of Indirect Effects

GIS is a widely used and effective tool for analyzing large amounts of spatial data, for documenting and quantifying assumptions about direct habitat loss, and the value of the habitat (where habitat models are available). However, the indirect impacts of projects are not easily captured in GIS and thus were only addressed qualitatively. This is important to note because many of these indirect effects (i.e., effects following construction) have greater significance and greater ecological consequences than the original habitat loss. Of particular concern are the effects of habitat fragmentation and its consequences for population viability and the effects of disrupted wildlife movement and connectivity and its effects on gene flow, subjecting populations of species such as bighorn sheep to isolation and inbreeding depression, and reducing their adaptability to climate change.

Other common themes that arose in this qualitative analysis of indirect cumulative effects include: increased vehicle-related mortality; disturbance from noise, lighting and increased human activity; increase in predators such as ravens; spread of invasive non-native plants; downwind effects of facilities and wind fencing on sand transport corridors; bird collisions and electrocutions; climate change and its accompanying increased risk of drought, fire the and spread of invasive exotic plants; and the downstream effects of channel diversions on fluvial sediment transport and riparian vegetation.

Limitations of the Cumulative Project Data and Datasets

The large renewable projects proposed on BLM and private land that made up the dataset of future projects in the cumulative analysis for Biological Resources

(Biological Resources Table 9) represent only those projects that had applications to the BLM, the Energy Commission, or eastern Riverside County as of January 2010 (the time of the analysis). **Biological Resources Figures 1 and 2** include projects for which staff had no GIS-based shapefiles at the time of the analysis; thus, they were not included in the quantitative analysis. The project list changes frequently; updates to the data used are presented below and in Section B.3.2, **Cumulative Scenario**. Further, not all of the projects shown on the table will complete the environmental review, and not all projects will be funded and constructed. Alternatively, it is possible, even likely, that new projects will be proposed in the near future that are not reflected in this analysis. See Section B.3.2 (Cumulative Scenario) for a discussion on the likelihood of development of the renewable projects on BLM and private lands listed in **Biological Resources Table 9** and illustrated in **Biological Resources Figures 1 and 2**.

This analysis does not compare the loss of individuals to the total known metapopulation; population data are incomplete for many or most species or occurrences and for some species can vary widely from year to year in response to drought.

Finally, in the GIS-based analysis, which requires the use of datasets that encompass the entire geographic scope of the analysis, the Project-specific survey data could not be compared to data for the region that was derived from different methodologies. For example, the Project survey data for waters and habitat is generally based on field surveys. Conversely, the NECO datasets for plant communities and habitats are based largely on aerial photo interpretation. Consequently, the GIS analysis of impacts to plant communities, landforms, and habitats is based on region-wide datasets for those resources (primarily NECO datasets), and not on Project survey data. Acreages listed in the analysis below, for example desert wash woodland or sand dunes may not match the Project-specific survey results. Where there are such differences, they are noted in a footnote to the table or in the summary of a specific analysis. Notwithstanding the challenges presented by comparing region-wide and Project-specific datasets, the GIS-based datasets for vegetation and landforms still provide a powerful and efficient tool for conducting large-scale, region-wide analyses.

C.2.8.6 PROJECTS CONTRIBUTING TO CUMULATIVE EFFECTS TO BIOLOGICAL RESOURCES

This analysis evaluates the impacts of the proposed Project in addition to the current baseline of past effects, present (existing) projects, and reasonably foreseeable or probable future projects in the I-10 corridor as well as the greater NECO Planning Area. **Biological Resources Figure 1**, located at the end of this section, illustrates the numerous proposed renewable projects on BLM, State and private land in the I-10 corridor between Desert Center and the Colorado River, near Blythe, in eastern Riverside County. **Biological Resources Figure 2** encompasses the entire NECO planning area, an area that is roughly equivalent to the boundaries of the Northern and Eastern Colorado Desert Recovery Unit for desert tortoise. **Biological Resources Table 9** lists the existing and foreseeable future projects (proposed) that were included in the quantitative analysis of cumulative effects. See Section B.4, **Cumulative Scenario Figures 2 and 3** and **Cumulative Scenario Tables 2 and 3** for descriptions of these existing and future proposed projects.

Biological Resources Table 9
Existing and Proposed Future Projects Considered in Cumulative Effects
Analysis

Existing Projects (analyzed quantitatively)	ROW Area* (ac)	Foreseeable Future Projects * [Proposed] (analyzed quantitatively)	ROW Area* (ac)
Chuckwalla State Prison	1,044	Genesis Solar Power Project (GSEP)	3,001**
Ironwood State Prison	681	Blythe Solar Power Project	7,239**
Eagle Mountain Pumping Plant (MDWSC)	378	NextEra Energy – McCoy (Solar)	20,560
Kaiser Mine	5,772	Palen Solar Power Project	2,974*
I-10 Corridor (200ft Freeway buffer from CL)	6,494	Bull Frog Green Energy – Big Maria Vista (Solar)	22,663
State highways (50ft Highway buffer from CL)	2,640	Chuckwalla Solar 1	4,091
DPV1 Transmission Line and Existing Access Roads (100ft ⁵ T-line Tower Buffer; 20ft road width)	2,861	Rice Solar Energy Project	3,859
Landfills (BLM NECO dataset)		Desert Quartzite (Solar)	7,530
Blythe Energy Project I***	148	Desert Sunlight (Solar)	5,119
BLM Campgrounds – Wiley’s Well, Coon Hollow, Cottonwood Spring, and Midland Long- Term Visitor Area	8,042	EnXco 1 (Solar)	1,325
BLM Off-Road Vehicle- authorized/designated routes in Meccapocopia SRMS. (BLM NECO Human Use LTVAs dataset)	3,031	Chuckwalla Valley Raceway	493
Blythe area urban and agricultural lands (GAP Analysis vegetation dataset)	88,317	Mule Mountain Solar Project	6,618
Desert Center area urban and agricultural lands (2005 NAIP imagery)	8,424	Eagle Mountain Pumped Storage Project	252
Pipeline (NECO pipelines dataset)	4,392	Red Bluff Substation – for Genesis Solar Power Project	90
Projects Considered Qualitatively	Area (ac)	Colorado Substation – for Blythe Solar Power Project	44
Existing		EnXco 2 Mule Mountain	~2,021
BLM Grazing – Cattle and sheep allotments (Lazy Daisy, Chemehuevi, Rice Valley, and Ford Dry Lake (recently closed))	n/a	Paradise Valley (Residential “New Town” development)	6,724
BLM Multiple Use – Intensive multiple-use classes	n/a	Blythe Airport Solar I Project	639
Gen. Patton military training areas	n/a	Eagle Mountain Landfill	1,633
Colorado Aqueduct – open portions	n/a	Blythe Energy Project II	153
Chocolate Mountains Aerial Gunnery Range	n/a	DPV2 Proposed Roads (2-foot width) and towers (100 sq ft/tower)	256
Four approved commercial and 12 residential developments near Blythe	n/a	Genesis Solar Project Access Road	29
Solar Projects at Arizona border	n/a	Blythe Energy Project Transmission Line Towers	148
BLM Renewable Energy Study Areas (future, proposed)	n/a		
BLM Transmission Corridors	n/a		
		Genesis Solar Project Gas Line (100 foot width)	85
Total Future Projects* 02/05/2010			339,704 acres
Total Existing Disturbances*			134,750 acres

* Includes only renewable energy projects that had submitted a Plan of Development (POD) as of the time of the analysis (02/05/2010) and projects for which area data was available. Acreage shown for existing disturbances reflects only those projects for which area data was available.

** Acreage impacts depicted reflect the project footprint only; not the entire ROW. The unused portions of the ROW will be returned to BLM and not included in the final ROW permit
*** UFWS issued a BO for this project in 2001 and it's currently being constructed.
**** Not all of the projects depicted here will complete the environmental review, not all projects will be funded and constructed, and many will not use the entire ROW area.

Project Information Updates

Since **Biological Resources Table 9** was compiled and the GIS analysis conducted, several project changes have occurred, as follows:

- The Altera Black Hills project included in the impact calculations has been denied by the BLM.
- The LightSource Renewables – Mule Mountain II project, which is an active application in to the BLM, was not included in the impact calculations.
- The Pacific Solar Investments – Ogilby project has refined the project boundaries from those used in the impact calculations.

C.2.8.7 ANALYSIS OF CUMULATIVE EFFECTS TO BIOLOGICAL RESOURCES

Desert Washes/Waters of the State

The geographic scope for the analysis of cumulative impacts to desert washes include: the Chuckwalla-Ford Dry Lake watershed (the watershed encompassing the project) and the entire NECO planning area. The watershed area analysis (**Biological Resources Figure 3**) was based on the USGS National Hydrographic Dataset (2010) within the watershed boundary as defined by the California Interagency Watershed Map of 1999 (California Interagency Watershed Mapping Committee 1999). All figures are provided at the end of the cumulative effects analysis.

The primary hydrologic feature in the watershed is Ford Dry Lake, a depressional sink and dry playa. It is a closed basin, and the receiving basin for 1,504 miles of unnamed desert washes, including the many smaller ephemeral desert washes that pass through the Project site and drain the southeastern flank of the Palen Mountains. The “Palen Wash” is the larger feature that drains the alluvial fan between the Palen and McCoy Mountains. McCoy Spring and an old growth forest of ironwood occur on its upper reaches. The lower reaches of this feature passes through the western portion of the transmission line, natural gas line, and access road alignment.

The Chuckwalla-Ford Dry Lake watershed is relatively unaffected by existing impacts with one notable exception that was not analyzed quantitatively – the construction of I-10 and a series of wing dikes south of I-10. These permanently diverted surface flows from miles of small ephemeral desert washes and desert dry wash woodland north of I-10, leaving miles of scattered dead ironwood trees and poor creosote bush desert scrub in their wake. Plant cover is very sparse and diversity very low in these affected areas; they are also a testament to the downstream effects that channel diversions, including small channels, can have on both upland and riparian plant communities. For the Project, these effects would be minimized somewhat by the proposed redistribution of flows below the Project into many (not all) of the delineated channels downstream of the

Project, but it is unclear to what extent sediment transport in the diverted channels would be affected.

Portions of the I-10 corridor were also disturbed historically for military training exercises during World War II, and later by jojoba farming and various transmission corridors (gas and electric). There are several large infestations of Sahara mustard in this area but the watershed is otherwise little affected by existing impacts. **Biological Resources Table 10** summarizes the direct loss of desert washes that would result from anticipated future projects within the Chuckwalla-Ford Dry Lake watershed. These effects are also illustrated spatially in **Biological Resources Figure 3**. Proposed future projects would affect approximately 63 miles of desert washes (4.2 percent). Based on the USGS National Hydrographic Dataset (2010) that was used to quantify existing and future impacts throughout the watershed, the Project would affect 2.9 miles (4.6 percent of all future impacts). The ground-based and field-verified delineation of state waters (TTEC 2010) is provided as a footnote to **Biological Resources Table 10**.

The combined loss of desert washes within the watershed is significant (**Biological Resources Table 10**) but reflects only the direct loss of washes and is only part of the bigger picture of cumulative effects to desert washes. The combined indirect effects to these features from all probable future projects that are not reflected in the quantitative analysis include: impacts to sediment transport from the numerous channel diversions; impacts to wind sand transport processes from the loss of sediment input; impacts to water quality from culverts and road crossings; fragmentation of habitat, and the corresponding loss of habitat function and values.

The combined direct and indirect effects to washes adjacent to dune systems may also have unanticipated consequences to dune habitat and the special-status plants and animals that depend on them. The affected washes around Ford Dry Lake may also be an important contributor to the aeolian and fluvial sand transport systems that maintain the dunes in the Ford Dry Lake vicinity, including stabilized and partially stabilized dunes and sand sheets. The indirect effects of channel diversions and redistribution below the various solar project sites are not well understood but could include deprivation of flows and/or sediment to dependent species, or the introduction and spread of weeds. The downstream indirect impacts of the Project would be minimized, at least in part, through the modifications to the drainage plan to discharge diverted flows into existing large and small flow paths between the Project and Ford Dry Lake (See **BIO-19** (Section A) and **Soil and Water** section for a discussion of Channel Maintenance requirements).

The incremental effects of the Project to desert washes, described above, are cumulatively considerable when viewed in connection with the effects of the past, current and probable future projects included in this analysis (See **Biological Resources Table 9**). With the Project design changes described above and implementation of staff's proposed Conditions of Certification (**BIO-22**, **BIO-7**, **BIO-8**, **BIO-14** and **BIO-23**), staff has concluded that the Project's contribution to cumulative impacts to desert washes in the Project's watershed area would be less than considerable. Staff's proposed Condition of Certification **BIO-22** requires compensation through acquisition of desert washes within or adjacent to the Chuckwalla-Ford Dry Lake watershed; **BIO-7** specifies mitigation monitoring and reporting requirements; **BIO-**

8 requires implementing avoidance and minimization measures; **BIO-14** requires finalizing and implementing a detailed Weed Management Plan, and **BIO-23** requires implementing a closure and decommissioning plan for restoring the site topography and hydrology to a more natural condition and revegetating with the locally native species.

Biological Resources Table 10
Cumulative Effects: Desert Washes in Chuckwalla-Ford Dry Lake Watershed

Total Desert Washes* in Genesis Watershed	Impacts to Habitat from Existing Projects** (Percent of total watershed)	Impacts to Habitat from Foreseeable Future Projects*** (Percent of total watershed)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects)
1,503 miles	13 miles (0.9%)	63 miles (4.2%)	2.9 miles (4.6%) (based on USGS dataset)

*Based on the USGS National Hydrographic Dataset (2010) and CalWater Version 2.2.1 (California Interagency Watershed Mapping Committee 1999).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see **Biological Resources Table 9**.

***The ground-based, field-verified delineation of state waters concluded that 90 acres of desert washes would be directly affected and 21 acres would be indirectly affected downstream of the Project (TTEC 2010I, TTEC 2009d).

Biological Resources Table 11 and **Biological Resources Figure 4** illustrate the potential cumulative impacts to all desert washes within the entire NECO planning area, as depicted in the USGS National Hydrographic Dataset (USGS 2010). Cumulative impacts to desert washes from all foreseeable future projects within the larger NECO planning area are significant. Within NECO, the northern Palo Verde Mesa watershed (near Blythe) and the watersheds immediately north of Highway 62 near Cadiz Valley and Danby Lake are particularly hard-hit by proposed future projects. The cumulative projects' direct effects are compounded by the fact that they also cause impairment of hydrologic, geochemical, geomorphic, and habitat function and values of the remaining reaches downstream of the impact. With the Project design changes described above and implementation of staff's proposed Conditions of Certification (**BIO-22**, **BIO-7**, **BIO-8**, **BIO-14** and **BIO-23**) staff concludes that the effects of the Project to desert washes, described above, would be less than cumulatively considerable.

Biological Resources Table 11
Cumulative Effects: Desert Washes in the NECO Planning Area

Total Desert Washes* in NECO	Impacts to Habitat from Existing Projects** (Percent of total washes in NECO)	Impacts to Habitat from Foreseeable Future Projects*** (Percent of total washes in NECO)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects)
18,596 miles	190 miles (1.0%)	1,122 miles (6.0%)	2.9 miles (0.3%) (based on USGS dataset)

*Based on the USGS National Hydrographic Dataset (USGS 2010).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see **Biological Resources Table 9**.

***The ground-based, field-verified delineation of state waters concluded that 90 acres of desert washes would be directly affected and 21 acres would be indirectly affected downstream of the Project (TTEC 2010I, TTEC 2009d).

Special-Status Wildlife

Desert Tortoise

This analysis addresses cumulative impacts to desert tortoise habitat as defined by the current USGS Desert Tortoise Habitat Model (Nussear et al. 2009). It is a predictive model for mapping the potential distribution of desert tortoise habitat and is useful tool for evaluating different land-use issues that tortoises face at a landscape scale.

Biological Resources Figure 5 is a spatial representation of the predicted habitat potential index values for desert tortoise, based on the 2009 model. The model is not intended to be used, or viewed, as a substitute for ground-based and site-specific field surveys. Model scores reflect a hypothesized habitat potential given the range of environmental conditions where tortoise occurrence was documented. Nussear et al. (2009, p. 15) specifically states:

“As such, there are likely areas of potential habitat for which habitat potential was not predicted to be high, and likewise, areas of low potential for which the model predicted higher potential. Finally, the map of desert tortoise potential habitat that we present does not account either for anthropogenic effects, such as urban development, habitat destruction, or fragmentation, or for natural disturbances, such as fire, which might have rendered potential habitat into habitat with much lower potential in recent years”.

GIS-based files for the boundaries of the Eastern and Northern Colorado Recovery Units of the 1994 Desert Tortoise Recovery Plan were not available from the USFWS and the proposed new boundaries as depicted in the USFWS 2008 Draft Revised Recovery Plan had not been adopted as of the time of this analysis. Consequently, the NECO planning area boundary was used for this analysis. The NECO boundary closely approximates the boundaries of the two USFWS recovery units; however, the USFWS boundaries extend slightly to the north and west of the NECO boundary.

The Project’s unmitigated effects to desert tortoise habitat (based on the 2009 USGS habitat model) are quantified below in **Biological Resources Table 12** (and **Biological Resources Figure 5**). Most of the proposed projects in the NECO area would impact lower quality desert tortoise habitat, according to the predictive model. Across the NECO planning area, the cumulative effects to moderate quality desert tortoise habitat from proposed future projects is particularly significant but even seemingly minor effects to higher quality habitat are significant given the species’ decline and the present and future direct and indirect threats from habitat fragmentation and its associated impacts on population viability, the effects of increased predation from ravens, and other reasonably foreseeable future threats.

One of the objectives for desert tortoise recovery in the NECO is to “*mitigate effects on desert tortoise populations and habitat outside DWMMAs to provide connectivity between DWMMAs.*” Maintaining connectivity is particularly important given the threats posed by global climate change, according to the USFWS 2008 Draft Revised Recovery Plan. Probable desert tortoise linkages between the Chuckwalla and Chemehuevi Critical Habitat Units and DWMMAs are shown in **Biological Resources Figure 6**. The linkages depicted represent areas of the best habitat quality for tortoises between the DWMMAs and critical habitat, and therefore represent the most probable linkages and most

important areas to protect to maintain connectivity between the Chemehuevi and Chuckwalla DWMA's. The identified linkages are based on a review of information on existing vegetation and landform data (NECO datasets and Project-specific survey data) and depicted in the USGS habitat model. The location of available lands in "probable" linkages is a useful tool for identifying potential acquisition lands for desert tortoise mitigation, and for evaluating different land-use issues that tortoises face at a landscape scale. **Biological Resources Figure 6** identifies these linkages based on the areas of moderate and high quality habitat between management areas for a qualitative analysis of cumulative effects; however, the impacts to linkages are not quantified here as the areas have not been formalized or created as shape layers suitable for GIS analysis. Along with the linkages depicted in **Biological Resources Figure 6**, additional linkages through areas currently considered lower quality habitat that could be restored may also be important for long-term connectivity between the Chemehuevi and Chuckwalla DWMA's. The Project would not contribute significantly to loss of desert tortoise connectivity between the Chuckwalla and Chemehuevi Desert Wildlife Management Areas (DWMA's) and Critical Habitat Units.

While impacts to higher quality habitat are small (approximately 3 percent) relative to cumulative effects to moderate and low quality habitat, this nevertheless represents over 53,000 acres of habitat and over 150,000 acres of moderate and moderately high quality habitat that would be lost to proposed future projects. Although the Project impacts only lower quality habitats, it nevertheless contributes, at least incrementally, to a cumulatively considerable effect. In situations where the combined impact is most severe, even small incremental impacts may be cumulatively considerable.

The USFWS has expressed significant concerns about the likelihood of renewable energy development resulting in increased raven numbers even with implementation of project-specific raven management plans (USFWS 2010). To mitigate the Genesis Project's contribution to cumulative and indirect impacts on desert tortoise from raven predation, staff proposes that the applicant contribute toward implementation of the Regional Raven Management Program, and Project-specific mitigation measures as described in Condition of Certification **BIO-13** and **BIO-12**. The applicant's payment would support the regional raven management plan activities focused within the Colorado Desert Recovery Unit, which would be adversely affected by increases in raven subsidies attributable to the proposed Project. In addition, **BIO-13** requires development of Project-specific raven management actions that would reduce foraging and nesting opportunities for ravens in and near the Project area. With the implementation of staff's proposed Condition of Certification **BIO-12** (acquisition of compensation lands), desert tortoise-specific avoidance and minimization measures **BIO-1** through **BIO-6**, and monitoring and reporting requirements in **BIO-7**, staff believes that the Project's contribution to cumulative impacts to desert tortoise habitat would be less than considerable. Condition of Certification **BIO-12** specifies that compensation habitat acquisitions occur within the Colorado Desert Recovery Unit in areas that have potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise designated critical habitat, known populations of desert tortoise, and/or other preserved lands. Indirect effects to desert tortoise from ravens and the degradation of habitat quality from the spread of noxious weeds would be minimized through the detailed raven and weed management plans required under **BIO-13** and **BIO-14**.

**Biological Resources Table 12
Cumulative Effects: Desert Tortoise Habitat***

Habitat Value*	Total Desert Tortoise habitat* in NECO	Impacts to Habitat from Existing** Projects (Percent of total in NECO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of total in NECO)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects)
0	243,679 acres	67,028 acres 27.5%	21,774 acres 8.9%	0 acres
0.1	233,260 acres	9,094 acres 3.9%	25,937 acres 11.0%	523 acres 2.0%
0.2	373,170 acres	9,288 acres 2.5%	44,595 acres 12.0%	1,277 acres 2.9%
0.3	628,960 acres	11,987 acres 1.9%	38,163 acres 6.1%	52 acres 0.1%
0.4 – 0.5	787,882 acres	15,885 acres 2.0%	61,163 acres 7.8%	0 acres
0.6 – 0.7	1,381,024 acres	10,279 acres 0.7%	94,944 acres 6.9%	0 acres
0.8 – 0.9	1,868,475 acres	9,233 acres 2.8%	53,074 acres 2.8%	0 acres
1.0	30,883 acres	71 acres 0.2%	55 acres 0.2%	0 acres

*Based on the USGS Desert Tortoise Habitat Model (Nussear et al. 2009).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see **Biological Resources Table 9**.

*** Includes only BLM Renewables that had submitted a Plan of Development at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**.

Implementation of staff's proposed conditions of certification would reduce the Project's contribution to cumulative impacts to desert tortoise habitat, movement, and connectivity would be less than considerable. There may be cumulative impacts after mitigation is implemented by all projects, but due to the mitigation implemented by the Project, its contribution would not be cumulatively considerable. These residual cumulative effects from all future projects could be addressed through a regional and coordinated planning effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors.

Nelson's bighorn sheep

The distribution and extent of the NECO-designated bighorn sheep WHMAs (occupied and unoccupied range) and connectivity corridors, overlaid with past and foreseeable future projects within the NECO Planning Area, are quantified in **Biological Resources Table 13** and illustrated in **Biological Resources Figure 7-a**. The GIS analysis of the NECO bighorn sheep WHMAs and connectivity corridors indicates that occupied and unoccupied ranges and connectivity corridors are unaffected by the proposed Project. However, large-scale renewable energy development in the region north of Highway 62 could significantly impact gene flow between sheep populations through significant cumulative impacts to connectivity corridors, potentially decreasing the viability of the metapopulation of bighorn sheep. The Genesis Project itself, however, has no direct contribution to the loss of habitat within the identified connectivity corridors or the WHMAs.

The Genesis Project is located within the proposed Palen-Ford multi-species WHMA (BLM CDD 2002; map 2-21); but is mainly located outside the sensitive habitats for which the WHMA was primarily established (i.e., dunes and playas). The Project is not located within a bighorn sheep WHMA or corridor (BLM CDD 2002). The cumulative effects of all other proposed future projects on bighorn sheep connectivity can only be addressed through a regional and coordinated effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors.

**Biological Resources Table 13
Cumulative Effects: Bighorn Sheep WHMAs and Connectivity Corridors**

Bighorn sheep WHMAs & Connectivity Corridors*	Total WHMA or Connectivity Corridor* in NECO	Impacts to WHMAs & Connectivity Corridors from Existing** Projects (Percent of all WHMAs or Corridors in NECO)	Impacts to WHMAs & Connectivity Corridors from Foreseeable Future*** Projects (Percent of all WHMAs or Corridors in NECO)	Contribution GSEP to future cumulative impacts (Percent of total impacts from Future projects)
Total in NECO	2,552,074 acres	9,872 acres 0.4% of total NECO	93,295 acres 3.7% of total NECO	0 acres
Occupied Range	1,718,254 acres	6,008 acres 0.3% of total Occupied range	51,508 acres 2.3% of total Occupied range	0 acres
Unoccupied Range	232,506 acres	1,409 acres 0.6% of total Unoccupied range	8,134 acres 3.5% of total Unoccupied range	0 acres
Connectivity Corridors	601,313 acres	2,455 acres 0.4% of total Connectivity corridor	33,653 acres 5.6% of total Connectivity corridor	0 acres

* Based on the BLM NECO Bighorn Sheep WHMAs dataset (BLM CDD 2002).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see **Biological Resources Table 9**.

*** Includes only BLM Renewables that had submitted a Plan of Development at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**.

Another consideration of this analysis was whether the proposed future projects would cumulatively and significantly affect bighorn sheep through the loss of spring forage on the upper bajadas adjacent to occupied range. Based on recommendations from the Society for Conservation of Bighorn Sheep, staff analyzed the impact of existing and future projects within a one-mile buffer from the base of occupied ranges (or potentially restored populations in unoccupied ranges) on plant communities to assess the potential impacts to bighorn foraging habitat. These impacts are depicted in **Biological Resources Figure 7-b** and summarized in **Biological Resources Table 14**, below. No direct or cumulatively considerable effects to bighorn sheep WHMAs or spring foraging habitat would result from the proposed Project and thus no mitigation measures relating to bighorn sheep are proposed by staff. Impacts to spring foraging habitat in other affected portions of NECO, from other projects, remain significant, however. Approximately 4.5 percent of all spring forage in Sonoran creosote bush scrub and an additional 3.3 percent of Mojave creosote bush scrub within a mile of bighorn sheep WHMAs would be affected from all other foreseeable future projects.

Biological Resources Table 14
Cumulative Effects: Bighorn Sheep Spring Foraging Habitat within 1 Mile of
Bighorn Sheep WHMAs and Connectivity Corridors

Foraging Habitat* (by plant community)	Total Plant Communities* within 1-mile buffer of Bighorn Sheep WHMAs	Impacts to Spring Foraging Habitat from Existing** Projects (Percent of all Community types in 1-mile buffer)	Impacts to Spring Foraging Habitat from Foreseeable Future*** Projects (Percent of all Community types in 1-mile buffer)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects)
Mojave Creosote Scrub	549,123 acres	936 acres 0.2%	18,342 acres 3.3%	0 acres
Sonoran Creosote Scrub	2,526,869 acres	8,768 acres 0.3%	113,434 acres 4.5%	0 acres
Desert Dry Wash Woodland	277,981	1,371 acres 0.5%	8,167 acres 2.9%	0 acres
Playa/Dry Lake	5,264 acres	0 acres	1,810 acres 34.4%	0 acres
Sand Dunes	6,218 acres	49 acres 0.8%	8 acres 0.1%	0 acres
Chenopod Scrub	258 acres	10 acres 3.9%	0 acres	0 acres
Agriculture, Developed	7,253 acres	N/A	576 acres 7.9%	0 acres
Pinyon-Juniper Woodland	1,928 acres	0 acres	0 acres	0 acres

* Based on the BLM NECO Bighorn Sheep WHMAs dataset (BLM CDD 2002).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see **Biological Resources Table 9**.

*** Includes only BLM Renewables that had submitted a Plan of Development at the time of the analysis and those additional future projects listed in **Biological Resources Table 9**.

Mojave Fringe-toed Lizard

The geographic scope for the first of two cumulative effects analyses for Mojave fringe-toed lizard is the entire NECO planning area; the second analysis looked only at the habitat for the Chuckwalla Valley population. The NECO habitat dataset for Mojave fringe-toed lizard, which included all but the highest portions of the mountain ranges, was refined to reflect the species restriction to sandier substrates. Using the NECO landforms dataset, staff created a habitat model by selecting the following landforms: crescentic dunes, longitudinal dunes, undifferentiated dunes, sandy dissected fans, sandy plains, and dry playas. Dry playas were included because they often have at least a veneer of sand. The selected landforms were overlaid with documented occurrences of Mojave fringe-toed lizard from CNDDDB and the detailed field survey data from four renewable energy projects within the NECO boundary. The occurrence data was in considerable agreement with the selected landforms; no corrections were

necessary and no attempt was made to rank habitat value. **Biological Resources Figure 8** and **Biological Resources Table 15** present the results of the Mojave fringe-toed lizard habitat mapping overlaid with the existing and future projects within the NECO planning area to quantify the cumulative effects of all projects on habitat loss. **Biological Resources Table 15** also summarizes the cumulative loss of habitat for six additional plant and animal species discussed later in this section (American badger and desert kit fox, burrowing owl, Le Conte's thrasher, burro deer, Couch's spadefoot toad, and Harwood's milk-vetch),

However, there are also cumulatively considerable indirect effects to Mojave fringe-toed lizard that are not reflected in this quantitative analysis of habitat loss. These include impacts to sand transport systems and the maintenance of dunes from renewable energy projects (wind fencing and the obstruction of sand-carrying winds and water-deposited sands); premature stabilization of dunes by the spread of noxious weeds, which also fuel wildfires; increased risk of fire from transmission lines and increased ignition rates and vehicle-related mortalities from the introduction of vehicles into formerly undisturbed habitats; the effects of past and future grazing and off-road vehicle use; fragmentation of the remaining habitat and the accompanying isolation and reduced population viability; and an increase in predation by ravens and other predators from an increase in perching structures. Staff considers these indirect cumulative effects significant. Of particular concern with all proposed projects within the aeolian (wind-deposited) sand transport corridor is the indirect downwind loss of dune habitat and habitat quality from obstructions (structures and wind fencing). Studies and examples in nearby Coachella Valley suggest that such effects can be acute and occur quickly (Katra et al. 2009; Turner et al. 1984).

Future (proposed) projects alone will cumulatively cause a direct loss of over 103,000 acres (16 percent) of all Mojave fringe-toed lizard habitat. Although the Project's contribution to these NECO-wide effects is relatively minor it nevertheless contributes, at least incrementally, to a significant cumulative effect.

Within Chuckwalla Valley (**Biological Resources Table 15** and **Biological Resources Figures 9**), nearly 13,000 acres (12.9 percent) of the Mojave fringe-toed lizard habitat would be directly impacted by the construction of all proposed projects. The Project's contribution to the direct loss of habitat for the Chuckwalla Valley population of Mojave fringe-toed lizard is somewhat more substantial in the local context (1.7 percent). However since publication of the Draft SA/EIS, the applicant re-designed the facility footprint by removing a 41.4-acre "toe" area which decreased direct impacts to sand dunes from 28 acres to 1 acre (from construction of the transmission line linear facility). Removal of 27 acres of impact to sand dune habitat also substantially decreased the Project's effects to the regional sand migration corridors that occur in the Genesis Project area (TTEC 2010o).

In addition to the minimization of effects created by the re-design, the Project's contribution to cumulative effects would also be reduced by proposed compensatory mitigation identified in Condition of Certification **BIO-20**, which requires implementation of impact avoidance and minimization measures and acquisition of habitat to mitigate for the Project-related loss of sand dune and other sandy habitats that support Mojave fringe-toed lizards. Condition of Certification **BIO-20** specifies that the acquisitions

would need to be targeted for sand dune or partially stabilized sand dune habitat within the Chuckwalla Valley. Impacts to desert washes in Chuckwalla Valley, some of which contribute sand to the aeolian transport corridor, would be offset through Condition of Certification **BIO-22** by acquiring and preserving private lands in the valley containing desert washes that are not currently protected under a conservation easement and could be developed in the future. Indirect effects from ravens and the spread of Sahara mustard and other noxious weeds would be minimized through **BIO-13** and **BIO-14**. Implementation of all mitigation measures would be assured through Condition of Certification **BIO-7**. Therefore, with the implementation of the aforementioned conditions of certifications, the Project's contribution to the cumulative effects to Mojave fringe-toed lizard would be less than considerable.

**Biological Resources Table 15
Cumulative Effects: Special-status Species Habitat**

Special-status Species Habitat	Total habitat in NECO (or other study area)	Impacts to Habitat from Existing+ Projects (percent of total habitat)	Impacts to Habitat from Foreseeable Future++ Projects (percent of total habitat)	Contribution GSEP to future cumulative impacts¹ (percent of total future impacts)
Mojave fringe-toed lizard habitat* (all NECO)	630,121 acres	14,541 acres 2.3%	103,604 acres 16.4%	224 acres 0.2%
Mojave fringe-toed lizard habitat* (Chuckwalla Population)	99,657 acres	8,290 acres 8.3%	12,845 acres 12.9%	224 acres 1.7%
American badger and desert kit fox habitat*	4,795,631 acres	134,750 acres 2.8%	339,704 acres 7.1%	1,811 acres 0.5%
Burrowing owl habitat***	4,795,631 acres	134,750 acres 2.8%	339,704 acres 7.1%	1,811 acres 0.5%
LeConte's thrasher habitat****	3,718,357 acres	47,078 acres 1.3%	300,139 acres 8.1%	1,811 acres 0.6%
Burro deer range*****	637,453 acres	10,236 acres 1.6%	47,640 acres 7.5%	151 acres 0.3%
Couch's spadefoot toad range*****	1,548,597 acres	88,992 acres 5.7%	115,218 acres 7.4%	1,811 acres 1.6%
Harwood's milk-vetch habitat*****	3,134,303 acres	54,788 acres 1.8%	274,727 acres 8.8%	1,811 acres 0.7%

1 = Acreages adjusted to reflect removal of the 41.4 acre "toe" (TTEC 2010o).

*Total habitat based on the BLM NECO Landforms dataset (BLM CDD 2002), selecting following values: undifferentiated dunes; crescentic dunes, longitudinal dunes; sandy plains; playas, and sandy dissected fans.

**Total habitat based on the BLM NECO Landforms dataset (BLM CDD 2002), excluding mountains playas, badlands, and lava flows

***Total habitat based on the BLM NECO Landforms dataset (BLM CDD 2002), excluding dunes, playas, mountains, badlands, and lava flows

****Total habitat based on the NECO habitat model for LeConte's thrasher

*****Total habitat based on the NECO habitat model for burro deer (mule deer)

*****Total habitat based on the NECO range map for Couch's spadefoot toad

*****Total habitat based on Staff's habitat model for Harwood milk-vetch. Using the NECO landforms model and selecting landforms on which occurrences of Harwood's milk-vetch have been documented; landforms do not imply presence of Harwood's milk-vetch

+ Includes only those existing projects between Desert Center and the Colorado River for which GIS-based spatial data was available at the time of the analysis; see Biological Resources Table 9

++ Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 9

Golden Eagle

Staff conducted four different analyses of cumulative effects on golden eagle foraging habitat: 1) the entire NECO planning area (**Biological Resources Figures 10**); 2) foraging habitat within 10 miles of the base of all mountain landforms within NECO (**Biological Resources Figures 11-a**); 3) a 10-mile radius around the Project (**Biological Resources Figures 11-b**), and 4) a 140-mile radius around the Project (**Biological Resources Figures 11-c**).

The model of foraging habitat adjacent to mountain landforms was based on an assumption that the mountainous areas were the most likely sites for golden eagle nests. The 140-mile analysis (**Biological Figure 11-c**) used the California GAP vegetation mapping dataset (Davis et al. 1998), a project of the Biogeography lab at UC Santa Barbara. The vegetation mapping depicted in Arizona and Nevada is based on the National GAP vegetation mapping project. The original GAP mapping of desert dry wash woodlands and dunes was improved for the NECO plant communities dataset used in **Biological Figures 11-a and 11-b** (BLM CDD 2002; Appendix H); however, all datasets are based largely on aerial photo interpretation and would not be considered as accurate as a ground-based and field-verified delineation of habitats. The basis for a 140-mile analysis (which was limited by a lack of compatible vegetation mapping data for Mexico) was based on an analysis of band recovery data provided by the U.S. Bird Banding Laboratory which showed that 90 percent of mature golden eagles re-encountered during the breeding season were within 140 miles of their natal site (USFWS 2009). Currently, no nests have been documented within 10 miles of the Project. Golden eagle nest surveys were completed in spring 2010 but the results were not available at the time of publication of the RSA. **Biological Resources Table 16** summarizes the impacts to foraging habitat for **Biological Resources Figures 11-a** through **11-c**. Please see **Biological Resources Table 18** and **Figure 19-a** for a summary and map of impacts to plant communities within entire NECO planning area.

All of the golden eagle foraging habitat figures depict the locations of currently known and documented golden eagle nest locations. The source of this information include the "nest card" database, desert-wide helicopter surveys conducted in 1978 and 1979, and locations depicted in a 1984 BLM California Desert Conservation Area (CDCA) map of "Sensitive, Rare, Threatened and Endangered Fish and Wildlife" that were digitized for this analysis (BLM 1999). It is unknown whether these nests are still active and/or present; this analysis assumes that they could be active and, at a minimum, that the site is suitable for nesting. The nest locations depicted are approximate (with a margin of error +/- 1-2 miles) and the map should not be viewed as a substitute for site-specific nest surveys to assess project impacts.

The loss of foraging habitat quantified in the GIS analysis is but one picture of the range-wide cumulative effects that have contributed to a sharp decline in golden eagle populations in recent years. The USFWS and others (USFWS 2009b; Kochert et al. 2002) estimate there are approximately 30,000 golden eagles in the western U.S., down from an estimated 100,000 in the late 1970s. Survey data from 2003 and 2006-2008 indicate a decline of 26 percent since 2003. Climate change is also expected to impact golden eagle by increasing drought severity, and the CO₂ concentrations are expected to exacerbate the spread of invasive weeds, which displace native species and habitats,

fuel wild fires, and alter fire regimes. Wind energy development may also be particularly harmful to golden eagles; however, the proposed transmission lines for this and other proposed future projects are also expected to increase raptor collisions and electrocutions. Lead poisoning and the loss of prey species are also important contributors to golden eagle mortality and the overall decline in habitat function and value from human activities.

Proposed future projects within 10 miles of all mountains (**Biological Resources Figure 11-a** and **Biological Resources Table 16**) would cumulatively affect over 325,000 acres of foraging habitat (not including agriculture). The combined effect of all existing and probable future impacts to the loss of foraging habitat within 10 miles of the Project is also significant. Proposed future projects within 10 miles of the Project site (**Biological Resources Figures 11-b**) would cumulatively affect over 31,780 acres of foraging habitat (not including agriculture)—nearly 10 percent of all potential foraging habitat. The Project contributes, at least incrementally, to a significant cumulative loss of foraging habitat, and habitat quality for a species in sharp decline. In situations where the cumulative impact is most severe, even small incremental impacts may be cumulatively considerable.

The Project's contribution to the cumulative loss of foraging habitat would be less than cumulatively considerable with the implementation of staff's proposed conditions of certification to address both habitat loss and the indirect effects described above. As specified in staff's proposed Condition of Certification **BIO-12**, the Applicant shall acquire and protect 1,864 acres of Sonoran creosote bush scrub within the Colorado Desert Recovery Unit (for desert tortoise), 190 acres of Mojave fringe-toed lizard habitat (**BIO-20**), and 132 acres of ephemeral desert washes within or adjacent to the Chuckwalla- Ford Dry Lake watershed (**BIO-22**). While acquisition does not address the net loss of foraging habitat in the immediate future, it is expected to prevent future losses of habitat by placing a permanent conservation easement and deed restrictions on private lands that could otherwise be converted for urban or agricultural uses, or energy development. The Project's contribution to the indirect cumulative effects to foraging habitat from the spread of invasive non-native plants would be less than considerable after implementation of Condition of Certification **BIO-14** (Weed Management Plan).

There may be cumulative impacts after mitigation is implemented by this Project, but the mitigation implemented by the proposed Project reduces its contribution to cumulative impacts to a level that is not cumulatively considerable. These residual cumulative effects from all future projects—after mitigation to less than significant—could be addressed through a regional and coordinated planning effort aimed at preserving and enhancing large, intact expanses of foraging habitat, limiting development near nest sites, developing guidelines for minimizing collisions and electrocutions, and other programmatic efforts.

**Biological Resources Table 16
Cumulative Effects: Golden Eagle Foraging Habitat**

Cumulative Effects: Golden Eagle Foraging Habitat Within 10 miles of Mountains				
Foraging Habitat* (by plant community)	Total Plant Communities* within 10-mile buffer of mountains in NECO	Impacts to Foraging Habitat from Existing** Projects (Percent of all Community types in 10-mile buffer)	Impacts to Foraging Habitat from Foreseeable Future*** Projects (Percent of all Community types in 10-mile buffer)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects) ¹
Mojave Creosote Scrub	728,536 acres	1,691 acres 0.2%	33,920 acres 4.7%	0 acres
Sonoran Creosote Scrub	3,571,797 acres	22,019 acres 0.6%	228,363 acres 6.4%	1,773 acres 0.8%
Desert Dry Wash Woodland	654,735	8,128 acres 1.2%	48,086 acres 7.3%	16 acres**** 0.03%
Playa/Dry Lake	54,433 acres	961 acres 1.8%	15,713 acres 29%	37 acres 0.2%
Sand Dunes	60,807 acres	1,465 acres 2.4%	175 acres 0.3%	1 acre 0.6%
Chenopod Scrub	982 acres	72 acres 7.3%	0 acres	0 acres
Agriculture, Developed	79,894 acres	N/A	1,011 acres 1.3%	0 acres
Pinyon-Juniper Woodland	1,928 acres	0 acres	0 acres	0 acres

Cumulative Effects: Golden Eagle Foraging Habitat Within 10 miles of Project				
Foraging Habitat* (by plant community)	Total Plant Communities* within 10-mile buffer of Project	Impacts to Foraging Habitat from Existing** Projects (Percent of all Community types in 10-mile buffer)	Impacts to Foraging Habitat from Foreseeable Future*** Projects (Percent of all Community types in 10-mile buffer)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects) ¹
Mojave Creosote Scrub	0 acres	0 acres	0 acres	0 acres
Sonoran Creosote Scrub	257,135 acres	1,559 acres 0.6%	23,935 acres 9.3%	1,773 acres**** 7.4%
Desert Dry Wash Woodland	62,575 acres	1,255 acres 2.0%	7,677 acres 12.3%	16 acres**** 0.2%
Playa/Dry Lake	5,269 acres	950 acres 18.0%	0 acres	37 acres**** 100%
Sand Dunes	5,613 acres	0 acres	168 acres 3.0%	1 acre**** 0.6%
Chenopod Scrub	216 acres	62 acres 28.7%	0 acres	0 acres
Agriculture, Developed	2,205 acres	N/A	140 acres 6.3%	0 acres

Pinyon-Juniper Woodland	0 acres	0 acres	0 acres	0 acres
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*Based on the BLM NECO Plant Communities dataset (BLM CDD 2002) conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division UC Santa Barbara GAP Analysis (1996), updated during the NECO planning effort (see Appendix H of the NECO Management Plan (BLM CDD 2002)

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see Biological Resources Table 9

*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 9

**** Numbers reflect actual ground-based and field verified delineation of habitats (TTEC 2010-I; GSEP 2009a). Dune acreage (1ac.) reflects adjustment for removal of the 41.4 acre "toe" (TTEC 2010o).

Cumulative Effects: Golden Eagle Foraging Habitat+ 140-mile Radius Area				
+ Different vegetation mapping dataset than NECO area analyses; used California GAP Analysis dataset and National GAP program data for Arizona				
Foraging Habitat+ (by plant community)	Total Plant Communities+ in 140-mile Radius of Project	Impacts to Foraging Habitat from Existing ++Projects (Percent of all community type in 140-mile radius)	Impacts to Foraging Habitat from Foreseeable Future+++ Projects (Percent of all community type in 140-mile radius)	Contribution of BSPP to future cumulative impacts (Percent of total impacts from future projects) ¹
Mojavean & Sonoran Desert Scrubs	19,813,486 acres	n/a	1,106,998 acres 5.6%	1,773 acres++++ 0.2%
Great Basin Desert Scrubs	263,209 acres	n/a	7,419 acres 2.8%	0 acres
Alkali Desert Sink Scrub	374,785 acres	n/a	33,728 acres 9.0%	0 acres+++++
Desert Succulent Scrubs++++ (desert scrubs with cacti/succulents)	3,497,649 acres	n/a	68,671 acres 2.0%	0 acres
Chaparral	2,497,868 acres	n/a	21,940 acres 0.9%	0 acres
Riversidean Sage Scrub	368,827 acres	n/a	0 acres	0 acres
Desert Riparian (woodlands)	234,632 acres	n/a	0 acres	16 acres++++ 100%
Desert Wash (unvegetated and wash scrubs)	858,560 acres	n/a	57,723 acres 6.7%	74 acres++++ 0.1%
Playa/Lacustrine	282,667 acres	n/a	0 acres	37 acres 100%
Agriculture	1,604,793 acres	n/a	1,387 acres 0.1%	0 acres
Pinyon-Juniper Woodland	859,050 acres	n/a	164 acres 0.02%	0 acres
Montane Conifer	719,915 acres	n/a	9,663 acres 1.3%	0 acres
Montane Riparian Woodland	8,106 acres	n/a	0 acres	0 acres
Oak Woodland	114,388 acres	n/a	148 acres 0.1%	0 acres
Urban	1,307,902 acres	n/a	48 acres 0.004%	0 acres
Riverine and	105,806 acres	n/a	561 acres	0 acres

Lacustrine (open water)			0.5%	
Grassland and Mixed Shrub-Grass	584,229 acres	n/a	1,368 acres 0.2%	0 acres
Wet Meadow	26,568 acres	n/a	0 acres	0 acres
Emergent Marsh (Saline and Freshwater)	9,579 acres	n/a	9.8 acres 0.1%	0 acres
Palm Oasis	3,029 acres	n/a	0 acres	0 acres
Barren (Rock outcrop)	219,155 acres	n/a	337 acres 0.1%	0 acres

*Based on the BLM NECO Plant Communities dataset (BLM CDD 2002) conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division UC Santa Barbara GAP Analysis (1996), updated during the NECO planning effort (see Appendix H of the NECO Management Plan (BLM CDD 2002))

** Includes only those existing projects between Desert Center and the Colorado River for which GIS-based spatial data was available at the time of the analysis; see **Biological Resources Table 9**

*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in **Biological Resources Table 9** (February 2010)

**** Includes the indirect effects to dune habitat (33 ac.) from the proposed SCE Colorado Substation, and 4 acres direct impacts from the linear facilities of the Project. Substation impacts will be mitigated under the authority of the CPUC.

+Based on the California GAP Analysis conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division UC Santa Barbara GAP Analysis (1996). Arizona vegetation data based on National GAP Program data. Nevada GAP data not included in Table 15

++Existing impacts dataset not compiled for this analysis

+++Based only on future (proposed) renewable energy projects in California and Arizona; ROW obtained from BLM California and BLM Arizona; includes only projects with a Plan of Development (POD) at the time of the analysis (May 2010). BLM Nevada GIS-based data not available at time of analysis (May 2010)

++++Includes Joshua Tree Woodland, Mojave Yucca Woodland, and various mixed shrub and cacti communities

+++++Numbers reflect the ground-based delineation of habitats and state waters; dune acreage (1ac.) reflects adjustment for removal of the 41.4 acre "toe" (TTEC 2010o).

American Badger and Desert Kit Fox

The geographic scope for the cumulative analysis for these two species encompasses the entire NECO planning area. Using the NECO landforms dataset, the extent of suitable habitat depicted in the NECO plan was refined somewhat by excluding the following landforms: playas, badlands (steep erosional features), lava flows, and mountains. The remaining habitat was then overlaid by existing and foreseeable future projects to quantify cumulative impacts to badger and kit fox habitat (**Biological Resources Table 15** and **Biological Resources Figure 12**).

This quantitative analysis of habitat loss does not address use of the Project site and adjacent habitat for both foraging and movement pathways. Other reasonably anticipated cumulative effects not quantified here include habitat fragmentation and the diminished habitat values of remaining habitat from increased noise; disruption from night lighting; exotic plant invasion (which fuels wildfires and alters fire regimes); dust and air pollution; an increase in predators; agriculture and urban development, and; the consequences of human intrusion into previously undisturbed habitats (such as hunting, use of rodenticides and other poisons, road kills, trapping, and human disturbance).

An estimated 339,704 acres of American badger and desert kit fox habitat would be displaced by the proposed future projects within the NECO planning area, representing approximately 7 percent of the total habitat mapped in NECO (based on the simple habitat model described above). Staff considers this a cumulatively considerable contribution to a significant cumulative effect, particularly when viewed in combination

with the anticipated indirect effects of habitat fragmentation and degradation to remaining habitat and other threats described above. The Project contributes—at least incrementally—to a significant cumulative effect. Staff’s proposed Condition of Certification **BIO-12** requiring acquisition of 1,864 acres of Sonoran creosote bush scrub within the Colorado Desert Recovery Unit (for desert tortoise), 190 acres of Mojave fringe-toed lizard habitat (**BIO-20**) within Chuckwalla Valley, and 132 acres of desert washes (**BIO-22**) within the immediate or adjacent watershed, would also benefit American badger and desert kit fox. With the implementation of habitat acquisition (**BIO-12, 20, and 22**), and the avoidance and minimization measures for American badger and desert kit fox contained in **BIO-17**, the Project’s contribution to the combined effects of the Project and the past, present, and probable future impacts would be less than cumulatively considerable. While acquisition does not replace the habitat, it prevents future losses of habitat through conservation easements and deed restrictions on private lands that could otherwise be converted for urban or agricultural uses, or energy development. A programmatic and multi-agency approach to address the cumulative effects of all projects, after implementation of the Project-specific mitigation measures, is currently in progress.

Western Burrowing Owl

Using the NECO landforms dataset, the extent of suitable habitat for burrowing owl in the NECO planning area was refined by excluding the following landforms: dunes, mountains, playas, badlands (steep erosional features) and lava flows. The results were then overlaid by existing and foreseeable future projects to quantify cumulative impacts to burrowing owl habitat (**Biological Resources Table 15** and **Biological Resources Figure 13**).

The GIS-based analysis of habitat loss does not reflect the significant cumulative effects of habitat fragmentation and its impacts on population viability, increased road kills, increased risk of fire from weed invasion and ignition sources, and the degradation of remaining habitat function and values. Staff considers the combined effect of all proposed future projects on habitat loss (339,704 acres or 7.1 percent loss of all habitat in the NECO planning area), and the indirect effects described above, to be a significant cumulative effect to which the Project contributes incrementally. However, the Project’s contribution to cumulative effects would be reduced to a level less than considerable through implementation of the following conditions of certification: acquisition of 1,864 acres of Sonoran creosote bush scrub within the Colorado Desert Recovery Unit for desert tortoise (**BIO-12**), 190 acres of Mojave fringe-toed lizard habitat (**BIO-20**) within Chuckwalla Valley, and 132 acres of desert washes (**BIO-22**) within the immediate or adjacent watershed. This proposed habitat replacement would also be expected to benefit burrowing owl by preventing future losses of habitat that is currently zoned for energy or other development. The Raven Management Plan (**BIO-13**) and Weed Management Plan (**BIO-14**) are also expected to minimize the Project’s contribution to the indirect effects of increased avian predators and the spread of invasive plants, and **BIO-18** contains measures specifically for avoiding and minimizing impacts to burrowing owl.

Le Conte's Thrasher

The scope of this analysis includes the entire NECO planning area and utilized the NECO Le Conte's thrasher habitat dataset to quantify cumulative effects of habitat loss from existing and foreseeable future projects (**Biological Resources Table 15** and **Biological Resources Figure 14**). The NECO habitat model for this species is applicable to several other special-status bird species that inhabit desert dry wash woodland and adjacent upland habitat, including loggerhead shrike, phainopepla, ash-throated flycatcher, and northern mockingbird. The cumulative impacts to migratory birds not addressed in the quantitative analysis of habitat loss include habitat fragmentation, and degradation, and impacts to riparian and groundwater-dependent vegetation and riparian vegetation from water overdrafts and diversions.

The combined effect of the Project and the existing and probable future impacts are substantial; 300,139 acres of desert scrubs and desert wash woodland would be lost to future renewable energy development within the NECO planning area alone; this represents 8.1 percent of all potential habitat in NECO. Staff believes that the Project's contribution to the cumulative loss of habitat would be less than cumulatively considerable through implementation of proposed Condition of Certification **BIO-22**, which requires acquisition and enhancement of desert dry wash woodland and unvegetated ephemeral washes within the same watershed as the Genesis Project. Condition of Certification **BIO-12** requires compensatory habitat acquisition for desert tortoise habitat, which is also expected to benefit Le Conte's thrasher, and **BIO-15** requires pre-construction nesting bird surveys. Proposed Conditions of Certification **BIO-25** and **BIO-26** would require monitoring for impacts to groundwater-dependent vegetation within 10 miles of the Project pumping well and require remedial action if adverse effects are detected. The Project's contributions to the cumulative effects to Le Conte's thrasher from the indirect effects described above would be less than cumulatively considerable with the implementation of these additional mitigation measures.

Burro Deer

Burro deer is a subspecies of mule deer found in the Colorado Desert of Southern California, primarily along the Colorado River and in desert dry wash woodland communities away from the river. During the hot summers, water is critical, and deer concentrate along the Colorado River where water developments have been installed and where the microphyll woodland is dense and provides good forage and cover. Impacts are most important within 1/4 mile of natural or artificial watering sites; these sites are depicted in the bighorn sheep Wildlife Habitat Management Area map, **Biological Resources Figure 7a**, and are based on the NECO dataset for natural and artificial water sources.

Biological Resources Table 15 summarizes the anticipated cumulative effects to burro deer range; these effects are also illustrated in **Biological Resources Figure 15**. Using the NECO dataset for burro deer range, approximately 151 acres of the total 47,640 acres (0.3 percent) of burro deer range in the NECPO plan area would be displaced by the Genesis Project. Proposed future projects would cumulatively affect 7.5 percent of the burro deer range, as the range is documented in NECO (BLM CDD 2002). Staff's proposed Condition of Certification **BIO-22** for acquisition of 132 acres of desert washes

within or adjacent to the Chuckwalla-Ford Dry Lake watershed, and Condition of Certification **BIO-12** for acquisition of 1,864 acres of Sonoran creosote bush scrub would reduce the Project's contributions to the cumulative loss of burro deer range to a level less than cumulatively considerable. The Project's contribution to indirect cumulative effects would be minimized through **BIO-14** (detailed Weed Management Plan), **BIO-24** (revegetation of temporarily disturbed areas), and **BIO-25** and **26** (monitoring for impacts to groundwater-dependent vegetation within 10 miles of the Project pumping well and remedial action if adverse effects are detected).

Burro deer movement between the eastern portion of Ford Dry Lake and the Palen Wash ironwood forest, which is depicted in **Biological Resources Figure 15** as burro deer range, would be impacted by the proposed Project. This is not expected to be a significant impact because the importance of this linkage is already compromised by OHV and other human disturbance from the Wiley Well Rest Stop, and because the western portion of the ROW will be returned to BLM, thus allowing continued movement upslope into the Palen Wash and Palen Mountain Range from the west.

The cumulative effects of all future projects on wildlife movement and connectivity are discussed below and addressed in part through a proposed coordinated, multi-agency approach to preserving important linkages in the Chuckwalla Valley outlined in **Biological Resources Appendix B**.

Couch's Spadefoot Toad

The NECO Couch's spadefoot toad range dataset was used in this analysis to quantify cumulative impacts to potential habitat (**Biological Resources Table 15** and **Biological Resources Figure 16**). Based on the dataset's depiction of the range the GIS analysis indicates that the cumulative effects of all proposed future projects would affect 115,218 acres of Couch's spadefoot toad range in California, or 7.4 percent of its total range in California. Staff considers this a significant cumulative effect to which the Project would contribute to at least incrementally. The Project's contribution to this significant cumulative effect would be minimized to a level less than cumulatively considerable through implementation of staff's proposed Condition of Certification **BIO-27**, which specifies avoidance and minimizations measures for the known breeding pond south of I-10 along the interconnecting transmission line. The Project's contribution to an increase in invasive non-native plants and avian predators would be minimized through staff's proposed conditions of certification **BIO-13** (Raven Management Plan) and **BIO-14** (Weed Management Plan).

Wildlife Movement and Connectivity

Connectivity refers to the degree to which organisms can move among habitat patches and populations. Individuals must be able to move between patches to meet their resource needs, and in the long term populations must be connected to allow for dispersion, gene flow, and re-colonization. This discussion includes a qualitative discussion of cumulative effects to wildlife movement and connectivity. The probable desert tortoise linkages between the Chuckwalla DWMA and Chemehuevi DWMA are depicted spatially in **Biological Resources Figure 6** "Desert Tortoise DWMAs & Connectivity Corridors", displayed on a base map of USGS desert tortoise habitat modeling (Nussear et al. 2009).

Biological Resources Table 13 and **Figures 7-a** and **7-b** summarize cumulative effects to bighorn sheep WHMAs and connectivity corridors as depicted in the NECO Plan (BLM CDD 2002). **Biological Resources Table 17** and **Biological Resources Figure 17** and **18** look at the cumulative effects to plant communities and landforms within three Multi-Species WHMAs in the Project vicinity: Big Maria Mountains WHMA, Palen-Ford WHMA, and the DWMA Continuity WHMA, which provides connectivity between the Chuckwalla DWMA/ACEC south of I-10 and the Palen-Ford WHMA north of I-10. This analysis utilized the NECO Plant Communities and Landforms datasets to describe the type of habitat affected within each separate WHMA.

Two other solar projects are currently proposed within the Palen-Ford WHMA: Palen Solar Power Project and Chuckwalla Solar One. **Biological Resources Table 17** and **Figures 17** and **18** indicates the Genesis Project is an important contributor to the loss of Sonoran creosote bush scrub (29 percent) and playa (37 acres, including sand drifts at the playa margins) within the Palen-Ford WHMA. The actual ground-delineated and field-verified impact for desert dry wash woodland is 16 acres (see also **Biological Resources Table 5**); the NECO GIS datasets are based on aerial photo interpretation and as such are considered less reliable than verified ground survey results.

The Palen-Ford WHMA, and all other WHMAs within the NECO planning area, was specifically designated to form the NECO Multi-species Conservation Zone, along with the wilderness areas, DWMA, ACECs, Joshua Tree National Park, and the military bases, to protect the species considered in NECO. The Palen-Ford WHMA was specifically established to protect the dunes and playas (NECO sensitive habitat types) and the Mojave fringe-toed lizard. The Project is responsible for 100% of the future impacts to playa and sand drifts over playa in the Palen-Ford WHMA.

The Genesis solar fields are located largely out of the dune system (after removal of the 41.4 acre "toe" (TTEC 2010o), and the linears moved slightly to avoid dune habitat occupied by Mojave fringe-toed lizard. The Project will not substantially impair the connectivity for those species for which the Palen-Ford WHMA was designated. The contribution of the Project to dune habitat loss does not reflect the indirect downwind effect of the solar field's obstruction of the wind sand transport corridor. However, re-routing washes from the Palen Mountains around the Genesis site would not represent a significant disruption to wildlife movement as the washes lead only to Ford Dry Lake and I-10; an area that is also disturbed by human and unauthorized vehicle use around the Wiley Well Rest Area.

The combined effect of the Project and all existing and probable future projects in NECO on connectivity within Chuckwalla Valley and the Palen-Ford WHMA is significant and thus the Project will contribute, at least incrementally, to a cumulatively considerable effect. The requirement in **BIO-20** and **BIO-22** to acquire habitat within Chuckwalla Valley and within within the identified connectivity linkages would reduce the Project's contribution to cumulative effects to connectivity in Chuckwalla Valley and the Palen-Ford WHMA to a level less than cumulatively considerable.

Staff believes that the Project's contribution to desert tortoise connectivity is not cumulatively considerable; staff has identified the area west of Desert Center and HWY

177 as being the most valuable area for tortoise connectivity based on existing habitat conditions, tortoise densities, and the USGS habitat modeling for the Project vicinity (see **Biological Resources Figure 6**). Additionally, the dunes and playas form a north-to-south barrier to tortoise movement. The Project is also located outside the DWMA Connectivity WHMA. Although the WHMA was not established to specifically serve desert tortoise, the Project does contribute to the loss of habitat (Sonoran creosote bush scrub) within the WHMA. Proposed Condition of Certification **BIO-12** would require acquisition and protection of 1,864 acres of Sonoran creosote bush scrub within the Chuckwalla Desert Tortoise Critical Habitat Unit. Mitigation for cumulative effects to connectivity could be enhanced if desert tortoise acquisitions were targeted for areas that would enhance wildlife connectivity within the same WHMA and corridor, as described in **Biological Resources Appendix B**. Kit foxes, coyotes, and badgers are not NECO species and were not the reason for the establishment of the WHMAs; however, the acquisition of lands within the connectivity linkages described in **Appendix B** would also benefit kit fox, coyote, badger, and burro deer.

Biological Resources Table 17
Cumulative Effects: Wildlife Habitat Management Areas and Plant Communities

Palen-Ford WHMA				
Plant Community* within WHMA	Total Plant Communities* in WHMA	Impacts to Habitat from Existing** Projects (Percent of all Community type in WHMA)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in WHMA)	Contribution of GSEP to future cumulative impacts (Percent of total impacts to WHMA from Future projects) ¹
Sonoran Creosote Scrub	39,366 acres	2,087 acres 5.3%	5,488 acres 14%	1,587 acres 29%
Desert Dry Wash Woodland****	13,104 acres	932 acres 7.1%	202 acres 1.5%	123 acres**** 61% (16 acres/7.9%)
Sand Dunes	17,690 acres	0 acres	44 acres 0.25%	17 acres**** 39% (1 acres/63.6%)
Chenopod Scrub	381 acres	62 acres 16.3%	0 acres	0 acres**** (38 acres/100%)
Playas	13,696 acres	950 acres 6.9%	0 acres	0 acres**** (37 acres)
Agriculture, Urban	152 acres	146 acres N/A	0 acres	0 acres

Big Maria Mountains WHMA				
Plant Community* within WHMA	Total Plant Communities* in WHMA	Impacts to Habitat from Existing** Projects (Percent of all Community type in WHMA)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in WHMA)	Contribution of GSEP to future cumulative impacts (Percent of total impacts to WHMA from Future projects)
Sonoran Creosote Scrub	24,436 acres	317 acres 1.3%	3,105 acres 12.7%	0 acres
Desert Dry Wash Woodland****	9,308 acres	507 acres 5.4%	1,008 acres 10.8%	0 acres
Agriculture, Urban	50 acres	n/a	0 acres	0 acres

DWMA Continuity WHMA				
Plant Community* within WHMA	Total Plant Communities* in WHMA	Impacts to Habitat from Existing** Projects (Percent of all Community type in WHMA)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in WHMA)	Contribution of GSEP to future cumulative impacts (Percent of total impacts to WHMA from Future projects)
Sonoran Creosote Scrub	12,804 acres	856 acres 6.7%	988 acres 7.7%	0 acres
Desert Dry Wash Woodland	275 acres	2.9 acres 1.1%	1.4 acres 0.5%	0 acres

*Based on the BLM NECO Plant Communities dataset (BLM CDD 2002), updated from the California Gap Analysis Project, conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division UC Santa Barbara GAP Analysis (1996).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see Biological Resources Table 9

*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 9

**** Acreages shown reflect the ground-based and field-verified delineation of habitats (TTEC 2010-I); dune acreage (1 ac) adjusted to reflect removal of the 41.4 acre "toe" (TTEC 2010o).

Natural Communities

Two cumulative effects analyses of different geographic scope were conducted for natural communities: 1) the entire NECO planning area (**Biological Resources Figure 19-a**), and 2) Chuckwalla Valley (**Biological Resources Figure 19-b**). The NECO plant communities dataset was used for both analyses; it is based on the California Gap Analysis Project (Davis et al. 1998) but the accuracy and resolution of the GAP mapping was improved for the NECO plant communities dataset (BLM CDD; Appendix H) using aerial photos and helicopter surveys. However, such analyses are inferior (in accuracy) to ground-based and field-verified delineation of habitats; consequently, the Project's contribution to cumulative effects reflects the actual ground-based results. **Biological Resources Table 18** quantifies the cumulative effects to plant communities stratified by community type. "Mojave creosote scrub" refers to the creosote bush-dominant desert scrubs that occur within the Mojave Desert region of the California Desert geographic subdivision (Hickman 1993). The transition to Sonoran Desert is mapped at the Bristol Mountains near the Twenty-Nine Palms Marine Corps Base and extends east and south through the NECO planning area, and encompasses the Project area.

Significant cumulative effects to plant communities from probable future projects (before mitigation) across the NECO planning area are seen in many community types: 228,363 acres of Sonoran creosote scrub (5.9 percent of the total habitat type in NECO), 43,320 acres of Mojave creosote bush scrub (5.4 percent), 48,167 acres of desert dry wash woodland (7.1 percent), and 18,634 acres of playa (21.1 percent). Project-specific compensatory mitigation measures—similar to those recommended in this Revised Staff assessment—are likely to be imposed for the future renewable energy projects; however, the combined impacts to habitat reflected in **Biological Resources Table 18** do not address the significant cumulative indirect effects to remaining habitat that can be expected from the past, present, and future projects: fragmentation and edge effects; alteration of the surface drainage patterns and fluvial and aeolian sand transport systems that maintain dune and dry playa habitats (which in turn support many special-status plant species); groundwater pumping impacts to mesquite groves and other phreatophytes; an increase in the risk of fire, and the introduction and spread of noxious weeds. The potential for spread of Sahara mustard is major concern because it is already infesting many areas on and adjacent to the Project and it has the potential to spread explosively if not carefully managed. Sahara mustard has been reported to be toxic to desert tortoise and other herbivores, and is an immediate threat to several special-status plant occurrences. Climate change is expected to exacerbate the effects of drought and noxious weed spread.

The combined effect of the Project and existing and future probable impacts in NECO and Chuckwalla Valley is cumulatively considerable. The Project contributes substantially to the combined effect from all probable future projects in Chuckwalla Valley to Sonoran creosote bush scrub (10.2%), and 100% of the cumulative impacts to playa and sand drifts over playa (a NECO-sensitive natural community). Sonoran creosote bush scrub is a common and widespread community in the southeastern deserts of California; however, this broad designation does not reflect the uncommon and even rare plant assemblages within the alliance of creosote bush that have been documented by the CDFG Vegetation Committee (CDFG 2003); nor does it reflect the reasonably anticipated indirect effects described above. The Project's contribution to

these impacts would be minimized to a level less than cumulatively considerable with implementation of the following conditions of certification: **BIO-12** for acquisition of 1,864 acres of Sonoran creosote bush scrub; **BIO-21** for acquisition and protection of 132 acres of desert washes and desert dry wash woodland within or adjacent to the Chuckwalla-Ford Dry Lake watershed; **BIO-20** for the acquisition and protection of 190 acres of dunes or other sandy landforms within Chuckwalla Valley; **BIO-14** for weed management; **BIO-24** for revegetation of temporarily disturbed areas using locally native seed; and **BIO-25** and **BIO-26** for monitoring of groundwater-dependent vegetation and remedial action in the event of adverse effects.

**Biological Resources Table 18
Cumulative Effects: Natural Communities**

Natural Communities – NECO				
Plant Community*	Total Plant Communities* in NECO	Impacts to Habitat from Existing** Projects (Percent of all Community type in NECO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in NECO)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects) ¹
Mojave Creosote Scrub	805,832 acres	6,233 acres 0.8%	43,320 acres 5.4%	0 acres
Sonoran Creosote Scrub	3,829,999 acres	22,815 acres 0.6%	228,363 acres 5.9%	1,773 acres**** 0.8%
Desert Dry Wash Woodland/Microphyll Woodland****	682,027 acres	8,457 acres 1.2%	48,167 acres 7.1%	16 acres**** 0.03%
Playa/Dry Lake**** (including sand drifts over playa margins)	88,110 acres	961 acres 1.1%	18,634 acres 21.1%	37 acres**** 0.2%
Sand Dunes****	62,140 acres	14 acres 0.02%	175 acres 0.3%	1 acre**** 0.6%
Chenopod Scrub	2,113 acres	480 acres 22.7%	0 acres	0 acres
Agriculture, Developed	94,187 acres	N/A	1,017 acres 1.1%	0 acres
Pinyon-Juniper Woodland	1,928 acres	0 acres	0 acres	0 acres
Natural Communities – Chuckwalla Valley				
Plant Community*	Total Plant Communities* in NECO	Impacts to Habitat from Existing** Projects (Percent of all Community type in NECO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in NECO)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects) ¹
Sonoran Creosote Scrub	403,760 acres	6,657 acres 1.6%	17,306 acres 4.3%	1,773 acres**** 10.2%
Desert Dry Wash Woodland/Microphyll Woodland****	148,856	4,645 acres 3.1%	10,950 acres 7.4%	16 acres**** 0.03%
Playa/Dry Lake****	13,696 acres	950 acres 6.9%	0 acres	37 acres**** 100%
Sand Dunes****	18,705 acres	0 acres	168 acres 0.9%	1 acre**** 0.6%
Chenopod Scrub	474 acres	72 acres 15.2%	0 acres	0 acres
Agriculture, Developed	9,345 acres	N/A	568 acres 6.1%	0 acres

*Based on the BLM NECO Plant Communities dataset (BLM CDD 2002) conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division UC Santa Barbara GAP Analysis (1996), updated during the NECO planning effort (see Appendix H of the NECO (BLM and CDD 2002)

** Includes only those existing projects between Desert Center and the Colorado River for which GIS-based spatial data was available at the time of the analysis; see Biological Resources Table 9

*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 9

****Acreages reflect the ground-based and field-verified delineation of habitats, including the 1 acre adjustment for removal of the 41.4 acre "toe" (TTEC 2010o).

Landforms

Biological Resources Table 19 reflects the cumulative impacts to landforms within the NECO planning area, stratified by landform and based on the NECO landforms dataset. Like the NECO plant communities mapping dataset, the landforms dataset was also based on aerial photo interpretation with some ground-truthing, but is less accurate than ground-based and field-verified delineations of habitat. However, the landforms dataset was in considerable alignment with the ground-based and verified habitat mapping.

As illustrated below, and illustrated spatially in **Biological Resources Figure 20**, the cumulative effects of all future (proposed) projects to dunes, playas, and plains are significant. Dunes and sandy plains also provide habitat for several rare plants and animals in the Chuckwalla region, most notably Mojave fringe-toed lizards, Harwood's milk-vetch, Harwood's eriastrum, Abram's spurge, jack-ass clover, and a potentially new species of saltbush recently discovered on the margins of Palen Dry Lake (Andre pers. comm.). The Project contributes—at least incrementally—to these significant cumulative effects. The Project also contributes to cumulatively considerable indirect effects to these NECO- and CNDDDB-sensitive habitats, including interrupted aeolian (wind-deposited) and fluvial (water-deposited) sand transport systems, both of which contribute to the maintenance and sustainability of dune habitats; groundwater pumping (lowering groundwater tables has also been demonstrated to influence dune morphology [Langford et al 2009]); habitat fragmentation and degradation from roads and increased vehicle and human disturbance; an increase in avian predators of dune species from the increase in perching sites; and the spread of invasive non-native plants such as Sahara mustard, which is believed to be toxic to desert tortoise and other herbivores and can spread explosively in response to disturbance.

The Project's contribution to significant cumulative effects to sandy plains, sand drifts over playa, and dunes would be minimized to a level less than cumulatively considerable through implementation of staff's proposed Condition of Certification **BIO-20**. This requires acquisition of 190 combined acres of dunes, playa and sandy plains within Chuckwalla Valley. The Project's contribution to the cumulative loss of alluvial fans and bajadas is minimized through **BIO-12**, which requires protection of 1,864 acres of Sonoran creosote bush scrub, which inhabits these landforms that occur between the valley floor and the base of the adjacent mountains. The Project's contribution to the cumulative loss of desert washes will be addressed through **BIO-22**; 132 acres of desert washes and desert dry wash woodland would be protected within the Ford watershed or adjoining watersheds.

The Project's contribution to cumulatively significant indirect effects would be minimized to a level less than cumulatively considerable through implementation of Conditions of Certification **BIO-13** (Raven Management Plan), **BIO-14** (Weed Management Plan), **BIO-24** (revegetation of temporarily disturbed areas using locally native seed), and **BIO-25** and **BIO-26** (monitoring of groundwater-dependent vegetation and remedial action in the event of adverse effects).

**Biological Resources Table 19
Cumulative Effects: Landforms/Wildlife Habitat**

NECO Landform*	Total Landform* in NECO	Impacts to Habitat from Existing** Projects (Percent of all landform type in NECO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all landform type in NECO)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects) ¹
Alluvial Fans/Bajadas	2,997,468 acres	42,619 acres 1.4%	217,761 acres 7.3%	1,809 acres 0.8%
Sand Dunes	150,136 acres	3,755 acres 2.5% of total	17,027 acres 11.3% of total	1 acre**** 0.2%
Pediments	139,282 acres	1,715 acres 1.2% of total	1,263 acres 0.9% of total	0 acres
Plains	408,453 acres	75,687 acres 18.5% of total	48,117 acres 11.8% of total	0 acres
Badlands	79,141 acres	40 acres 0.05% of total	1,203 acres 1.5% of total	0 acres
Lava Flows	180 acres	0 acres	0 acres	0 acres
Riverwashes	137,265 acres	1,475 acres 0.1% of total	6,896 acres 5.0% of total	74 acres**** 1.1%
Dry Playas	62,106 acres	1,348 acres 2.2% of total	9,423 acres 15.2% of total	37 acres**** 0.4%
Mesas	6,843 acres	2 acres 0.03%	0 acres	0 acres
Tilted Plateaus	8,979 acres	0.1 acres 0.001%	3,762 acres 42.0% of total	0 acres
Mountains	609,023 acres	1,468 acres 0.2% of total	8,682 acres 1.4% of total	0 acres

*Based on the NECO Landforms dataset (BLM CDD 2002); acreages for dunes and playa from this dataset differ from the acreages based on an analysis using the NECO plant communities dataset, due to differences in methodology, minimum mapping polygons, etc. Actual project-specific field survey data concluded that the project would directly affect 1 acres of stabilized and partially stabilized dunes.

** Includes only those existing projects between Desert Center and the Colorado River for which GIS-based spatial data was available at the time of the analysis; see T Biological Resources Table 9

*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in T Biological Resources Table 9

****Acreages reflect the ground-based and field-verified delineation of habitats, including the 1 acre adjustment for removal of the 41.4 acre "toe" (TTEC 2010o).

Desert Dry Wash Woodland

Biological Resources Table 20 highlights the cumulative effects of existing and future projects to desert dry wash woodland within the immediate watershed encompassing the Project (**Biological Resources Figure 21**). The NECO plant communities dataset was used for this analysis, which is based largely on aerial photo interpretation. The Project's field-verified, ground-based delineation (TTEC 2010I) documented 16 acres of desert dry wash woodland (a microphyll woodland) along jurisdictional state waters features in the project footprint that would be directly impacted and reflects the field-verified, ground-based delineation of waters of the state. The NECO dataset and GIS-

based analysis showed a 165-acre area of desert dry wash woodland. The differences are presumably based on different methodologies (remote versus ground-based delineation) and different criteria for 'membership' in the microphyll woodland category; however, a large polygon of desert dry wash woodland that occurs just outside of the Project footprint along the Palen Wash may also account for the difference in acreage between the field-based delineation and the mapping of woodland in the NECO plant communities dataset, assuming the aerial photos were taken at different times and at different angles. Staff relies on the field-verified and ground-based delineation of habitats. The terms 'desert dry wash woodland' and 'microphyll woodland' are used interchangeably by Holland (1986) Barbour & Keeler-Wolf (2007) and in practice by BLM.

According to CEQA guidelines, seemingly minor impacts can be significant if they affect an extremely rare or limited resource, and the cumulative impact may be substantial. Desert dry wash woodland is a sensitive natural community recognized under many LORS and area plans. Because it has a limited distribution (relative to common and widespread communities such as Sonoran creosote bush scrub) and carries an ecological importance that is disproportionate to its limited extent, staff considers the combined loss of approximately 7 percent of desert dry wash woodland from future impacts to be a significant cumulative effect—an effect to which the Project contributes at least incrementally. Desert dry wash woodland and other wash-dependent habitat that occurs within the stream environment is regulated under Section 1600 of the California Fish and Game Code. These habitats are also recognized as sensitive communities in the NECO plan (BLM CDD 2002) and CNDDDB (CDFG 2003).

This GIS analysis of direct habitat loss does not reflect the equally significant indirect effects that could be reasonably expected to result from all or most of the proposed future projects, including the Genesis Project: interrupted geomorphic processes downstream of the stream diversions and the loss of sediments critical to many rare plants; diverted stream flows and deprived stream reaches; fragmentation of the remaining habitat and diminished habitat function and value for wildlife; and invasion by tamarisk (a highly invasive noxious weed that displaces native riparian vegetation and depletes shallow groundwater). Miles of standing dead ironwood trees north of I-10 in the Corn Springs Area are a testament to the effects of channel diversions—even small channels—on desert riparian trees.

The Project's contribution to cumulatively significant desert dry wash woodland impacts would be minimized to a level less than cumulatively considerable through a variety of measures. Condition of Certification **BIO-22** specifies acquisition and enhancement of 48 acres of desert dry wash woodland (16 acres mitigated at a 3:1 ratio) within or adjacent to the Chuckwalla-Ford Dry Lake watershed. The Weed Management Plan (**BIO-14**) would include tamarisk as a target for management, and **BIO-19**, Section A (special-status plant mitigation) specifies the modification of the engineered channel design to ensure that the discharge of the diverted flows is revised to align with the existing natural drainages delineated between the Project and Ford Dry Lake.

**Biological Resources Table 20
Cumulative Effects: Desert Dry Wash Woodland**

Desert Dry Wash Woodland – Chuckwalla Valley				
Plant Community*	Total Plant Communities* in Chuckwalla Valley	Impacts to Habitat from Existing** Projects (Percent of all Community type in Chuckwalla Valley)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in Chuckwalla Valley)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects)
Desert Dry Wash Woodland/Microphyll Woodland	148,856 acres	4,645 acres 3.1%	10,950 acres 7.4%	16 acres**** 0.15%
Desert Dry Wash Woodland – NECO				
Plant Community*	Total Plant Communities* in NECO	Impacts to Habitat from Existing** Projects (Percent of all Community type in NECO)	Impacts to Habitat from Foreseeable Future*** Projects (Percent of all Community type in NECO)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects)
Desert Dry Wash Woodland/Microphyll Woodland	682,027 acres	8,457 acres 1.2%	48,167 acres 7.1%	16 acres**** 0.03%

*Based on the BLM NECO Plant Communities dataset (BLM CDD 2002) conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division UC Santa Barbara GAP Analysis (Davis et al. 1998), updated during the NECO planning effort (see Appendix H of the NECO (BLM- CDD 2002).

** Includes only those existing projects for which GIS-based spatial data was available at the time of the analysis; see Biological Resources Table 9.

*** Includes only BLM Renewables that had submitted a Plan of Development at the time of the analysis.

****Acreages reflect the ground-based and field-verified delineation of habitats, including the 1 acre adjustment for removal of the 41.4 acre "toe" (TTEC 2010o).

Active Dune Habitat in Chuckwalla Valley

This analysis highlights the cumulative effects of existing and proposed future projects on the most active portions of the dune ecosystem in Chuckwalla Valley: landforms mapped in the NECO landforms dataset as crescentic dunes, longitudinal dunes, and undifferentiated dunes. The Chuckwalla Valley dunes is a system that is isolated and distinct from other dune systems in NECO, and, like the Palo Verde mesa and Cadiz Valley areas, it is an area that would be disproportionately affected by proposed renewable energy projects.

Dunes provide essential habitat for a disproportionate number of special-status animals and plants. Locally these species include: Mojave fring-toed lizard; Harwood's eriastrum; Harwood's milk-vetch; jack-ass clover; Abram's spurge; several rare cryptantha species, and a potentially new species of saltbush (*Atriplex* sp. nov. J. Andre) recently discovered around the margins of Palen Dry Lake (documented) and Ford Dry Lake (reported). In nearby Coachella Valley, the dune ecosystems are home to a wide variety of rare and endemic, threatened and endangered plants and animals, including several rare dune endemic invertebrates. Dunes are also BLM NECO sensitive communities and recognized as rare natural communities in the CNDDDB (CDFG 2003). As noted above, even seemingly minor impacts may be considered significant if they affect an extremely rare or limited resource.

Biological Resources Table 21 and **Biological Resources Figure 20** quantifies the cumulative effects of the existing and future projects on “active” dune formations in the NECO planning area; the extent of other less active aeolian-deposited and stream-deposited sands within the aeolian sand transport corridor are better reflected in the habitat model for Mojave fringe-toed lizard (**Biological Resources Figure 8 and 9**, and **Biological Resources Table 14**). The habitat model for Mojave fringe-toed lizard includes also sandy plains, and sand-covered alluvial fans; all or portions of these landforms appear to be located within the wind-sand transport corridor but occur in the less active outer portions beyond the more active dunes (Worley-Parsons 2010c, 2010d; Collison 2010).

The direct loss of habitat quantified in **Biological Resources Table 21** is only part of the picture of cumulative effects; staff also considers the Project’s likely indirect effects, which, when combined with similar effects from other probable future projects, are severe. These include: the degradation and eventual loss of habitat from obstructions in the wind transport corridor; depriving the dunes downwind of the fine windblown sands that build and maintain the habitat and ensure its suitability for Mojave fringe-toed lizard. In the absence of regular fresh input of fine, windblown sands, the deprived dunes quickly become stabilized, vegetate, compact, and develop a surface lag of coarse sand or gravel that combine to render the habitat unsuitable for the many plants and animals that have evolved to the unique, always shifting, natural disturbance regime of the dunes. The Project contributes at least incrementally to this cumulatively significant effect. Other reasonably foreseeable indirect effects of existing and future impacts to dune habitat not reflected in this quantitative analysis include: fragmentation and degradation of remaining habitat by roads and the resulting loss of gene flow between isolated populations; unauthorized off-road vehicles increased by the construction of new roads into previously inaccessible areas, altered drainage patterns, and the spread of noxious weeds such as Russian thistle and Sahara mustard, which prematurely stabilize the dunes and make the habitat less suitable for dune-dependent rare plants and fringe-toed lizard (Barrows pers. comm; Barrows et al. 2009; Griffiths et al. 2002). Habitat values for dependent wildlife are also affected by increased predation from avian predators, which benefit from the new perching structures that the solar facilities provide. Recent research in New Mexico has confirmed that groundwater is a key feature that contributes to dune morphology; dune fields are shaped by a feedback between aeolian dynamics and groundwater chemistry (Langford et al. 2009). The combined effects of groundwater pumping may also cause a significant cumulative effect on dune habitat, an effect to which the Project contributes at least incrementally.

Biological Resources Table 21 illustrates the significant cumulative effects to active dunes expected to occur in the Chuckwalla Valley; over 1,600 acres of active dunes would be directly affected by habitat loss alone. Please also see **Biological Resources Figure 8 and 9**, and **Biological Resources Table 15** for a summary of the Mojave fringe-toed lizard habitat model, which includes sandy plains and sand-covered alluvial fans (in addition to more active dune landforms). All or portions of these landforms are located within the wind-sand transport corridor but occur in the less active outer portions beyond the more active dunes (barchan dunes, etc.).

The combined loss of dune habitat from the Project and other probable future projects is a significant. Although the Project’s contribution to the loss of habitat is less than

cumulatively considerable, it also contributes to a significant-to-severe cumulative effect from all the anticipated indirect effects described above. According to CEQA guidance, in situations where the cumulative impact is severe, even small incremental impacts may be cumulatively considerable. The Project's contribution to these effects would be minimized to a level less than cumulatively considerable through implementation of the following conditions of certification: **BIO-20** for acquisition and protection of 190 acres of dunes and sand drifts over playa in Chuckwalla Valley; **BIO-13** (Raven Management Plan); **BIO-14** (Weed Management Plan); **BIO-24** (revegetation plan for temporary disturbance), and **BIO-25** and **BIO-26** for monitoring groundwater-dependent vegetation and remedial action in the event that adverse effects are detected.

**Biological Resources Table 21
Cumulative Effects: Active Dune Habitat**

Total Dune habitat* in Chuckwalla Valley	Impacts to Dune Habitat from Existing** Projects (Percent of all dune habitat in Chuckwalla Valley)	Impacts to Dune Habitat from Foreseeable Future*** Projects (Percent of all dune habitat in Chuckwalla Valley)	Contribution of GSEP to future cumulative impacts (Percent of total impacts from Future projects) ¹
25,463 acres	1,049 acres 4.1% of total	1,607 acres 6.3% of total	0 acres**** (1 acres/1.7%)

¹ = Acreages adjusted to reflect removal of the 41.4 acre "toe" (TTEC 2010o).

*Based on the BLM NECO Landforms dataset (BLM CDD 2002) for the following values: crescentic dunes, longitudinal dunes, and undifferentiated dunes. Actual project-specific field survey data concluded that the project would directly affect 28 acres of stabilized and partially stabilized dunes. Additionally, approximately 453 acres of habitat downwind of the solar fields would be indirectly affected (**Soil & Water Appendix A**).

** Includes only those existing projects between Desert Center and the Colorado River for which GIS-based spatial data was available at the time of the analysis; see Biological Resources Table 9

*** Includes only BLM Renewables that had submitted a Plan of Development (POD) at the time of the analysis and those additional future projects listed in Biological Resources Table 9

**** Acreage shown based on NECO landforms dataset (BLM CDD 2002); Applicant's ground-based delineation of habitat shown in parentheses () below (GSEP 2009a).

SPECIAL-STATUS PLANTS

Staff's analysis of cumulative impacts to special-status plants relied on three types of analyses: 1) a quantitative GIS-based analysis of impacts to essential habitat using NECO landforms and/or natural community datasets, and the USGS National Hydrographic Dataset; 2) a careful review of the Consortium of California Herbaria (CCH 2010) to determine if there were additional documented occurrences that were not already included in CNDDDB (2010) and 3) the occurrence data was loaded into an ESRI GIS-based web application that allowed staff to view all CNDDDB and CCH occurrences overlain on various jurisdictional, biological, landform, utility, USGS topographic maps and aerial imagery. This allowed staff to better understand a species' threats and management vulnerabilities relative to probable future renewable energy projects throughout their range, their distance and proximity to projects or features, their peripheral status, their eco-geographic variation or diversity, potential for fragmentation and other indirect effects from nearby development, and ownership and management threats to remaining occurrences. A complete list of datasets that were utilized in this web-application is included in staff's analysis of direct impacts to plants (see Section C.2.4.2).

Many new occurrences of Harwood's milk-vetch have been found at three of the proposed solar projects in the I-10 corridor; in a good rainfall year, it appears to be fairly well distributed in the dune habitats in the Chuckwalla Valley. Of the 46 total

occurrences (CNDDDB and CCH); 11 are historical occurrences and of the remaining 35, no more than 10 appear to be protected in federal wilderness or state park ownership. Of the 25 occurrences not protected, 10 of these would be affected by renewable energy projects alone. It is important to note, however, that survey data from the proposed projects has not yet been incorporated into CNDDDB, and the preliminary data. Staff also expects that many of these new occurrences would also be directly or indirectly affected by the Projects whose surveys resulted in their discovery.

Significant cumulative indirect effects that are likely to occur include: altered drainage patterns, disrupted wind- or fluvial-sand transport processes, fragmentation of the habitat and reduced gene flow between isolated populations, the spread of non-native plants, and an increased risk of fire. Climate change is expected to exacerbate the effects of drought, and CO₂ concentration has already been demonstrated to promote the spread of invasive plants. Global warming is expected to disproportionately affect annual species in the Sonoran Desert region, according to a recent study by the University of Arizona.

Biological Resources Table 15 and **Biological Resources Figure 23** quantifies the cumulative effects of the BLM renewable energy projects and other existing and future projects to the sandy substrates associated with this special-status plant. The NECO landforms dataset was used; landforms selected to create the simple model of potential habitat include sandy dissected fans, sandy plains, fans, dissected fans, undifferentiated plains, and undifferentiated dunes. This was based on a careful review of the landforms dataset overlaid with known occurrences of Harwood's milk-vetch from CNDDDB occurrences and the Project-specific survey data. Staff expects that this model somewhat over-represents actual suitable habitat for Harwood's milk-vetch but it cannot be refined until the more detailed soil mapping for the region is available (currently in development by the Natural Resources Conservation Service). However, the mapping of habitat should not be misconstrued to conclude that all the habitat is potentially occupied; rare plants have very specific microhabitat requirements that are often poorly understood. Actual distribution within mapped habitat is often confined to small or scattered and infrequent occurrences within an already restricted range. Rare plants can also sometimes be locally abundant but highly restricted in their range. Harwood's milk-vetch habitat would be disproportionately affected (almost 9 percent of its habitat in NECO) by the push for renewable development in NECO, and the species' range in California is nearly restricted to the NECO planning area. In the Chuckwalla Valley, 12.9% of its habitat is affected by probable future projects and 8.3% has already been lost (see **Biological Resources Table 15** for Mojave fringe-toed lizard, which occupies similar sandy habitat). The loss of habitat quantified in the GIS analysis does not reflect the combined indirect effects of spread of noxious weeds, fragmentation and reduced gene flow among isolated populations from existing and future projects.

The combined loss of Harwood's milk-vetch habitat, the cumulative indirect impacts to documented occurrences, and the ownership and management threats to remaining occurrences are cumulatively significant. Although the Project's contribution to these effects may be small, it contributes, at least incrementally to a significant cumulative effect. According to CEQA guidance, in situations where the cumulative impact is substantial, even small incremental impacts may be cumulatively considerable.

Other species restricted to dune and playa habitats, washes and other sandy habitats have occurrences outside of federal wilderness or state park lands and are threatened by renewable energy development, but the cumulative effects to Harwood's milk-vetch are of particular concern due to the position of many occurrences in the immediate vicinity of probable future projects and the likelihood of significant indirect effects. These include: lobed ground cherry, Las Animas colubrina, Abram's spurge, jack-ass clover, California and glandular ditaxis. Harwood's eriastrum is somewhat more affected than these aforementioned plant species, and dwarf germander and flat-seeded spurred have very few documented occurrences in California. They also have occurrences that are not protected in federal wilderness designation or in national or state park ownership.

Populations of most special-status plants in this region of California were considered relatively stable until recently, as the push for renewable energy development has placed many plants and occurrences at risk. The Project's contribution to these effects, and to cumulative effects to other special-status plants found in the Project area, would be less than cumulatively considerable through implementation of the following conditions of certification: **BIO-19**, which includes detailed specifications for avoidance and minimization measures, and criteria and performance standards for off-site mitigation through acquisition of rehabilitation of degraded populations; **BIO-20** for acquisition and protection of 190 acres of dunes and sand drifts over playa in the Chuckwalla Valley; **BIO-14** (Weed Management Plan), and **BIO-22** for acquisition of desert washes (at a 3:1 ratio) in the Chuckwalla-Ford Dry lake watershed.

It is likely that implementation of **BIO-19** will require compensatory mitigation, and avoidance and minimization measures for impacts to special-status plants, and the dunes, playas, sand drifts, and desert washes that support the majority of rare plants in the valleys and low-lying areas affected by renewable energy development. There may be cumulative impacts after mitigation is implemented by all projects, but due to the mitigation implemented by the Project, its contribution would be less than cumulatively considerable. The residual cumulative effects from all future projects, after mitigation could be addressed through a regional and coordinated planning effort aimed at preserving and enhancing remaining populations and their essential habitat, and restoring degraded populations.

Groundwater-Dependent Vegetation

The groundwater cumulative impact analysis (see **Soil and Water Resources**, Section C.7.4.2) indicates that groundwater extraction during construction and operation of this and other foreseeable projects would place the basin into an overdraft condition. This impact may be exacerbated by other unidentified renewable energy projects in the I-10 corridor, which has been targeted as a potential area for further renewable energy development. However, staff concluded that the amount of water that is stored in the basin greatly exceeds the amount of cumulative overdraft, even taking into account other reasonably foreseeable future projects, rendering the project's contribution to this cumulative impact less than cumulatively considerable.

Nevertheless, the proposed Project would have an impact on the deep aquifer groundwater levels within the area immediately surrounding the proposed Project pumping well. The area of potential affect surrounding the well is estimated to extend

approximately 10 miles out from the Project pumping well by the end of Project operation. The Applicant has stated that pumping from the deeper aquifer would not affect the shallow alluvial-fill aquifer that supports groundwater-dependent vegetation within this zone of potential effect based on the presence of low permeability clay layers between the shallow and deep aquifers observed at the test well onsite, and that characteristically occur around lakebeds. However, the calculations and assumptions used to evaluate potential groundwater level impacts are imprecise and have limitations and uncertainties associated with them such that the magnitude of potential impacts that could occur cannot be determined precisely.

Although the Project's contribution to the cumulative effects of probable future projects to drawdown of the spring baseline water tables is minor—due in part to its position at the far east end of the valley—it contributes, at least incrementally to a significant, and potentially severe, cumulative effect. According to CEQA guidance, in situations where the cumulative impact is substantial, even small incremental impacts may be cumulatively considerable. Implementation of Conditions of Certification **BIO-25**, **BIO-26**, and **SOIL& WATER-3**, **-4**, and **-5** would ensure that the Project's proposed use of groundwater and effect on groundwater dependent vegetation would be less than cumulatively considerable, **BIO-25** provides detailed specifications, minimum standards, and reporting requirements for monitoring the groundwater-dependent vegetation and spring groundwater levels within the 10-mile area of effect around the Project pumping well. **BIO-26** outlines the thresholds for remedial action and performance standards for the mitigation in the event that adverse effects are detected.

Overview: Cumulative Impacts to Biological Resources of the Chuckwalla Valley

The indirect effects of past, present, and foreseeable future development of the Chuckwalla Valley will contribute cumulatively to the overall loss of dune habitat, desert washes, and the fragmentation and degradation of the remaining habitat for Mojave fringe-toed lizard and several dune-dependent rare plant species. The indirect cumulative effects of development on dune ecosystems are not represented in the GIS analysis of direct habitat loss, but such effects are well documented in Coachella Valley—a comparable and suitable reference site from which conclusions may be reasonably drawn about the environmental stressors and their effects. The Chuckwalla Valley system, although not nearly as fragmented as Coachella Valley, has already been adversely affected in many ways. Proposed renewable energy development in Chuckwalla Valley could threaten what remains of the habitat and places several populations at risk—most notably, the local Chuckwalla Valley population of the Mojave fringe-toed lizard. Past and present impacts in Chuckwalla Valley that have already contributed to a decline in the quality and extent of aeolian dune habitat, habitat for Mojave fringe-toed lizard and dune-dependent rare plant species, desert washes and wash-dependent vegetation, include:

- Compaction and habitat degradation from historic military training operations during World War II;
- Past off-road vehicle use and present/future unauthorized use around Ford Dry Lake;
- Past sheep grazing around Ford Dry Lake;

- Electric and Natural Gas Transmission line construction;
- Road construction associated with the transmission construction;
- Construction and operation of the Wiley Wells Rest Stop;
- Construction of Interstate 10 and the network of diversion dikes south of I-10;
- State Highway 177 and a network of both paved roads and unimproved roads;
- Urban and agricultural conversion around Desert Center (8,424 acres);
- Blythe Energy and DPV 1 transmission lines and access roads; and
- Construction of the Colorado Aqueduct; and
- Chuckwalla Valley State Prison

Dikes associated with I-10 limit the depositional area of the Chuckwalla Mountains bajada to the south (upstream) of I-10 and concentrate the flows into three discrete channels, where historically numerous small channels fanned out over large areas contributing to fluvial sediment to the aeolian system. The downstream effects of these diversions are striking, severe, and very apparent throughout the I-10 corridor to the north, and in comparisons of current and historical photos. The perimeter stormwater conveyance channels proposed with nearly every solar project would closely mimic these downstream effects to fluvial transport systems. Russian thistle, a noxious weed, has replaced native plant diversity in some dune habitats. More recently, Sahara mustard has invaded the valley and spread explosively since it was introduced some decades ago. Invasive plants increase fire frequency and are correlated with population declines of milk-vetch and fringe-toed lizard in Coachella Valley (Barrows and Allen 2007).

A list of the existing and probable future projects considered in the NECO-wide analysis of cumulative effects is provided in **Biological Resources Table 9**. A subset of probable future renewable energy projects that occur in Chuckwalla Valley are listed below, including those that occur in the portion of the valley and dune system south of I-10.

Reasonably foreseeable future actions that will further contribute to the loss of habitat, desert washes and wash-dependent vegetation, and to the fragmentation and degradation of dunes and adjacent habitat for fringe-toed lizard and dune-dependent rare plant species in Chuckwalla Valley include:

- Palen Solar Power Project (3,001 acres)
- Genesis Solar Energy Project (1,797 acres)
- Chuckwalla Solar 1 (4,091 acres)
- EnXco 2 (Solar Energy Project, 1,325 acres)
- First Solar – Desert Sunlight (5,119 acres)

On the dunes south of I-10:

- Colorado Substation (approximately 80 acres)
- DPV 2 and Desert Southwest transmission lines and access roads
- LightSource Renewables – Mule Mountain II
- Altera - Mule Mountain (6,618 acres).

In the Coachella Valley, blocked sand/wind corridors have been shown to lead to sand compaction and premature stabilization of the dunes, increased mean grain size (which reduces habitat suitability for fringe-toed lizards), and aeolian habitat loss. Stabilization of the dunes is also aggravated by an increase in invasive exotic plants, introduced through soil disturbance and an increase in vectors (vehicles). Invasive plants are correlated with decreases in the rare dune-endemic species of milk-vetch, fringe-toed lizard, and endemic sand-treader crickets in Coachella Valley.

Road construction associated with new solar projects and their related transmission corridors further degrade and fragment the habitat, and lead to an increase in vehicle traffic and encroachment in previously undisturbed areas. Unpaved roads into the valley interior and historical grazing have led to a dramatic increase in noxious weed invasion over large areas of dunes and surrounding habitat. New roads into otherwise undisturbed portions of the valley also lead to an increase in vehicle-related mortality, and habitat destruction from unauthorized off-road vehicle use. Human encroachment, agriculture, and development around Desert Center are also accompanied by an increase in predators, such as ravens. These indirect cumulative effects on dune-dependent species are particularly acute in isolated, fragmented habitats that lack the buffering effects of connectivity to larger populations. All of these stressor and effects are documented to have led to the decline of dune ecosystems in Coachella Valley and can reasonably be expected to occur in Chuckwalla Valley with future development.

C.2.8.8 CONCLUSION

Construction and operation of the Genesis Project will contribute, at least incrementally, to a significant cumulative effect in nearly every resource area analyzed. Cumulative impacts in some areas—impacts to dunes and playa habitat, desert washes, Harwood’s milk-vetch—are substantial. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. Cumulative impact assessments cannot conclude that contributions to cumulative impacts are not significant merely because the contributions represent a small percentage of the overall problem.

The biological resources cumulative effects analysis employed a quantitative, GIS-based analysis of direct impacts to habitat and a qualitative analysis of indirect effects (e.g., increases in predators, noxious weeds, etc.). In many cases, the anticipated indirect impacts are more significant, or adverse, than the direct loss of habitat, but are more difficult to quantify. In preparing the qualitative assessment of indirect cumulative effects, staff relied on consultations with regional experts and agency biologists, a literature review of the threats to species and their habitats, and documented observations and studies from Coachella Valley, a dune system west of Chuckwalla

Valley that supports many related species and similar habitats (Barrows 1996; Barrows & Allen 2007; CVAG 2007; Griffiths et al. 2002; Katra et al. 2009; Turner et al. 1984; Weaver 1981; Barrows pers. comm.).

The geographic scope of the cumulative effects analysis varied between the biological resources. Many of the analyses used the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries (BLM-CDD 2002). The NECO boundary closely approximates the boundaries of the Eastern and Northern Colorado Desert Tortoise Recovery Units; however, the recovery unit boundaries extend slightly to the north and west of the NECO boundary. For some resources, a different geographic scope was warranted, such as the use of watershed boundaries to analyze cumulative effects to desert washes, or the Chuckwalla Valley region of the I-10 corridor for populations or dune systems restricted to that geographic area.

Significant cumulative effects (including indirect effects) were identified in a number of biological resource areas where the Project contributes—at least incrementally—to the cumulative effect. These include:

- Desert washes – Chuckwalla - Ford Dry Lake Watershed and the broader NECO planning area;
- Desert tortoise habitat;
- Golden eagle foraging habitat;
- Mojave fringe-toed lizard and their habitat;
- Habitat for American badger, desert kit fox, and burrowing owl;
- LeConte's thrasher habitat;
- Couch's spadefoot toad range;
- Habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants;
- Wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe toed lizard, dunes, and playa);
- Mojave and Sonoran creosote bush scrub; desert dry wash woodland (microphyll woodland); playa and sand drifts over playa, and dunes (active and stabilized)

Of particular concern are the cumulative effects of renewable energy projects within the geographic scope of the Chuckwalla Valley, which contains an isolated system of dunes and population of Mojave fringe-toed lizard. The direct loss of dune habitat and Mojave fringe-toed lizard is minor relative to the indirect downwind effects from obstructions within the active aeolian sand transport corridor, and the disruption of the fluvial processes that contribute sand to the system from the diversion of washes – approximately 63 miles of washes within the Chuckwalla-Ford Dry Lake watershed alone. Lessons learned from decades of study at nearby Coachella Valley (a comparable and suitable reference site from which conclusions may be reasonably drawn about Chuckwalla Valley) suggest that these indirect effects are significant and adverse. In addition to the disruption of geomorphic processes, significant indirect effects that can be reasonably expected to occur in the Chuckwalla system from future

projects include fragmentation and its effects on connectivity and gene flow; spread of invasive non-native plants; increase in avian predators, and; an increase in vehicle-related wildlife mortality.

In a recent study “Climate Change and the Future of California's Endemic Flora” (Loarie et al 2009), anticipated climate change is projected to cause greater than 80 percent reductions in range size for up to 66% of California's endemic species within a century. These results are comparable to other studies, but projected reductions depend on the magnitude of future emissions and on the ability of species to disperse from their current locations. California's varied terrain could cause species to move in very different directions, breaking up present-day floras. However, these projections also identify regions where species undergoing severe range reductions may persist. Protecting these potential future refugia and facilitating species dispersal will be essential to maintain biodiversity in the face of climate change (Loarie et al 2009). These include the cooler, more mesic microclimates of the mountainous areas, which may protect significant components of biodiversity into the next century. Many of these areas are already in some degree of federal wilderness protection. However, the value of these refugia depends critically on the ability of species to disperse, underscoring the importance of landscape connectivity and potential restoration in the face of increasing urbanization, land use change, and disturbance.

The proposed Project is expected to contribute to a cumulative reduction in greenhouse gases. However, the benefits gained by the Project's reduction in greenhouse gases must also be weighed against the potential loss of carbon sequestration benefits from the desert vegetation and biological soil crusts.

A recent study conducted in the Mojave Desert found that the desert soil ecosystems could represent a significant carbon sink (Campbell et al. 2009). Whether a result of biotic crusts, vegetation, alkaline soils, or an increase in average precipitation, the rate of carbon absorption in the soil has scientists considering whether desert ecosystems play a more critical role in the carbon cycle than previously believed (Stone 2008; Campbell et al. 2009). Some scientists, however, dispute these findings and attribute them to an anomaly caused by increased rain for the study period reported (Campbell et al. 2009). A study is currently underway by the University of Oregon “to determine whether the installation and operation of solar thermal plants will impact carbon sequestration capabilities of the Mojave Desert ecosystem and ecosystem services (assessment endpoint) to the extent that more carbon is released or inhibited from being stored than saved while utilizing solar technology.” (Campbell et al. 2009). Until the dispute is resolved, staff expects that the answer may vary somewhat on a case-by-case basis. For example, project sites that are very sparsely vegetated with only a minor component of soil crusts may confer less sequestration capabilities than sites with a rich cover of biological soils crusts and succulent desert scrubs.

Nevertheless, there is little dispute that the loss of desert vegetation and biological soil crusts on a solar thermal plant site permanently eliminates the carbon sequestration benefits, and the soil disturbance during grading and construction releases the stored carbon back into the atmosphere. Staff believes that the cumulative loss of sequestration benefits and release of stored carbon from all past, present, and probable future projects is likely to be significant. With implementation of the avoidance and

minimization measures (**BIO-8**), revegetation plan for temporarily disturbed area (**BIO-24**), compensating for habitat loss by preventing the future development of desert lands through acquisition and permanent protection under conservation easements (**BIO-12**, **BIO-19**, **BIO-20** and **BIO-22**), restoring degraded portions of acquired lands (**BIO-12** and **BIO-19**), minimizing the size of the disturbance area along the linears (**BIO-8** and **BIO-19**), and revegetating after closure and decommissioning (**BIO-23**), the Project's contribution to the cumulative effects described above would be less than cumulatively considerable.

Compliance with the mitigation measures identified by staff would reduce the Project's contribution to cumulative effects to a level that is less than cumulatively considerable. There may be cumulative effects after mitigation is implemented by this project, but mitigation would reduce this project's contribution to a level that is not cumulatively considerable. These residual cumulative effects from all past, current, and future projects could be addressed through a regional and coordinated planning effort aimed at: preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors, and identifying and preserving important refugia to facilitate species dispersal and maintain biodiversity in the face of climate change.

In addition to addressing the residual ecological impacts, after mitigation to less than significant levels, these coordinated planning efforts by state and federal agencies must also address the cumulative loss of carbon sequestration benefits from the loss of desert vegetation and biological soil crusts, and the concurrent release of stored carbon back into the atmosphere during grading and construction is significant. These could be addressed through coordinated planning efforts aimed at: creating incentive programs for energy efficiency and conservation; funding research that analyzes alternative energy options that are less land intensive; reducing the number of permitted projects and creating solar exclusion zones in areas of high ecological values and carbon sequestration potential; restoring or better utilizing degraded desert lands; and restoring the carbon sequestration benefits of damaged desert (and especially) forest ecosystems elsewhere (Campbell et al. 2009).

Ongoing collaborative efforts by federal and state agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS offer an appropriate forum for such planning. **Appendix B** describes the Desert Wildlife Management Area management strategies that could achieve the goals of preservation and enhancement of wildlife connectivity in the NECO planning area. Staff supports these programmatic efforts and believes they represent an excellent means of integrating the State's and BLM's renewable resources goals and environmental protection goals.

C.2.9 COMPLIANCE WITH LORS

The proposed Project must comply with state and federal laws, ordinances, regulations, and standards that address state and federally listed species, as well as other sensitive species and their habitats.

C.2.9.1 STATE LORS

Under the Warren-Alquist Act (Public Resources Code § 25500) the Energy Commission's certificate for thermal power plants 50 MW and more is "in lieu of" other state, local, and regional permits (*ibid.*). Staff has incorporated all required terms and conditions that might otherwise be included in state permits into the Energy Commission's certification process. When conditions of certification are finalized they would satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following state permits:

Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the proposed Project could result in the "take" of desert tortoise, listed as threatened under CESA. Energy Commission staff's proposed Condition of Certification **BIO-12** specifies compensatory mitigation for desert tortoise habitat loss at a 1:1 ratio. Energy Commission staff have concluded that this funding and mitigation approach would ensure compliance with CESA.

Streambed Alteration Agreement: California Fish and Game Code §§ 1600 1607.

Pursuant to these sections, CDFG typically regulates all changes to the natural flow, bed, or bank, of any river, stream, or lake that supports fish or wildlife resources. Construction and operation of the Project would result in direct impacts to 91 acres of waters of the state and 21 acres of indirect impacts. Staff's proposed Condition of Certification **BIO-22** would minimize and offset direct and indirect impacts to state waters and would assure compliance with CDFG codes that provide protection to these waters.

C.2.9.2 FEDERAL LORS

The Genesis Project is located on federal land under BLM's jurisdiction and is therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan (BLM 1999). As an amendment to the CDCA Plan, BLM produced the Northern and Eastern Colorado Coordinated Management Plan (NECO) (BLM CDD 2002). The NECO Plan provides for conservation and management of special status species through a system of management areas including: Desert Wildlife Management Areas (DWMAs), multi-species Wildlife Habitat Management Areas (WHMAs), bighorn sheep WHMAs, Areas of Critical Environmental Concern (ACEC), and wilderness areas.

- **Desert Wildlife Management Areas (DWMA)** are general areas recommended by the Desert Tortoise Recovery Plan (USFWS 1994) within which recovery efforts for the desert tortoise would be concentrated. DWMAs had no specific legal boundaries in the 1994 Recovery Plan. The BLM formalized the general DWMAs from the 1994 Recovery Plan through its planning process and administers them as Areas of Critical Environmental Concern (see below). The linear facilities south of I-10 pass through the Chuckwalla DWMA.
- **Area of Critical Environmental Concern (ACEC)** are specific, legally defined, BLM designations where special management is needed to protect and prevent

irreparable damage to important historical, cultural, scenic values, fish and wildlife, and natural resources or to protect life and safety from natural hazards. Besides the Chuckwalla DWMA/ ACEC, the Genesis Project is not included within a designated ACEC, but the Palen Dry Lake ACEC is located to the west.

- **Critical Habitat** consists of specific areas defined by the USFWS as areas essential for the conservation of the listed species, which support physical and biological features essential for survival and that may require special management considerations or protection. Critical habitat for the desert tortoise was designated in 1994, largely based on proposed DWMAs in the draft Recovery Plan. The linear facilities overlap with 23 acres of the Chuckwalla Desert Tortoise Critical Habitat Unit.
- **Wildlife Habitat Management Areas** address other special status species and habitat management in the NECO, and include two kinds: one for bighorn sheep, one for all other special status species and habitats. Bighorn sheep WHMAs overlay the entire range of their occurrence and movement corridors. Multi-species WHMAs are complementary to existing restricted areas and DWMAs, which also cover other special status species and habitats. The plant site and portions of the linear facility routes are situated within the Palen-Ford Multi-Species WHMA.
- **Wilderness Area** The Project is contiguous and south of the 259,000-acre Palen/McCoy Wilderness, which includes the Granite, McCoy, Palen, Little Maria and Arica Mountains, five distinct mountain ranges separated by broad sloping bajadas.
- **Endangered Species Act (ESA; 16 USC Section 1531 et seq.).** Potential take of the desert tortoise, listed as threatened by the USFWS, requires compliance with the federal Endangered Species Act (ESA) (16 USC §§ 1531 et seq.). “Take” of a federally-listed species is prohibited without an Incidental Take Permit, which would be obtained through a Section 7 consultation between BLM and the USFWS. The Applicant will submit a Draft Biological Assessment (BA) for the Project to BLM, and when BLM has reviewed and made appropriate revisions to the draft BA it will be submitted to the USFWS so that the formal Section 7 consultation process can be initiated.
- **Bald and Golden Eagle Protection Act (Title 16, United States Code, Sections 668-668c)** A recently issued Final Rule (September 2009) provides for a regulatory mechanism under the Bald and Golden Eagle Protection Act (Eagle Act) to permit take of bald or golden eagles comparable to incidental take permits under the ESA. This rule adds a new section at 50 CFR 22.26 to authorize the issuance of permits to take bald eagles and golden eagles on a limited basis. The proposed Project could potentially result in “take” of the golden eagle from disturbance to nesting pairs as well as loss of foraging habitat. Implementation of Condition of Certification **BIO-28** would avoid of golden eagles by monitoring eagle nests during construction and implementing adaptive management measures. Staff’s proposed Condition of Certification **BIO-12** requires the acquisition of desert tortoise habitat that would also provide suitable eagle foraging habitat. While acquisition does not address the net loss of foraging habitat in the immediate future, it would prevent future losses of habitat by placing a permanent conservation easement and deed restrictions on

private lands. With implementation of staff's proposed Conditions of Certification **BIO-28** and **BIO-12** the proposed project would be in compliance with the Eagle Act.

C.2.10 NOTEWORTHY PUBLIC BENEFITS

The Genesis Project and the proposed alternative would result in significant impacts to sensitive biological resources, and would permanently diminish the extent and value of native plant and animal communities in the region. Staff has therefore concluded that the Genesis Project would not provide any noteworthy public benefits related to biological resources, despite the contributions the Project would make to meeting federal and state mandates for development of renewable energy resources.

C.2.11 RESPONSE TO PUBLIC AND AGENCY COMMENTS

Staff received comments on the Biological Resources section of the SA/DEIS and on the November 23, 2009 Notice of Intent to Prepare an Environmental Impact Statement. Comments on biological resources were received from the following parties:

- California Unions for Reliable Energy, May 13, 2010
- Kenneth Waxlax, Peter Murray and Associates Real Estate, May 7, 2010
- Defenders of Wildlife, December 23, 2009
- Western Watersheds Project, December 23, 2009
- Center for Biological Diversity, December 23, 2009
- California/Nevada Desert Energy Committee of the Sierra Club, December 23, 2009
- Californians for Renewable Energy, December 23, 2009
- U.S. Environmental Protection Agency , November 30, 2009

California Unions for Reliable Energy Letter Dated May 13, 2010

CURE Comment #1: CURE comments that the SA/DEIS lacks the information necessary to analyze the Project's potentially significant impacts, and therefore the SA/DEIS must be revised to inform the public and decision makers of the Project's significant impacts, and to avoid or reduce environmental damage when possible by requiring alternatives or mitigation measures.

Staff Response: Staff does not agree that more information is needed to come to conclusions about the significance of Project impacts to biological resources, or to develop mitigation measures that would reduce impacts to less than significant levels. For those few areas in which staff is still awaiting survey results (i.e., late season rare plant and golden eagles), staff has developed mitigation measures based on conservative assumptions that sensitive biological resources may be directly or indirectly impacted by the Project. Staff has assumed that golden eagles could be nesting in close proximity to Project construction, and has measures in **BIO-28** to monitor the nest territories during construction and has recommended mitigation to avoid disturbance to nesting activities. Similarly, even if late summer/fall floristic surveys detected an extremely rare plant species on

the Project site, **BIO-19** provides all the tools needed to avoid and minimize significant impacts, including specifications for avoidance and minimization measures, thresholds for assessing significance of impacts to late season special-status plants and conditions under which avoidance or off-site mitigation would be required, and detailed guidelines for off-site mitigation through acquisition or restoration/enhancement. **BIO-19** includes detailed performance standards, monitoring, and reporting requirements for the mitigation.

CURE Comment #2: CURE comments that the SA/DEIS' baseline method, in some instances, blatantly violates the requirements of CEQA. By relying upon incomplete data, the SA/DEIS did not adequately establish the environmental setting for biological resources in the Project area, a necessary prerequisite to conducting an adequate impact analysis under CEQA.

Staff Response: CEQA requires a description of the physical environmental conditions in the vicinity of the project and notes the importance of knowledge of the regional setting in assessing impacts, and further specifies that special attention be paid to biological resources that are rare or unique to the region (Section 15125 (a) and 15125(c)). A discussion of baseline conditions in the Project site and vicinity is presented in subsection C.2.4.1, and contains a level of detail sufficient to allow staff to assess the impacts of the Project. Although some biological survey results were unavailable, staff had access to sufficient data to establish regional knowledge and reasonable assumptions regarding the presence of biological resources within the project area and vicinity (i.e., baseline) and, where necessary, supplemented the Applicant's data through coordination with local experts and regulatory agencies to ensure a full understanding of the Project site.

CURE Comment #3: CURE comments that the SA/DEIS' baseline method, in some instances, blatantly violates the requirements of CEQA. By relying upon incomplete data, the SA/DEIS did not adequately establish the environmental setting for biological resources in the Project area, a necessary prerequisite to conducting an adequate impact analysis under CEQA.

Staff Response: To establish a proper environmental baseline for floristic species, staff consulted with numerous local botanical experts on the development of potentially occurring plant species, the rarity of these species, and their likelihood of occurrence in the Project area. Staff also relied on a thorough GIS analysis of the distribution and range of late-season special-status plants throughout the Sonoran Desert and eastern Mojave Desert of California, and consulted a wide variety of sources. These are described in detail in the impact analysis of this Revised Staff Assessment. Staff agrees that late summer/fall surveys are necessary and has revised **BIO-19** to require the applicant to conduct late-season fall surveys for a number of late-blooming plant species that can only be detected during summer and/or fall months. The data and information the botanical experts provided were also used in the development of an appropriate late-season plant survey protocol provided in **BIO-19**. Although complete rare plant survey results were not available for staff in preparation of the Revised Staff Assessment, staff used the best available

scientific information to assess Project impacts to special-status plants, and provided detailed and specific triggers for mitigation and performance standards for avoidance, minimization, and compensatory mitigation to ensure that any special-status plants found are mitigated to a level less-than-significant.

CURE Comment #4: CURE comments that the SA/DEIS fails to provide an adequate description of the environmental setting, analysis, and identification of mitigation for these rare plants. CURE also notes that although the SA/DEIS attempts to analyze the impacts and formulate mitigation measures for special-status plants, this analysis may bear little resemblance to the analysis and mitigation that will be required after significant impacts to rare plants are actually identified through an adequate survey effort.

Staff Response: Please see staff's response to CURE comments #1 and #2 regarding establishing floristic baseline conditions. Staff has revised proposed Condition of Certification **BIO-19** which implements a suite of mitigation measures as well as late summer/fall floristic surveys. It also requires that the Applicant implement plant impact avoidance and minimization measures during construction, finalize the draft special-status plant impact avoidance and minimization plan, and incorporate the monitoring of these measures into the Project's Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP, **BIO-7**), among other measures. Also, **BIO-19** includes a step-wise approach to implementation of—and appropriate mitigation for—future findings of rare plants on the Project site. Should future floristic surveys detect previously unknown populations of plants, a framework for comprehensive conservation strategies is already in place for the Applicant, and developed in conjunction with the resource agencies. While it is impossible to accurately predict the late season special-status plants that have potential to occur; staff has undertaken a conservative approach by assuming that late-season special-status plants may occur, and analyzed all the late-season plants documented to occur within a nine-quadrangle area centered on the Project. At least ten additional species were added as a result of consultation with experts in the flora of the region. Staff looked at the full range of possibilities, identified the most likely to occur with input from botanical experts, and prepared triggers and performance standards for mitigation of any unanticipated finds.

CURE Comment #5: CURE comments that the SA/DEIS finds that the Applicant failed to conduct focused spring surveys for golden eagle nest sites or breeding pairs and failed to assess whether the Project site is used by wintering golden eagles. Therefore, the SA/DEIS does not provide an adequate basis for analysis of potential impacts and development of mitigation measures, and cannot make a finding regarding consistency with the Bald and Golden Eagle Protection Act, as required by the Warren-Alquist Act.

Staff Response: Eagle surveys are in progress and results were unavailable at the time of RSA publication. Therefore staff evaluated the potential for the Project to injure or disturb golden eagles with the assumption that an active golden eagle territory might occur within 10 miles of the proposed project; this includes breeding and wintering golden eagles. The recommendation for assessing golden eagle territories with 10 miles of the Project boundaries is based on staff's

USFWS guidance (Pagel et al. 2010). Accordingly, Condition of Certification **BIO-28** was developed to avoid and minimize impacts to golden eagles. Acquisition of compensatory habitat for desert tortoise would mitigate potential cumulative impacts attributable to loss of foraging habitat (**BIO-12**). Staff determined in the RSA that potential direct, indirect, and cumulative impacts to golden eagles would be less than significant with implementation of staff's proposed conditions of certification (i.e., **BIO-12, 14, 20, 22, and 28**). As described in section C.2.9.2 of the RSA, take (e.g., disturbance) would not occur with implementation of staff's proposed conditions of certification and the Project would therefore be in compliance with the federal Bald and Golden Eagle Protection Act.

CURE Comment #6: CURE comments that the SA/DEIS states that the Applicant's surveys for Couch's spadefoot toads "were not conducted during the proper season (i.e., after summer rains)." Thus, the SA/DEIS requires additional surveys to identify potential spadefoot toad breeding habitat. CURE also comments that the SA/DEIS fails to provide an adequate description of the environmental setting, analysis and identification of mitigation for Couch's spadefoot toad, and that CEQA requires that staff include the analysis outlined in **BIO-27** in the Revised SA, not in a mitigation plan that will be provided by the Applicant after Project approval. Thus, the SA/DEIS failed to provide an adequate analysis and identification of mitigation for Couch's spadefoot toad.

Staff Response: The SA/DEIS text does not, and is not meant to, require surveys at a specific time of year to determine breeding habitat. Potential breeding habitat can be identified throughout the year by identifying areas of possible water impoundment. Breeding habitat has been identified in the Project area, and an impact analysis is included in the SA/DEIS, subsection C.2.4.2. Provisions for further surveys to identify breeding habitat are required pursuant to **BIO-27**, and impact avoidance, minimization, and mitigation measures protect the known breeding site near Wiley Well Road as well as any other breeding sites within the Project site.

CURE Comment #7: CURE comments that although the SA/DEIS attempts to analyze the impacts (and formulate mitigation measures) for the golden eagle, this analysis may bear little resemblance to the analysis (and mitigation) that will be required after significant impacts to golden eagles are actually identified through an adequate survey effort. Hence, the SA/DEIS fails to provide an adequate analysis and identification of mitigation for the golden eagle.

Staff Response: In the RSA, staff evaluated the potential for the Project to injure or disturb golden eagles with the assumption that an active golden eagle territory might occur within 10 miles of the proposed project. Subsequent survey results would not change this analysis and/or mitigation (i.e., **BIO-28**).

CURE Comment #8: CURE comments that SA/DEIS lacks effective, feasible mitigation for numerous impacts it identifies as significant. CURE states that by deferring the development of specific mitigation measures, the SA/DEIS has effectively precluded public input into the "efficacy" or "feasibility" of those measures. Thus, additional mitigation measures must be included in a Revised SA that is circulated to the public and provides a meaningful opportunity for public review and comment.

Staff Response: Consistent with the requirements of CEQA, the conditions of certification presented in the RSA are both effective and feasible. The conditions specifically identified by CURE as deficient are discussed in the following responses to comments.

CURE Comment #9: CURE comments that the following conditions of certification are examples of improper deferral of mitigation that deprive the public of any opportunity to review and submit comments on feasibility: **BIO-7, BIO-10, BIO-13, BIO-14, BIO-15, BIO-16, BIO-18(3), BIO-19, BIO-23, BIO-25, BIO-26, and BIO-27.** CURE states, “the SA/DEIS illegally defers identification of each of the above-listed mitigation measures until after certification of the Project. Until the above-listed mitigation measures are identified and evaluated, the Energy Commission lacks substantial evidence to make a finding that each of the mitigation measures listed above will reduce the particular impacts to a less than significant level. The Commission will also not know if it must consider making findings of overriding considerations. Thus, these plans and measures must be developed now, during the environmental review process, and be included in the Revised SA that is circulated for public review and comment.”

Staff Response: The conditions of certification identified by CURE require the development of agency-approved final plans prior to construction or operation of the proposed project. The conditions contain well-defined performance standards, and measures within the plans are designed to achieve those performance standards, as required by the respective condition of certification. If the plan’s performance standard is achieved, which is required by the conditions of certification, impacts would be less than significant. Finalized plans are not required for the Commission to make its findings pursuant to CEQA and Energy Commission regulations.

CURE Comment #10: CURE comments that **BIO-20** requires the Applicant to acquire compensation lands to mitigate for the direct and indirect impacts to Mojave fringe-toed lizard habitat. However, there is no evidence that qualifying lands exist. The compensation lands must be identified now in order to ensure that significant impacts to Mojave fringe-toed lizards are adequately mitigated.

Staff Response: Staff and other parties (AECOM 2010b) have assessed the availability of privately held mitigation lands within the Chuckwalla Valley that meet the criteria described in **BIO-20** and have determined that sufficient acreage is available to fulfill this mitigation measure. Staff conducted its own independent GIS analysis of potential mitigation lands by overlaying ownership boundaries, parcel data, and the NECO landforms dataset on aerial photo and topographic base maps. Staff concluded that there were ample opportunities for acquiring qualifying lands within the Chuckwalla Valley.

CURE Comment #11: CURE comments that **BIO-19(3)** requires the Applicant to acquire compensation lands to mitigate for potential impacts to four special-status plant species, including Abram’s spurge, glandular ditaxis, flat-seeded spurge, and lobed ground cherry without determining whether there is evidence that qualifying lands exist. Thus, CURE states, the mitigation measure may not be “capable of being accomplished in a successful manner...”. CURE claims that the compensation lands must be

identified now in order to ensure that significant impacts to special-status plants are adequately mitigated.

Staff Response: **BIO-19** of the Revised Staff Assessment provides an option for compensatory mitigation through land acquisition or qualifying habitat enhancement/restoration projects. Moreover, avoidance and minimization measures are required for all protected plant occurrences. This is consistent with the CEQA definition of “mitigation” (14 Cal. Code Reg. 15370 of the CEQA Guidelines): avoiding; minimizing; rectifying; reducing or eliminating the impact over time; and compensating by providing replacement or substitute resources or environments. Thus, even if 100 percent of the compensation lands were unavailable, the impact can still be mitigated through enhancement measures on, or adjacent to existing occurrences, on public or private land. The threat of Sahara mustard to the future of special-status plants in Chuckwalla Valley and similar habitats in the region is second only to habitat loss. There are ample opportunities for rehabilitation of degraded or threatened special-status plant occurrences within Chuckwalla Valley and the range of the species, and **BIO-19** includes strict and detailed performance standards for such projects. **BIO-19** also allows for the compensatory mitigation to occur anywhere within the species’ range in California, as threats are documented throughout their range. **BIO-19** includes equally specific criteria and reporting and verification requirements for acquisition. **BIO-19** also includes triggers for mitigation of any late-season plants detected during the required summer-fall surveys. Staff conducted an independent assessment of the availability of private lands that contain occurrences or provide important buffer or connectivity lands within the range of the species affected or with the highest potential for occurrence. Staff used a GIS-based web application that allowed staff to view all special-status plant occurrences in the CNDDDB dataset and from the California Consortium of Herbaria, overlay on various jurisdictional, biological, landform, utility, USGS topographic maps and aerial imagery for ease of identifying ownership and management opportunities.

CURE Comment #12: CURE comments that **BIO-26** requires the Applicant to implement “remedial action” if the Project causes a decline in spring water tables and a decline in the vigor of groundwater dependent vegetation, but states that the “remedial action” is yet to be defined. CURE claims that the SA/DEIS fails to provide any evidence that any action can be taken to adequately mitigate significant impacts to groundwater dependent vegetation, and concludes that, as written, **BIO-26** is not a feasible mitigation measure.

Staff Response: Staff defined several remedial actions in the SA/DEIS (see “**Impacts to Groundwater-Dependent Vegetation during Construction and Operation**” pages C.2-100 and C.2-101 of the SA/DEIS). Condition of Certification **BIO-26** has been revised to include remedial measures discussed in the analysis. The Project owner may choose the most feasible method providing it meets the performance standard of restoring the spring water table to baseline levels. The analysis includes a discussion of the importance of the spring water table levels to healthy ecological functioning. Remedial measures must include one of the following measures to meet the performance standard of restoring the

spring groundwater tables to baseline levels: 1) Relocating the Project pumping well to another location farther from the groundwater-dependent vegetation (and where the dependent vegetation is no longer within the drawdown cone of depression), or—alternatively—constructing a new well farther away and reducing water usage in the well closest to the dependent plant communities; 2) Reducing the Project water usage through water conservation methods or new technologies.

Relocating the Project pumping well farther from the affected groundwater-dependent vegetation would address the impact by reducing or eliminating groundwater use in the vicinity of the phreatophytic communities; the influence of the well on groundwater decreases with distance. There is relatively little vegetation of this kind in the valley as it occurs only in areas with a relatively shallow water table (e.g., less than approximately 100 feet in depth). It occurs around the margins of the two dry lake beds. Staff does not expect that the groundwater usage would affect the ironwood forest in Palen Wash, or the ironwood and Palo Verde trees that occur along the many washes leading to the lakebeds; however, staff has insufficient data on which to base such an assumption. Staff therefore recommends that the monitoring of vegetation prescribed under **BIO-25** include a representation of the ironwood and Palo Verde stands in the valley and on Palen Wash, where they occur within the estimated 9 to 10-mile zone of potential effect (at end of operation).

Based on the performance standards for remedial action described above, staff has concluded that with implementation of Conditions of Certification **BIO-25** and **BIO-26**, impacts to groundwater-dependent plant communities would be reduced to less than significant levels.

CURE Comment #13: CURE comments that **BIO-27** attempts to mitigate significant impacts to Couch's spadefoot toad by requiring the Applicant to "create additional breeding habitats" if the breeding pond south of I-10 cannot be avoided. CURE states that there is no evidence that breeding ponds for Couch's spadefoot toad can be created successfully, and states that the measure fails to provide any guidance for the successful creation of breeding habitats for Couch's spadefoot toad. **BIO-27** must be revised to include success criteria. In addition, the Applicant should be required to monitor the created breeding habitats to ensure success. As it stands, **BIO-27** is not a feasible mitigation measure.

Staff Response: Staff believes that creating suitable spadefoot toad breeding habitat is highly feasible because this species readily breeds in ephemeral artificial impoundments such as stock tanks and pools that form at the base of road and railroad grades (Morey 2005). Staff agrees that performance criteria are needed and has added language to **BIO-27** to require monitoring of the created ponds to ensure they hold water for at least 9 days during the spadefoot toad breeding season.

CURE Comment #14: CURE comments that **BIO-8(#9)** requires the Applicant to use "[a] continuous low-pressure technique...for steam blows, to the extent possible, in order to reduce noise levels in sensitive habitat..." **BIO-8(#9)** is vague and uncertain. There is

no evidence that the measure will in fact reduce impacts to biological resources to a less than significant level.

Staff Response: Staff has revised BIO-8 (#9) to require avoidance of loud construction noises during from February 15 to April 15 if it would result in noise levels over 60 dBA in nesting habitat.

CURE Comment #15: CURE comments that **BIO-19** requires that avoidance and minimization measures be implemented to preserve special-status plant occurrences, including the use of existing roads “wherever possible” and the requirement to “minimize” ground-disturbing activities. These measures are vague and uncertain. There is no evidence that the measures will in fact reduce impacts to biological resources to a less than significant level. The SA/DEIS must therefore be revised to include specific, enforceable mitigation measures. Until then, impacts to special-status plants remain significant.

Staff Response: Staff has revised **BIO-19** to require the applicant perform late-season botanical surveys for special-status plant species. Staff has also added conditions to **BIO-19** which establish specific, enforceable mitigation including performance standards and a range of options for the applicant to achieve mitigation to less than significant levels. Lastly, the verification of this condition includes the specifics that require the applicant and agencies to commit to carrying out this condition for special-status plant species.

CURE Comment #16 CURE comments that **BIO-21** is also vague and uncertain. The SA/DEIS must define “sufficient duration and intensity” and provide evidence that the surveys will provide an “accurate assessment of bird and wildlife use of the ponds.” As it stands, BIO-21 is unenforceable. Thus, impacts to biological resources from evaporation ponds remain significant and unmitigated.

Staff Response: Condition of Certification **BIO-21** has been revised to define “sufficient duration and intensity” as a minimum of two hours following sunrise (i.e., dawn), a minimum of one hour mid-day (i.e., 1100 to 1300), and a minimum of two hours preceding sunset (i.e., dusk).

CURE Comment #17: CURE comments that **BIO-23** is vague and uncertain. The measure provides no indication as to what “relatively natural condition” means. Thus, the success of the measure is uncertain. There is no certainty that the measure will accomplish the goal of reducing significant impacts to below a level of significance. Further, there is no certainty that the measure can be carried out at all.

Staff Response: Staff has revised **BIO-23** to require the Decommissioning and Reclamation Plan to be consistent with the provisions set forth in the BLM’s 43 C.F.R. section 2805.12 and 3809.500-.599.

CURE Comment #18: CURE comments that **BIO-15** is vague and uncertain. To mitigate for significant impacts to birds from construction noise, the SA/DEIS requires preconstruction surveys for nesting birds. However, the SA/DEIS fails to describe the survey methods to be used. The SA/DEIS should provide information on the specific methods that will be used to conduct the pre-construction nesting bird surveys. The

SA/DEIS should describe how well-concealed or camouflaged nests will be located and not adversely affected by Project activities. In addition, the SA/DEIS should discuss the methods that will be used to minimize surveyor-induced predation, nest disturbance, and abandonment. This information is crucial to evaluating whether the proposed mitigation will reduce noise impacts to a less than significant level. Because the SA/DEIS fails to include this information, the proposed mitigation is uncertain, and impacts to biological resources from Project noise remain significant.

Staff Response: Staff has revised **BIO-15** to address CURE's concerns. The condition now specifies that the Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993), and that surveyors performing nest surveys shall not concurrently be conducting desert tortoise surveys. It also requires establishment of non-disturbance nest buffers that incorporate species-specific alert distances and flush initiation distances.

CURE Comment #19: CURE comments that Condition **BIO-18** of the SA/DEIS is vague and uncertain. Staff needs to clarify the extent to which the Applicant will be required to conform to CBOC guidelines. If the Applicant will not be held responsible for conducting all four phases called for in the CBOC guidelines, the SA/DEIS should specify the survey techniques expected of the Applicant, including the time of day surveys will be permitted.

Staff Response: Staff has revised **BIO-18** to address CURE's concerns. The condition now requires that monitor conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise.

CURE Comment #20: CURE comments that the ability to effectively survey for multiple species concurrently depends on the habits of the target species. The SA/DEIS should not assume that surveys for multiple species can effectively be conducted concurrently. Instead, the SA/DEIS must demonstrate that such surveys can be done concurrently, or the SA/DEIS must require that such surveys be conducted independently.

Staff Response: Staff has proposed individual conditions of certification for the following: desert tortoise, nesting birds, American badger and desert kit fox, burrowing owl, special-status plant species, and Couch's spadefoot toad. Each of the individual conditions of certification specify independent pre-construction surveys either following the agency recommended protocol for that species or has specified methods and parameter to be followed during surveys, if a formal survey protocol does not exist. Staff has revised the impact discussion for desert kit fox and American badger to state that pre-construction surveys performed concurrently for these ground-dwelling species would effectively identify the presence of each species. **BIO-15** and **BIO-18** have been revised to address CURE's concerns.

CURE Comment #21: CURE comments that the SA/DEIS' preconstruction survey requirement entails a Burrowing Owl Mitigation Plan if owls are detected within the Project area. Owls were detected during the Applicant's 2007 and 2009 surveys. CBOC guidelines call for mitigation for burrows occupied within the past three years. As a result, the SA/DEIS must require the Burrowing Owl Mitigation Plan to be prepared prior to construction for public review and comment.

Staff Response: Preparation of the Burrowing Owl Mitigation Plan requires site-specific, current information based on the results of surveys conducted immediately before construction, and therefore a plan cannot be prepared now and circulated for public review and comment. Staff's Condition of Certification **BIO-18** requires that the applicant prepare and submit for agency review and comment a Burrowing Owl Mitigation Plan prior to construction. This condition provides sufficient guidance so that all parties can understand the triggers for mitigation and the types and effectiveness of measures that will be implemented.

CURE Comment #22: CURE comments that the burrowing owl mitigation guidelines issued by CDFG recommend that the project sponsor 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 CDFG. The SA/DEIS must be revised to incorporate these guidelines into the conditions of certification.

Staff Response: **BIO-18** already requires long term management and monitoring of the 39 acres of compensatory mitigation land. In addition, staff has revised **BIO-18** to require five years of monitoring and management at the relocation area.

DEFENDERS OF WILDLIFE (DOW) LETTER DATED DECEMBER 23, 2009:

DOW Comment #1: DOW comments that the draft Environmental Impact Statement (DEIS) must include alternative project sites or locations, including those that may not fall under the jurisdiction of the BLM; project extent and electrical power generation that differ from the applicant's proposal; and the potential for different technology that may lead to lesser potential impacts on sensitive environmental resources. DOW comments that among the reasonable alternatives that should be analyzed is reduction in project size. They recommend the project exclude essentially all dune habitat and create a buffer zone of approximately 0.5 mile. This would protect the Mojave Fringe-toed Lizard, a BLM Sensitive species, and its habitat within the proposed project area.

Staff Response: Staff assessed several alternative sites and alternative configurations (including a reduced size alternative) to evaluate the impacts of those alternatives to biological resources in subsections C.2.5 through C.2.7. The **Alternatives** section of this report provides a detailed discussion of alternatives, including alternatives technologies. Since issuance of the SA/DEIS, the Applicant has initiated several project changes, including removing 41.4 acres of sand dune habitat from the easternmost portion of the Project footprint, reducing direct impacts to Mojave fringe-toed lizards and avoiding interference with the regional sand transport corridor. See subsection C.2.4.2 for further discussion.

DOW Comment #2: DOW comments that the Application for Certification (AFC) for the Genesis Solar Power Project submitted by the project proponent provides adequate detail of the species of plants, animals and their habitats that would be affected by the project, but they do not support the applicant's conclusions that the impacts would be rendered less than significant due to implementation of various mitigation and avoidance measures suggested by the applicant.

Staff Response: Staff believes that sufficient information was available with the AFC and subsequent Data Responses from the Applicant to arrive at conclusions about the significance of Project impacts to biological resources, and to develop mitigation measures that would reduce impacts to less than significant levels. These mitigation measures were developed in coordination with the resource agencies.

DOW Comment #3: The applicant has provided no avoidance measures to eliminate or reduce loss of habitat that supports Special Status Species, especially habitat for the Burrowing Owl and Mojave Fringe-toed Lizard. Capture and release of certain species that would be affected by the proposed project does not constitute avoidance or mitigation; rather, we consider these suggested actions as salvage operations.

Staff Response: Staff has provided species-specific avoidance, minimization and compensation measures for all of the special-status species that could occur in the Project area in conditions of certification. Staff agrees that capture and release of any species is a salvage measure carried out with the intention of avoiding direct construction impacts, and is a complement to other, higher-priority mitigation measures. Other efforts, such as Worker environmental training awareness (**BIO-6**), and Biological Resources Mitigation Implementation and Monitoring Plan (**BIO-7**), provide further, comprehensive measures designed to minimize Project effects upon Special Status Species. In addition, the Applicant has modified their Project footprint to eliminate 41.1 acres of their solar field which was intruding into a sand transport corridor, which reduced the impacts to Mojave fringe-toed lizards.

DOW Comment #4: DOW comments that permanent loss of approximately 2,000 acres of intact wildlife habitat and its associated species are significant and the proposed mitigation and avoidance measures contained in the applicant's AFC will not reduce the habitat loss.

Staff Response: Staff agrees that this habitat loss is significant for resident and migratory wildlife and has required compensation for these losses in Condition of Certification **BIO-12, BIO-20 and BIO-22**.

DOW Comment #5: DOW comment that the impacts from the proposed and other similar projects within the Chuckwalla Valley on designated WHMAs and their associated species need to be carefully analyzed. The long-term viability and management effectiveness of the WHMAs needs to be carefully analyzed.

Staff Response: Subsection C.2.4.2 and C.2.8 provide a detailed analysis of direct, indirect and cumulative impacts to plants, wildlife and habitats within the Chuckwalla Valley on designated WHMAs.

DOW Comment #6: DOW comment that the effect of the project on species movements within the area should be thoroughly examined, especially those of the Desert Tortoise, Mojave Fringe-toed Lizard, Mule Deer and Desert Bighorn. Based on the relatively remote location of the proposed project and its location across the middle of the outflow from Palen Wash, the analysis of impacts to species movements through the region should be carefully analyzed.

Staff Response: Subsections C.2.4.2 and C.2.8 provided a thorough analysis of Project impacts to desert tortoise, Mohave fringe-toed lizard, mule deer and desert bighorn sheep, and also considered impacts to species movements in this analysis.

DOW Comment #7: DOW comment that the impact of the project on deposition and maintenance of sand in dune and playa areas needs to be addressed especially since this medium supports significant numbers of Mojave Fringe-toed Lizards. Proposed drainage modification for control of precipitation runoff could have significant, long-term adverse impacts on the maintenance of dune habitats in the project area.

Staff Response: Staff has analyzed the direct and indirect impacts of the proposed project on the sand dune transport system in subsections C.2.4/2 and C.2.8. Additionally, in response to agency and public feedback, further Project refinements have been made, eliminating impacts to approximately 41.4 acres of stabilized and partially stabilized sand dune habitat located in a regional sand movement corridor, and to Sonoran creosote scrub habitat, and desert washes.

DOW Comment #8: DOW comment that the required mitigation for loss of dune and desert ephemeral wash habitats as per the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) Amendment to the CDCA Plan should be identified. It appears that loss of these habitats requires a project proponent to compensate at a ratio of 3 acres for every acre lost. The DEIS should also evaluate opportunities for such habitat compensation within the planning area and determine if any required habitat loss compensation opportunity exists.

Staff Response: Staff has required mitigation for impacts to sand dune habitat at a 3:1 ratio, as specified in NECO.

DOW Comment #9: DOW comments that the effects of water table drawdown on shallow aquifers including the Ford Dry Lake playa, Palen Dry Lake playa, and McCoy Spring need to be carefully analyzed. The effect of diversion of water from ephemeral streams on sand transport and deposition, vegetation communities and dependent wildlife should be analyzed.

Staff Response: Staff assessed the impact of the project to groundwater dependent vegetation and also evaluated the effects of water diversion on ephemeral streams and sand transport in subsection C.2.4.2.

DOW Comment #10: DOW comments that the cumulative impacts to species and their habitats in the Chuckwalla Valley region need to be analyzed. Trends in species populations and extent of habitats that BLM considers at-risk will be an important aspect of this analysis.

Staff Response: Subsection C.2.8 provides a thorough and quantitative analysis of cumulative impacts to habitat and sensitive species in the Chuckwalla Valley region.

DOW Comment #11: The DEIS must address the projected effects of global climate change on plants, animals and their habitats throughout the Chuckwalla Valley as part of the future environmental baseline. The future baseline condition should account for the existing impacts to species adaptation opportunities such as habitat lost and fragmented by highways, canals, fences and general development.

Staff Response: Subsection C.2.4.2 discusses the impacts of the project on listed species and other sensitive resources, and incorporates an assessment of climate change in this analysis. The cumulative impact analysis in subsection C.2.8 also considered the effects of climate change in their analysis.

Kenneth Waxlax Letter Dated May 7, 2010

Waxlax Comment #1: The commenter states that he is participating in a market study for the Coachella Valley Conservation Commission and that this study will be valuable in providing local parcel values for mitigation lands. Therefore, local land values should be used to accurately determine the appropriate mitigation costs for acquisition of mitigation lands.

Staff Response: Staff agrees that local land values should be used to accurately determine the appropriate costs for acquisition of mitigation lands, and is aware of the uncertainty associated with any estimate of future land acquisition costs. Staff is currently undertaking a more detailed analysis of anticipated land acquisition cost that would help refine the security estimates provided in the conditions of certification.

Waxlax Comment #2: The commenter states that the \$500 per acre estimate for acquisition of lands in the Chuckwalla Bench area may be accurate. However, the commenter does not believe it is accurate for all lands that might be acquired within the Colorado Desert Recovery Unit for all proposed solar projects in the region. In addition, based on previous sale rates at \$500/acre, it could potentially require several years to locate willing sellers at that price to acquire the needed mitigation acreage for solar projects in the region.

Staff Response: Staff agrees that the \$500/acre estimate may not reflect an accurate estimate for future land costs of suitable compensatory mitigation parcels within the Colorado Desert Recovery Unit. Staff is currently undertaking a more detailed analysis of anticipated land acquisition costs that would help refine the security estimates provided in the conditions of certification.

Waxlax Comment #3: The commenter states that proposed Condition of Certification **BIO-12** should be reworded to include language that summarizes all costs of land acquisition such as included in **BIO-22** and that clearly states that costs are subject to change based on market conditions.

Staff Response: Staff agrees and has made the suggested revision in proposed Condition of Certification **BIO-12**.

Waxlax Comment #4: The commenter states that the land values from the previously mentioned market survey should be used in the mitigation land acquisition calculations to more accurately estimate land acquisition costs. The commenter also states that there may be economies of scale for restoration and management of mitigation lands that may reduce the cost per acre below the \$1,450 per acre estimate.

Staff Response: Staff is analyzing the factors that may affect estimates of acquisition and management costs, including the referenced market survey, and agrees with the commenter that there are economies of scale to be achieved with large-scale restoration and management efforts.

Waxlax Comment #5: The commenter states that limiting acquisition of desert tortoise compensation lands to the Colorado Desert Recovery Unit precludes the potential to acquire lands in the Joshua Tree DWMA or lands on the western edge of NECO that may be critical to provide habitat for conservation of desert tortoise in the face of climate change.

Staff Response: The area referenced by the respondent largely pertains to the geographical area along the southern Little San Bernardino Mountains in the southeastern portion of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) area. This area is dominated by mountainous terrain that is largely intact without human obstructions to tortoise movement; there also is little threat of development due to absence of infrastructure and steep slopes. Mitigation parcels are typically prioritized by two criteria--biological value and degree of threat. The areas described by the commenter ranks low on both priority scales--steep topography, and therefore lower tortoise densities, with little threat from development. Land acquisition in this area would block up public land ownership where a BLM checkerboard pattern currently exists but would do little to offset impacts to desert tortoise connectivity.

The areas identified in the RSA as potentially suitable acquisition lands for desert tortoise compensatory mitigation (see Appendix B) better meet the criteria described above than the Coachella Valley-focused parcels mentioned by the commenter. Furthermore, acquiring mitigation lands in the area where the CVMSHCP plan and NECO overlap is problematic. Those parcels may be construed by some parties as counting towards the CVMSHCP rough-step formula, which functions as a governor to the pace of development. The formula prevents development from out-pacing conservation by more than 10 percent at any given point in time. Thus, as more conservation occurs (mitigation for solar projects), more development can occur as well. Therefore the acquisition of solar mitigation parcels in the CVMSHCP plan area may be interpreted by some

parties would as allowing Riverside County to approve more development on other private lands along the I-10 corridor that staff and the resource agencies are interested in protecting. However, since the CVMSHCP sets a cap on new development (approximately 90 percent of private lands will be conserved, 10 percent can be developed), the solar mitigation would only increase the rate of development, not the amount that could be lost in the future. With respect to climate change and the suitability of the areas targeted for compensatory mitigation for the Genesis Project, staff believes that these lands would facilitate desert tortoise movement in a future warmer climate scenario. On the west end, from Cactus City to Chiriaco Summit, desert tortoise movement upslope into Joshua Tree National Park would be facilitated with protection of the proposed lands. On the east end between the Chuckwalla and Palen mountains, desert tortoise movement up from the valley floor to the alluvial fans would be facilitated in both directions. Long-term latitudinal movements to the north would be facilitated at either end and in between.

Environmental Protection Agency Letter Dated December 11, 2009

EPA Comment #1: The EPA requested that the DEIS identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the Project area, and identify and quantify potential direct, indirect, and cumulative impacts to these resources. The EPA also recommended that the DEIS describe the condition of the land selected for the proposed project and disclose whether this land is classified as disturbed or impaired, identify measures to avoid and minimize habitat loss and fragmentation, discuss impacts of fence construction, effects of shade on vegetation, and effects of evaporation ponds on birds and other wildlife.

Staff Response: Staff has addressed all direct and indirect impacts associated with impacts to listed species (desert tortoise) and its critical habitat, and has also discussed impacts to other special concern species, in subsection C.2.4.2. The SA/DEIS also discussed the baseline condition of habitat and biological resources within the proposed Project area in subsection C.2.1. Subsection C.2.4.12 provides detailed conditions of certification that includes avoidance, minimization and compensation measures for habitat loss and fragmentation, impacts of fence construction, and evaporation ponds. The effect of shade is not addressed because this impact is not relevant to the kind of solar development proposed for this project.

EPA Comment #2: The EPA comments that it should be explained whether any ponded water associated with the project has the potential to attract wildlife, particularly migratory waterfowl. If there is potential for exposure of wildlife to contaminant in these waters then the EPA recommends identifying mitigation measures to avoid such impacts.

Staff Response: The proposed Project includes evaporation ponds, which staff considered a potential threat to waterfowl and other wildlife due to risk from toxic levels of selenium and other elements as well as hypersalinity. Staff's proposed Condition of Certification **BIO-21** requires the ponds to be netted to exclude birds and other wildlife and also requires a rigorous wildlife monitoring program.

EPA Comment #3: The EPA recommended that the SA/DEIS include an invasive plant management plan to monitor and control noxious weeds.

Staff Response: Staff's proposed Condition of Certification **BIO-14** provides guidance for preparation and implementation of a Weed Management Plan to monitor and control noxious weeds.

EPA Comment #4: The EPA recommends that the DEIS identify whether the proposed project is located within one of the solar energy study areas or in close proximity to one, and that staff consider the cumulative impacts associated with multiple large-scale solar projects proposed in the region and the potential impacts to endangered species and habitat.

Staff Response: Subsection C.2.8 provides a detailed and quantitative cumulative impact analysis for sensitive species and their habitat within the NECO planning area and the Chuckwalla Valley.

EPA Comment #5: The EPA recommends that BLM consider adopting a formal adaptive management plan to evaluate and monitor impacted resources.

Staff Response: Many of staff's proposed conditions of certification include adaptive management components, including **BIO-13** (Raven Management Plan), **BIO-15** (Avian Protection Plan), **BIO-16** (Pre-Construction Nest Surveys), **BIO-19** (Special Status Plant Impact Avoidance and Minimization), **BIO-24** (Golden Eagle Inventory and Monitoring), and **BIO-21** (Evaporation Pond Netting and Monitoring). **BIO-25** includes a detailed plan for monitoring groundwater-dependent vegetation within 10 miles of the Project pumping well, and triggers for implementation of remedial action. **BIO-25** describes the remedial action and the performance standard for success of the mitigation.

EPA Comment #5: The EPA recommends that the DEIS consider how climate change could potentially affect the proposed project, specifically within sensitive areas, and assess how the projected impacts could be exacerbated by climate change. The EPA also suggests that staff consider climate change in the cumulative impact analysis.

Staff Response Subsection C.2.4.2 discusses the impacts of the project on listed species and other sensitive resources, and incorporates an assessment of climate change in this analysis. The cumulative impact analysis in subsection C.2.8 also considered the effects of climate change in their analysis.:

Western Watersheds Project (WWP) Letter Dated December 23, 2009

WWP Comment #1: WWP comments that the NEPA/CEQA documents must describe, clearly characterize and identify the desert tortoise population that will be impacted by each alternative if the agencies are to take NEPA's requisite "hard look" at the environmental effects.

Staff Response: Subsection C.2.4.1 provides an assessment of the resident desert tortoise population on the proposed Project site. This assessment is inclusive of current literature and resource agency input. Using this information

staff has provided a detailed analysis of impacts of direct, indirect and cumulative impacts to desert tortoise in subsections C.2.4.2 and C.2.8.

WWP Comment #2: The Project Applicant describes the project sites as having no tortoise present although 2 carcasses were found in the zone-of-influence. Additional surveys should be conducted to confirm this. The EIS should also consider the status of the tortoises in the affected recovery unit.

Staff Response: Staff does not agree with the Applicant's characterization of the of desert tortoise habitat at the Project site. Subsection C.2.8 provides a detailed and quantitative analysis of impacts of the Project to desert tortoise with the assumption that the site could provide habitat for desert tortoise, and also addressed the impact of the project in the affected recovery unit.

WWP Comment #3: WWP comments that both the Ford Dry Lake project would disrupt connectivity between the Eastern Colorado Recovery Unit and the Northern Colorado Recovery Unit. This could reduce gene flow and impair desert tortoise recovery.

Staff Response: Staff addressed this potential impact in subsections C.2.4.2 and C.2.8, and agrees that connectivity could be affected by the Project. Staff has developed mitigation for this impact in proposed Condition of Certification **BIO-12**.

WWP Comment #4: WWP comments that the proposed evaporation ponds could lead to increased numbers of predatory ravens, coyotes, and other subsidized predators in the area. This could impair recovery in the adjacent Chuckwalla DWMA.

Staff Response: Staff agrees that the Project's evaporation ponds could attract ravens and other subsidized predators, and has proposed Condition of Certification **BIO-21** which requires the ponds to be netted to exclude ravens and other wildlife.

WWP Comment #5: WWP comments that desert tortoises could also be indirectly impacted by this project if OHV riders displaced from the Ford Dry Lake recreation area move to areas with higher desert tortoise values.

Staff Response: Ford Dry Lake and Dunes were formerly designated for OHV recreation, but now are closed to vehicles; therefore staff does not anticipate a significant increase in OHV use elsewhere in desert tortoise habitat as a result of the proposed Project.

WWP Comment #6: WWP comments that the NEPA/CEQA documents should provide a review of the direct, indirect and cumulative impacts of the proposed project on the tortoise of the Eastern Colorado and Northern Colorado Recovery Units, and all associated infrastructure including the roads and transmission lines.

Staff Response: Staff provides a review of the potential direct, indirect and cumulative impacts of the Proposed project on desert tortoise in subsections

C.2.4.2 and C.2.8, and provided mitigation for this impact in proposed Condition of Certification **BIO-12**.

WWP Comment #7: WWP comments that the project is located south of the Palen Mountains and south and west of the McCoy mountains and could provide connectivity for bighorn sheep moving between them. The NEPA/CEQA documents should review all direct, indirect and cumulative impacts to this species including impacts to linkage habitat and connectivity issues.

Staff Response: Staff provided an analysis of impacts of this and other nearby Projects to bighorn sheep connectivity, and addressed direct, indirect and cumulative impacts, in subsections C.2.4.2 and C.2.8.

WWP Comment #8: WWP comments that the EIS should carefully consider and analyze impacts to all State protected species such as burrowing owl, sensitive species, rare plants and Unusual Plant Assemblages (UPA) that would be affected by the project. It should provide detailed vegetation and wildlife maps to facilitate public input into the process.

Staff Response: Staff analyzed the impacts of the Project to burrowing owl, sensitive species, rare plants and sensitive plant communities in subsections C.2.4.2 and C.2.8, and provided avoidance, minimization and compensation measures for these impacts in the proposed conditions of certification. Detailed maps and figures on vegetation and wildlife records in and near the Project are available on the Energy Commission web page for this Project <www.energy.ca.gov/sitingcases/genesis_solar/index> Public input has been solicited and addressed through noticed meetings, electronic mail listservers, and included descriptions of baseline conditions at the site.

WWP Comment #9: WWP comments that invasive plants and weeds are threats to native habitat, rare plants, and sensitive species. They pose an immense fire hazard. Using chemicals to kill weeds requires exposing the environment, species, and watershed area to a toxic substance which can be the source of further damage to environmental and human health. Manual weed control requires much human effort, machinery, and can cause even more disturbance, leading to erosion, disturbance, and, in some cases, more weeds. The EIS should carefully consider how invasive plants and weeds will be managed and controlled.

Staff Response: Staff's proposed Condition of Certification **BIO-14** provides guidance for preparation and implementation of a Weed Management Plan to monitor and control noxious weeds.

WWP Comment #10: WWP comments that desert washes, drainage systems, and washlets are very important habitats for plants and animals in arid lands. The wash habitat impacted by each alternative should be evaluated and appropriate mitigations made for stream bed alterations. WWP comments that soil erosion on low fill slopes and steeply graded areas could result in sedimentation of water bodies. Changes in hydrology and soil movements may impact rare plants and habitats for sensitive species, and may impact burrowing species such as the desert tortoise.

Staff Response: Staff addressed direct, indirect and cumulative impacts to desert washes and other waters of the state in subsections C.2.4.2 and C.2.8. This analysis also considered the effects of soil erosion, sedimentation and off-site impacts of these alterations. Staff provided mitigation for these impacts in proposed conditions of certification **BIO-19** and **BIO-22**. Project alternatives focused on minimizing impacts to desert washes were considered in subsections C.2.5 through C.2.7.

WWP Comment #11: WWP comments that the EIS must consider the cumulative effects of this project in combination with all the other consumptive uses that are occurring on these public lands including livestock grazing, off road vehicle activity, and mining. New transmission line projects have the potential to open up more lands to energy (or other) development, placing wide swaths of habitat at risk, and greatly increase degradation and fragmentation of habitats and important wild land areas and have lasting and damaging impacts.

Staff Response: Subsection C.2.8 provides a detailed and quantitative cumulative impact analysis for sensitive species and their habitat within the NECO planning area and the Chuckwalla Valley.

WWP Comment #12: WWP comments that the NEPA/CEQA documents must explain the monitoring programs that will be in place to monitor the short and long term impacts of the project. This should include the timelines, and estimated costs and sources of funding for the monitoring programs.

Staff Response: Many of staff's proposed conditions of certification include a monitoring components, including **BIO-7**, (Biological Resources Mitigation Implementation and Monitoring Plan), **BIO-8**, (Impact Avoidance and Minimization Measures), **BIO-9** (Desert Tortoise Clearance Surveys and Fencing), **BIO-10** (Desert Tortoise Translocation Plan), **BIO-13** (Raven Management Plan), **BIO-15** (Avian Protection Plan), **BIO-16** (Pre-Construction Nest Surveys), **BIO-19** (Special Status Plant Impact Avoidance and Minimization), **BIO-28** (Golden Eagle Inventory and Monitoring), and **BIO-21** (Evaporation Pond Netting and Monitoring). **BIO-25** includes a detailed plan for monitoring groundwater-dependent vegetation within 10 miles of the Project pumping well, and triggers for implementation of remedial action. **BIO-25** describes the remedial action and the performance standard for success of the mitigation.

WWP Comment #13: WWP comments that the EIS should describe the restoration and rehabilitation activities that will be required for habitat disturbed during construction.

Staff Response: Staff's proposed Condition of Certification **BIO-8** (Impact Avoidance and Minimization Measures) requires preparation and implementation of a Revegetation Plan to restore all areas subject to temporary disturbance to pre-Project grade and conditions.

Center for Biological Diversity (CBD), letter dated December 23, 2009

CBD Comment #1: CBD comments that thorough, seasonal surveys should be performed for all plant and wildlife species and that the proper resource agencies should be consulted for the proper methods. Also, full disclosure of the methods and

results should be made available for public review to satisfy the requirements of NEPA and CEQA. CBD comments all plant and wildlife surveys should be performed following the applicable, agency-approved and recommended survey protocol. Additionally, all new rare species found during surveys must be reported to the California Natural Diversity Database (CNDDDB).

Staff Response: The Applicant conducted field surveys at the Genesis Project site following the applicable agency survey guidelines and survey protocols. Results of plant and wildlife surveys were made available for public review through several published means including the applicant's Application for Certification and Data Responses which are published and available on the Energy Commission's website. Survey methods and results for the Genesis Project were also discussed during several public meetings and workshops. Field surveys performed during 2009 and 2010 were performed following the most current survey guidelines and protocols provided by the California Department of Fish and Game, U.S. Fish and Wildlife Service, and the California Native Plant Society. The applicant provided CNDDDB forms for new species occurrences in the Application for Certification and/or Data Request Responses.

CBD Comment #2: CBD comments that vegetation mapping should be provided on a map at a large enough scale to provide an accurate mapping and account of project impacts to vegetation and wetland communities.

Staff Response: The applicant's assessment of the Project's impacts to vegetation communities and state waters was performed at an appropriate scale mapping unit. The majority of the impact assessment was performed in GIS which uses shapefiles and electronic data with the project/site plan overlaid that allows for an accurate assessment of impact acreages.

CBD Comment #3: CBD comments the EIS/SA must evaluate all direct, indirect, and cumulative impacts to sensitive habitats, including impacts associated with the establishment of unpermitted recreational activities, the introduction of non-native plants, the introduction of lighting, noise, and the loss and disruption of essential habitat due to edge effect.

Staff Response: Staff has provided a detailed analysis of impacts of direct, indirect and cumulative impacts to all sensitive biological resources, including those mentioned by CBD, in subsections C.2.4.2 and C.2.8. Staff conducted a detailed and quantitative cumulative effects analysis for biological resources affected by the project using GIS-based datasets for vegetation, landforms, soils, watersheds, CNDDDB occurrences, and the USGS desert tortoise habitat model. The cumulative effects analysis also carefully considered cumulative indirect effects that are more difficult to quantify in a GIS-based analysis of habitat loss.

CBD Comment #4: CBD comments that several plant and wildlife species were identified by the applicant as either occurring or having a high potential to occur within the Genesis site and that the SA/EIS must address the impacts and propose effective ways to avoid, minimize, and mitigate the impacts to these resources including as assessment of on-site and off-site alternatives that would avoid or minimize impacts.

Staff Response: All of the plant and wildlife species identified by the applicant were addressed in the RSA including their potential for occurrence in the Project area. Staff considered all sensitive habitats in the analysis, including plant communities identified by CNDDDB as rare (CDFG 2003). The analysis of effects included the indirect effects of increased vehicle use, introduction and spread of non-native plants, fragmentation and other edge effects, and lighting and noise

CBD Comment #5: CBD requests that staff look at ways to avoid impacts to desert tortoise by analyzing alternative sites and other measures, and recommends 5:1 mitigation for impacts to desert tortoise habitat. They also note that translocation does not have a proven track record of success, and specifies measures that must be taken for any translocation effort. CBD also comments that an aggressive raven predation plan is needed during project development and implementation.

Staff Response: Staff assessed several alternative sites and alternative configurations to evaluate the impacts of those alternatives to desert tortoise and other sensitive resources in subsections C.2.5 through C.2.7. Staff has proposed mitigation at a 1:1 ratio for desert tortoise in Condition of Certification **BIO-12**, and has also proposed development of a detailed Desert Tortoise Translocation Plan (**BIO10**) and a Raven Management Plan (**BIO-13**).

CBD Comment #6: CBD suggests that if burrowing owls are observed during field surveys, alternatives should be analyzed that consider moving the project away from active burrows, and recommended that mitigation lands be acquired for burrowing owl and managed in perpetuity at a ratio of 5:1.

Staff Response: Staff analyzed the potential impacts to burrowing owls from construction and operation of the project in subsection C.2.4.2, and staff's proposed Condition of Certification **BIO-18** recommends avoidance, minimization and compensation measures for burrowing owls in accordance with CDFG (1995) recommendations. Currently, no burrowing owl burrows have been detected within the Project Disturbance area.

CBD Comment #7: CBD comments the acquisition of lands to be managed in perpetuity for conservation must be included as part of the strategy to avoid, minimize and mitigate impacts to the other species found on the Genesis site as well. Acquisition is particularly important for the rare and sensitive species in the Project area because the Genesis Project appears to have no compatibility with any type of on-site conservation of plant communities or wildlife.

Staff Response: As discussed in subsection C.2.4.2, staff considers in-perpetuity protection of acquired compensation lands as a crucial element of compensatory mitigation.

CBD Comment #8: CBD states avoidance is the preferred method of mitigation for impacts to rare plants. If translocation is to be analyzed as a feasible means of minimizing rare plant impacts, a plan must be developed that identifies methods for transplanting, success criteria, and criteria for selecting lands for rare plant translocation,

Staff Response: Staff has required in Condition of Certification **BIO-19** that special-status plants that cannot be feasibly avoided be mitigated through acquisition and protection of off-site occurrences (or buffer lands surrounding the occurrence) that are vulnerable to development. Staff also included, as an option, detailed performance standards and guidelines for mitigation through restoration of occurrences degraded by invasive plants, ORV, grazing, or altered hydrologic or geomorphic processes. Staff specified in **BIO-19** that transplantation, or translocation, is not an acceptable method of mitigation based on previously demonstrated, overall high rates of failure.

CBD Comment #9: CBD comments that the EIS/SA evaluated the impact of the proposed permitted activities on locally rare species and not merely federal- and state-listed threatened and endangered species.

Staff Response: Staff directed the Applicant to provide survey data for CNPS List 3 and 4 plant species and communities recognized as rare by the CNDDDB (CDFG 2003), such as the galleta grass-dominant communities, even where not regulated by other LORS. These resources were analyzed and, where necessary to address significant impacts, mitigation measures were prescribed.

CBD Comment #10: CBD comments that the EIS/SA must identify and evaluate impacts to species and ecosystems from invasive exotics species. CBD comments that factors such as degradation of plant communities by invasive exotics, displacement of native vegetation by invasive landscape species, degradation of functioning ecosystems present in the project area must be evaluated in the EIS/SAs.

Staff Response: Staff has provided a detailed analysis of the impacts to ecosystems and sensitive species from invasive exotic species. To avoid and minimize such impacts, staff has proposed implementation of Condition of Certification **BIO-14**, the Weed Management Plan, to prevent any Project-related increases in weeds.

CBD Comment #11: CBD comments that the EIS/SA must evaluate all direct, indirect, and cumulative impacts to wildlife movement corridors including an analysis of movement of large mammals, as well as other taxonomic groups, including small mammals, birds, reptiles, amphibians, invertebrates, and vegetation communities. The EIS/SA should evaluate habitat suitability within the analysis window for multiple species, including all listed and sensitive species and should also consider how wildlife movement will be affected by other planned approved, planned, and proposed development in the region as part of the cumulative impacts. CBD also comments that the analysis should analyze whether any proposed wildlife movement corridors are wide enough to minimize edge effects and allow natural processes of disturbance and subsequent recruitment to function. The EIS/SAs should also evaluate whether the proposed wildlife movement corridors would provide key resources

Staff Response: Staff provided an analysis of direct, indirect and cumulative impacts to wildlife movement corridors in subsections C.2.4.2 and C.2.8.

CBD Comment #12: Because of the number of projects that are proposed in the projects' vicinity and the region, a thorough analysis of the cumulative impacts from all of these projects on the resources needs to be included.

Staff Response: A detailed and quantitative cumulative effects analysis has been provided in subsection C.2.8.

California/Nevada Regional Conservation Committee (CNRCC) Desert Committee Letter Dated December 23, 2009

CNRCC Desert Committee Comment #1: CNRCC Desert Committee comments that the DEIS must provide feasible project alternatives that would avoid significant impacts, particularly significant impacts to biological and cultural resources

Staff Response: Staff assessed several alternative sites and alternative configurations to evaluate the impacts of those alternatives to desert tortoise and other sensitive resources in subsections C.2.5 through C.2.7.

CNRCC Desert Committee Comment #2: CNRCC Desert Committee comments that the FSA/DEIS must address risks associated with global climate change in the broader context. This includes both the need for climate change mitigation strategies and the need for climate change adaptation strategies; especially conserving intact swathes of habitat and the landscape level corridors needed to connect them.

Staff Response: Staff considered the risks to biological resources associated with global climate change and, in consultation with BLM, USFWS, and CDFG, has identified a critical corridor for wildlife movement and connectivity between the lower elevations of the Chuckwalla DWMA and Critical Habitat Unit, and the higher elevations north of I-10. The areas are identified as priorities for both acquisition and future solar exclusion; a detailed description of the strategy is included as Appendix B to the Biological Resources RSA.

CNRCC Desert Committee Comment #3: CNRCC Desert Committee comments that the FSA/DEIS must undertake a rigorous analysis to determine which portion of the application, if any, is appropriate for the proposed exclusive industrial use of public lands to the exclusion of all other uses. Then, for any portion deemed suitable for such use, there must be full and feasible mitigation specific to each identified impact.

Staff Response: Staff undertook a rigorous independent analysis of the direct, indirect, and cumulative effects of the Project and has developed detailed mitigation measures with performance standards, monitoring and reporting requirements for the Applicant to follow. Monitoring and enforcement by the Energy Commission will extend for the life of the Project for many measures.

CNRCC Desert Committee Comment #4: CNRCC Desert Committee comments that the FSA/DEIS must identify and analyze the importance of alluvial fan habitat to multiple species and the effect of the structural loss of habitat on this alluvial fan/bajada on the remaining habitat in the area. After requiring avoidance to the maximum extent feasible, the DEIS must demonstrate that proposed mitigation actually provides for compensatory mitigation for each species of rare or sensitive plant and animal including listed species,

as well as, kit fox, burrowing owl, nesting bird species, badger, and Nelson bighorn sheep as well as each sensitive habitat type.

Staff Response: Staff has addressed all direct and indirect impacts associated with impacts to listed species and other special concern species, in subsection C.2.4.2. Subsection C.2.4.12 provides detailed conditions of certification that includes avoidance, minimization and compensation measures for the sensitive resources identified by CNRCC.

CNRCC Desert Committee Comment #5: CNRCC Desert Committee comments that the FSA/DEIS needs to adequately identify and analyze both the cumulative impacts and the growth inducing impacts, which in these cases are closely tied together.

Staff Response: Staff addressed cumulative impacts to biological resources in subsection C.2.8, but has not integrated this analysis with an assessment of growth-inducing impacts.

CNRCC Desert Committee Comment #6: CNRCC Desert Committee comments that in analyzing cumulative impacts to special status plants, the FSA/DEIS should analyze impacts across the range of these species as well as ways to avoid and minimize these impacts. If avoidance is infeasible, mitigation must ensure that the loss of the individual plants and the cumulative impacts from those losses will in fact be adequately compensated for each species impacted.

Staff Response: Staff carefully considered the cumulative effects of the Project on special-status plants directly affected, across their range, and looked at ownership of occurrences and the threats to occurrences across their range from weeds, ORV, etc. Condition of Certification **BIO-19** includes detailed avoidance and minimization measures for occurrences that can feasibly be avoided (occurrences along the linears and surrounding the project). For occurrences that cannot be feasibly avoided, staff has specified detailed mitigation measures for compensating through acquisition and protection of off-site occurrences that could otherwise be developed in the future, and through restoration or rehabilitation of off-site occurrences degraded by weeds, ORV, and other factors.

CNRCC Desert Committee Comment #7: CNRCC Desert Committee comments the scope of the cumulative impacts analysis should encompass the Sonoran/transition desert areas of the California desert at a minimum. Additionally, the cumulative impacts analysis should address species migration needs that may be caused by global climate change and should ensure broad landscape level corridor needed to accommodate the uncertainties involved in forecasting species migration. Not only migration needs but also ecological processes such as sand flow to and from dunes, need to be addressed.

Staff Response: Subsection C.2.8 provides a detailed and quantitative cumulative impact analysis for sensitive, listed threatened, or endangered species and their habitat within the NECO planning area and the Chuckwalla Valley. Staff included the entire Northern and Eastern Colorado Desert region of California (NECO), an area that is synonymous with, or roughly approximates, the Sonoran Desert region of California. Staff also looked at the full range of the

affected special-status plant species, including those likely to be found during the late season surveys. Staff considered the importance of preserving critical refugia for species dispersal to higher elevations and more mesic settings in its analysis of the significance of cumulative effects, and incorporated these concerns into **BIO-19** (Special-Status Plant Mitigation). **Appendix B** describes the Desert Wildlife Management Area management strategies that could achieve the goals of preservation and enhancement of wildlife connectivity between critical refugia in the NECO planning area. Staff supports these programmatic efforts and believes they represent an excellent means of integrating the State's and BLM's renewable resources goals and environmental protection goals.

CNRCC Desert Committee Comment #8: CNRCC Desert Committee comments that it is unclear as to how many years of surveys were conducted for each project.

Staff Response: Detailed surveys for all biological resources were conducted in spring of 2009 and again in spring 2010. Staff has also required a variety of pre-construction surveys in 2010, and a survey of the entire Project Disturbance Area in summer-fall 2010 for late season special-status plants.

CNRCC Desert Committee Comment #9: CNRCC Desert Committee comments that the lack of fall surveys may under-represent the full suite of rare plant taxa potentially occurring on site. These need to be done on all project sites. Botanical surveys should be deemed inadequate until additional surveys are conducted in late summer and fall in a year with adequate summer rainfall.

Staff Response: Condition of Certification **BIO-19** commits the Applicant to conduct floristic surveys of the entire Project Disturbance Area during the late summer/fall blooming season for special-status plants. Staff analyzed the effects of the Project on late season special-status plants known to occur within a very broad region extending into the Mojave Desert region and has specified performance standards for compensatory mitigation, and triggers for mitigation for any species that may be detected, based on the species rarity (rarity and threat rankings) and their total documented occurrences.

CNRCC Desert Committee Comment #10: CNRCC Desert Committee comments that without adequate surveys an accurate accounting of impacts to rare plants is not complete. It would be a violation of environmental laws to constrain the timeframe for project review and approval such that adequate data collection and analysis or adequate public review and input are precluded prior to a Committee decision.

Staff Response: Staff fully analyzed the potential impacts to late-season special-status plants. Staff considers that condition of certification **BIO-19** is adequate to achieve NEPA/CEQA conformance because it has a specific commitment to mitigate and contains detailed performance standards and guidelines for how and when to mitigate. In addition, **BIO-19** requires agency review and approval of the proposed mitigation to ensure that the performance standards are met.

CNRCC Desert Committee Comment #11: The CNRCC Desert Committee comments that the Genesis project site may be the least appropriate of the three solar project

currently being scoped in Riverside County as it is isolated from transmission, has a linear footprint which imposes a more of a threat to wildlife movement, and is sited immediately adjacent to designated wilderness and a lake shoreline.

Staff Response: Staff analyzed the impacts of the Project to wildlife movement, and also assessed the impacts associated with Project construction near a designated wilderness and adjacent to a dry lake. Staff has concluded that the footprint of the Project avoids sensitive habitat types such as sand dunes and playa.

CNRCC Desert Committee Comment #12: The CNRCC Desert Committee comments that the project should be pulled back from dunes and other sensitive areas on site or preferably moved to an alternative site closer to existing disturbance and transmission. CNRCC Desert Committee also comments that the assertion that little or no impact to wildlife waters will occur from extracting groundwater needs to be fully investigated. The CNRCC Desert Committee also asserts that brackish groundwater may still have value to plant species and wildlife.

Staff Response: The Project avoids most impacts to sand dune habitat, and with recent changes to the Project footprint (TTEC 2010o) less than one acre of sand dune habitat would be affected. Staff agrees that potential Project impacts to groundwater dependent vegetation require monitoring and adaptive management, and in Conditions of Certification **BIO-25** and **BIO-26** has provided specific recommendations for performance standards and, monitoring, and remedial action if impacts are detected.

C.2.12 CONCLUSIONS

Overview of Impacts to Biological Resources

The Genesis Solar Energy Project (Genesis Project or Project) would have significant impacts to biological resources, eliminating all of the Sonoran creosote bush scrub and other native plant and wildlife communities within the approximately 1,880-acre site. The Genesis Project would result in loss of an extensive network of desert washes comprising 91 acres of state jurisdictional waters, and would significantly alter the hydrology of the area by re-routing ephemeral drainages through engineered channels.

The Project site provides habitat for desert tortoise, a species listed as threatened under the federal and state endangered species acts. The Project would impact 1,772 acres of desert tortoise habitat, including 23 acres within the Chuckwalla Desert Critical Habitat Unit. Construction and operation of the Genesis Project would therefore require state and federal endangered species “take” authorization. In addition to direct loss of habitat the Project would fragment and degrade adjacent native plant and wildlife communities, and could promote the spread of invasive non-native plants and desert tortoise predators such as ravens.

The California Energy Commission (Energy Commission) staff has concluded that without mitigation the Genesis Project would contribute to the cumulatively significant loss of biological resources within the Chuckwalla Valley and the Northern and Eastern

Colorado Desert Coordinated Management Plan (NECO) area. Staff recommends compensatory mitigation to offset direct, indirect, and cumulative impacts to desert tortoise and other special-status species, and to assure compliance with state and federal laws such as the federal and state endangered species acts and regulations protecting waters of the state. With implementation of staff's proposed conditions of certification, Project impacts to biological resources would be reduced to less than significant levels.

Mitigation for Desert Tortoise

The measures in staff's proposed Conditions of Certification **BIO-9** through **BIO-11** would avoid and minimize potential take of desert tortoise during Project construction and operation. To offset the loss of 1,749 acres of desert tortoise habitat not located within critical habitat, staff's proposed Condition of Certification **BIO-12** recommends habitat compensation at a 1:1 ratio for desert tortoise (i.e., acquisition and preservation of one acre of compensation lands for every acre lost). For Project impacts to 23 acres of Chuckwalla Desert Critical Habitat Unit, the mitigation ratio would be 5:1. This compensatory mitigation is consistent with recommendations from the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and BLM guidance in the NECO. Staff's proposed Condition of Certification **BIO-12** also requires that the land acquisitions be within the Colorado Desert Recovery Unit, and have potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise populations and designated critical habitat. These conditions satisfy the California Department of Fish and Game's requirements under Section 2081 of the California Fish and Game Code. Staff's proposed Condition of Certification **BIO-13** requires implementation of a Raven Monitoring, Management and Control Plan to address Project-related increases in ravens, a desert tortoise predator.

Desert Tortoise Mitigation

Federal and state agencies are currently collaborating as the Renewable Energy Action Team (REAT) to establish joint policies and plans to expedite development of California's utility scale renewable energy projects. To accomplish this goal these agencies are developing a Desert Renewable Energy Conservation Plan (DRECP), a science-based process for reviewing, approving, and permitting renewable energy applications in California. Once the DRECP is complete, anticipated in late 2012, the plan will provide tools to expedite coordination of federal and state endangered species act permitting and a framework for implementing regionally coordinated land acquisition and mitigation. In the future, the DRECP may provide additional mitigation options for large-scale renewable energy projects.

Impacts to Mojave Fringe-toed Lizards

The Genesis Project would directly impact 66 acres of Mojave fringe-toed lizard habitat (including 1 acre of dunes and 37 acres of playa with sand drifts) and indirectly affect 151 acres of habitat downwind of the Project Disturbance Area. The indirect impact results from the Project solar arrays extending into the wind sand transport corridor, diminishing the input of sand to downwind areas and reducing the active sand layer that is crucial to Mojave fringe-toed lizard habitat. The Mojave fringe-toed lizards in the Chuckwalla Valley are at the southernmost portion of the species range, and the proposed Project could increase the risks of local extirpation of an already fragmented

and isolated population. Staff's proposed Condition of Certification **BIO-20** recommends acquisition and protection of core populations of Mojave fringe-toed lizard habitat in the Chuckwalla Valley, which would reduce Project impacts to less than significant levels.

Development of proposed projects would result in the direct loss of over 16 percent of all Mojave fringe-toed lizard habitat in the NECO planning area, effects that are all the more significant when combined with the expected indirect effects to Mojave fringe-toed lizard habitat, including: interruption of wind sand transport processes; diversions of desert washes and interruption of fluvial transport of sand that contribute to the maintenance of habitat; an increase in predation from ravens and direct mortality from an increase of vehicles in previously undisturbed habitat, and the continuing spread of non-native, weedy species such as Sahara mustard and Russian thistle in the Chuckwalla Valley. Staff considers these cumulative direct and indirect effects of to the Chuckwalla Valley population of Mojave fringe-toed lizards and their habitat to be significant. The Project's contributions to significant impacts would be mitigated to less than significant levels with implementation of staff's proposed conditions of certification.

Ephemeral Drainages

The Project would directly impact 91 acres of state jurisdictional waters, including 16 acres of microphyllous riparian vegetation, eliminating the hydrological, biogeochemical, vegetation, and wildlife functions of this network of ephemeral drainages. As many as 21 acres of ephemeral drainages downstream of the Project area could also be indirectly impacted by changes in upstream hydrology. Staff considers the direct, indirect, and cumulative impacts to ephemeral drainages to be significant. The measures in staff's proposed Condition of Certification **BIO-22** would minimize and offset direct and indirect impacts to state waters to less than significant levels and would assure compliance with CDFG codes that provide protection to these state waters. These measures include acquisition and enhancement of 132 acres of ephemeral dry washes within the Chuckwalla Valley watershed, as well as avoidance and minimization measures to protect drainages near the Project site.

As described in more detail in the following section, the removal of an approximate 40-acre 'toe' area from the plant site footprint would avoid several ephemeral drainages; however, the reduced and revised impact acreage to state waters was not provided at the time this Revised Staff Assessment was prepared.

Special-Status Plants

No federal or state-listed plant species occur within the Project Disturbance Area but four species of special-status plants were detected within the Study area during spring 2009 and 2010 surveys, including Harwood's milk-vetch, desert unicorn plant, and ribbed cryptantha. Harwood's eriastrum, a California endemic and BLM Sensitive species, was detected at the Colorado River Substation site and along the Project linears east of the substation. Harwood's eriastrum has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations, several of which are historic records that have not been verified.

Staff concludes that the Project's direct, indirect, and cumulative impacts to Harwood's eriastrum and Harwood's milk-vetch are significant, but impacts to ribbed cryptantha are

less than significant. The alteration of the surface drainage patterns and sediment transport, and the stabilization of dune habitats from an increase in the spread and density of Sahara mustard that would result from the proposed Project would affect rare plants indirectly by disrupting the basic geomorphic processes that maintain and sustain these species' habitat. The remaining occurrences are also stressed by the cumulative effects of fragmentation and isolation from the many foreseeable future projects proposed in the Chuckwalla Valley and throughout their range. While the direct effects of the Project on desert unicorn plant are minor, the impacts of all probable future projects are cumulatively considerable. The avoidance, minimization and compensation measures described in Condition of Certification **BIO-19** (Special-Status Plant Mitigation) would minimize the impacts to Harwood's eriastrum and Harwood's milk-vetch to a level less than significant, and would reduce the Project's contribution to cumulative effects to a level less than significant.

Based on consultation with recognized experts in the flora of the California Desert region staff has also concluded that potentially significant impacts to special-status plants could be missed unless additional late season surveys are conducted. Late-season plants regarded as having a moderate to high potential for occurrence—that could not be detected during the 2009 or 2010 spring surveys—include: Abram's spurge, flat-seeded spurge, and lobed ground cherry. **BIO-19** includes a requirement to conduct late-season surveys in summer-fall 2010. Specific triggers for mitigation of any special-status plant detected, and detailed performance standards for mitigation of impacts are included in **BIO-19** to ensure that impacts to any special-status plants found during the late season surveys are mitigated to a level less than significant.

Impacts to Groundwater Dependent Vegetation Communities

The proposed Project's groundwater pumping would have an impact on groundwater levels in the Chuckwalla Valley Groundwater Basin (see **Soil and Water** section). The Project's estimated zone of drawdown effects at the end of project operation extends to approximately 9 to 10 miles from the Project pumping well, decreasing in effect with distance from the well. Groundwater is important to sustain vegetation for wildlife habitat in some areas where surface waters are not present. Even minor drawdowns can adversely affect groundwater-dependent vegetation ("phreatophytes") and the wildlife it sustains if: groundwater drops below the effective rooting levels sustained over time (so that plants never have an opportunity to recover); water tables drop not just in summer (when plants are dormant) but throughout early spring when plants need and utilize water most and when they are least tolerant of drought, or if the Project groundwater use occurs during extended droughts.

Groundwater-dependent vegetation occurs at the northeast margin of Palen Dry Lake where groundwater has been observed near surface. Phreatophytes have also been documented and observed at the southwest margins of Palen and they occur sporadically at Ford Dry Lake, where groundwater levels are deeper. The project has the potential to lower groundwater levels as a result of water production during both construction and operations. The lowering of groundwater levels could have a significant impact to biological resources in areas where deep-rooted phreatophytes occur. Considerable uncertainty remains as to the potential extent of Project impacts to groundwater (see **Soil and Water** section) and to groundwater dependent plant communities, but staff considers these potential impacts to be significant.

To ensure that the Project's proposed use of groundwater does not lower groundwater levels in the basin so that biological resources are significantly and adversely affected, staff has proposed that the Applicant develop a vegetation monitoring program and identify what changes are occurring in basin water levels and in groundwater-dependent vegetation within the identified zone of potential effect. Substantial changes to groundwater levels caused by the proposed Project and other pumping in the basin would be documented by the Groundwater Well Monitoring and Reporting program outlined in Condition of Certification **SOIL&WATER-5**. Changes in the vigor of groundwater-dependent vegetation would be monitored, compared against controls, and documented under the Vegetation Monitoring and Reporting Plan outlined in staff's proposed Condition of Certification **BIO-25**. Condition of Certification **BIO-26** specifies remedial action to be taken and the performance standard that must be met if adverse effects are detected. These measures would be sufficient to ensure that the groundwater pumping for the Project would not result in significant adverse impacts to groundwater-dependent ecosystems in the Chuckwalla Basin.

Migratory Birds/Burrowing Mammals

Sonoran creosote bush scrub and ephemeral drainages within the Project Area provide foraging, cover, and/or breeding habitat for migratory birds, including a number of special-status bird species potentially occurring at the site (including loggerhead shrike, western burrowing owl, and California horned lark). Migratory birds and their eggs and young are protected by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503. Implementation of staff's proposed Conditions of Certification **BIO-8** (Impact Avoidance and Best Management Practices), **BIO-15** (Pre-Construction Nest Surveys), and **BIO-16** (Avian Protection Plan) would avoid these potentially significant impacts to nesting birds. Potential impacts to burrowing owls would be further mitigated by implementation of staff's proposed Condition of Certification **BIO-18**. This condition involves avoidance and minimization measures, passive relocation of burrowing owls if necessary, as well as acquisition of off-site habitat suitable for burrowing owl.

American badgers and desert kit foxes occur throughout the Project area, and construction activities could crush or entomb these burrowing species. Staff's proposed Condition of Certification **BIO-17**, which requires preconstruction surveys and avoidance measures to protect badgers and kit foxes, would avoid these potential impacts.

Impacts and Mitigation for Golden Eagles

Although golden eagles were not detected during the avian surveys conducted for the Project, no focused survey for nest sites or breeding pairs was conducted. Surveys were conducted in 2010 for golden eagle territories within 10 miles of the Project boundaries, but survey results were not available at the time of publication of the RSA. In the absence of survey information, staff analyzed the potential impacts to nesting golden eagles using the conservative assumption that nests might occur close enough to Project boundaries to be disturbed by construction activities. Staff's proposed Condition of Certification **BIO-28**, implementation of a golden eagle monitoring and management program, would mitigate potential impacts from construction to less than significant levels. Staff also concluded that the Project would contribute to the cumulative loss of golden eagle foraging habitat, but staff's proposed Condition of

Certification **BIO-12** would compensate for the Project's contribution to the cumulative loss of golden eagle foraging habitat.

Project Closure and Decommissioning

Staff's proposed Condition of Certification **BIO-23** requires the Applicant to develop a Decommissioning and Closure Plan and a cost estimate that meets the requirements of BLM's 43 CFR 3809.550 et seq.. Condition of Certification **BIO-23** also requires a cost estimate of the funding required to undertake those activities.

Alternatives

Staff analyzed two alternatives to the Proposed Project other than the No Project Alternative, the Reduced Acreage Alternative and the Dry Cooling Alternative. The smaller Reduced Acreage Alternative would have smaller impacts on many of the biological resources within the Project area, and substantially less impact on Mojave fringe-toed lizard habitat. The Reduced Acreage Alternative would use approximately 50 percent less groundwater than the Proposed Project. Because the linear facilities for the Proposed Project and the Reduced Acreage Alternatives share the same route, impacts associated with this corridor remain very similar, such as impacts to Couch's spadefoot toad and microphyll woodland. In addition, although the Reduced Acreage Project does represent fewer acres of impacts, it is the same overall length as the Proposed Project, and therefore indirect impacts to desert washes that currently flow through the area would be similar.

The Dry Cooling Alternative is located entirely within the boundaries of the Proposed Project. Because this alternative would occupy the same footprint as the Proposed Project, the impacts remain the same between the two except for impacts to groundwater-dependent ecosystems. The Dry Cooling Alternative would use over 95 percent less groundwater than the Proposed Project.

Staff considers direct, indirect, and cumulative impacts from the Proposed Project and both alternatives to be similar (aside from differences in impact acreage) for most biological resources, including impacts to desert tortoise habitat, Couch's spadefoot toad, microphyll woodland, and migratory birds. While impacts from the Reduced Acreage Alternative are substantially less to Mojave fringe-toed lizard habitat and desert wash, these impacts would still be considered significant under this alternative as well as under the Proposed Project and Dry Cooling Alternative. Staff currently has insufficient information to fully assess the indirect and cumulative impacts to groundwater-dependent vegetation, but these impacts may be considered significant under the Proposed Project and the Reduced Acreage Alternative. Impacts from the Dry Cooling Alternative are identical to those from the Proposed Project, except that this alternative would eliminate any potential Project impacts to groundwater-dependent vegetation.

Proposed conditions of certification under the Reduced Acreages Alternative are identical to those for the Proposed Project, except that the compensatory mitigation acreages recommended for desert tortoise habitat (staff's proposed Condition of Certification **BIO-12**), western burrowing owl (staff's proposed Condition of Certification **BIO-18**), sand dunes (staff's proposed Condition of Certification **BIO-20**), Mojave fringe-

toed lizards (staff's proposed Condition of Certification **BIO-20**), and state waters (staff's proposed Condition of Certification **BIO-22**) are adjusted to reflect the reduced areas of impacts. Proposed conditions of certification under the Dry Cooling Alternative are identical to those for the Proposed Project, except that proposed Condition of Certification **BIO-25** and **BIO-26** would not be required. Staff concludes that with implementation of these conditions, impacts from both alternatives would be less than significant.

Cumulative Effects

Construction and operation of the Genesis Project will have effects on a number of biological resources that are individually limited but cumulatively considerable. The cumulative effects analysis employed a quantitative, GIS-based analysis of direct impacts to habitat, and a qualitative analysis of indirect effects (e.g., increases in predators, noxious weeds, etc.). In many cases, the anticipated indirect effects are more significant, or adverse, than the direct loss of habitat, but are more difficult to quantify. Geographic scope varied between biological resources, but most analyses were based on the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries (BLM-CDD 2002).

Significant cumulative effects (including indirect effects) were identified in a number of biological resource areas where the Project contributes—at least incrementally—to the cumulative effect. These include: desert washes in the Ford Watershed and the broader NECO planning area; desert tortoise habitat; golden eagle foraging habitat; Mojave fringe toed lizard and their habitat; habitat for American badger, desert kit fox, and burrowing owl; LeConte's thrasher habitat; Couch's spadefoot toad range; habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants; wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe toed lizard, dunes, and playa); Mojave and Sonoran creosote bush scrub; desert dry wash woodland (microphyll woodland); playa and sand drifts over playa, and dunes (active and stabilized).

Of particular concern are the cumulative effects of renewable energy projects within the geographic scope of the Chuckwalla Valley, which contains an isolated system of dunes and population of Mojave fringe-toed lizard. The direct loss of dune habitat and Mojave fringe-toed lizard is minor relative to the indirect downwind effects from obstructions within the active aeolian sand transport corridor, and the disruption of the fluvial processes that contribute sand to the system from the diversion of washes--approximately 63 miles of washes within the Chuckwalla-Ford Dry Lake watershed alone. In addition to the disruption of geomorphic processes, significant indirect effects that can be reasonably expected to occur in the Chuckwalla system from future projects include: fragmentation and its effects on connectivity and gene flow; spread of invasive non-native plants; increase in avian predators; and an increase in vehicle-related wildlife mortality.

Implementation of staff's proposed conditions of certification would reduce the Project's contribution to cumulative effects to a level that is not cumulatively considerable. There may be cumulative effects after mitigation is implemented by all projects, but due to the mitigation implemented by the Project, its contribution would be less than cumulatively considerable. These residual cumulative effects from all future projects could be

addressed through a regional and coordinated planning effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors.

Ongoing collaborative efforts by federal and state agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS offer an appropriate forum for such planning. Appendix B describes the Desert Wildlife Management Area management strategies that could achieve the goals of preservation and enhancement of wildlife connectivity in the NECO planning area. Staff supports these programmatic efforts and believes they represent an excellent means of integrating the State's and BLM's renewable resources goals and environmental protection goals.

C.2.13 PROPOSED CONDITIONS OF CERTIFICATION

The accelerated timing requirements described in these proposed conditions of certification reflect the need for the Genesis Solar Power Project to commence construction before the end of 2010 in order to receive American Recovery and Reinvestment Act of 2009 (ARRA) funding.

The proposed conditions of certification below are generally the same as those in the SA/DEIS published in March 2010. However, revisions have been made in some of the conditions to reflect suggested changes, clarifications and additional information from the Applicant and other parties and from discussions at staff workshops held on April 21, May 5, and May 10, 2010. Updated guidance from the USFWS about golden eagle surveys provided the basis for a new condition, **BIO-28**. In addition, opportunities for mitigation from recently signed legislation (SB8X 34) and the Renewable Energy Action Team Memorandum of Agreement prompted changes in **BIO-12** and other conditions. **Biological Resources Table 22** summarizes the changes to proposed conditions of certification from the SA/DEIS.

**BIOLOGICAL RESOURCES TABLE 22-
Summary of Changes to Conditions of Certification**

Condition of Certification	Changes from SA/DEIS
BIO-1 Designated Biologist Selection and Qualifications	Minor clarifications in the definition of "Authorized Biologist"; replaced the trigger for verification timing from post-Energy Commission Decision to pre-construction.
BIO-2 Designated Biologist Duties	No changes
BIO-3 Biological Monitor Selection and Qualifications	No changes
BIO-4 Biological Monitor Duties	Minor additions to list of Biological Monitor duties.
BIO-5 Designated Biologist and Biological Monitor Authority	No changes.

Condition of Certification	Changes from SA/DEIS
BIO-6 Worker Environmental Awareness Program	Replaced the trigger for verification timing from post-Energy Commission Decision to pre-construction.
BIO-7 Biological Resources Mitigation Implementation & Monitoring Plan	Clarified that the BRMIMP shall include all biological mitigation and/or monitoring plans associated with the Project; changed the timing for submittal of the final BRMIMP to 7 days before construction rather than 30 days; revised to allow the BRMIMP to be revised or supplemented with additional permits.
BIO-8 Impact Avoidance and Minimization Measures	Specified speed limits of 25 mph on all roads, and added a requirement for signage; clarified requirements for monitoring during construction in unfenced habitat; modified the requirement for avoidance of loud construction noise; made minor changes to measures avoiding vehicle impacts to desert tortoise, and treatment of road-killed animals.
BIO-9 Desert Tortoise Clearance Surveys and Fencing	Made clarifications on installation of desert tortoise exclusion fencing, deleted the requirement for cattle grating at gates, provided more specificity on how clearance surveys would be conducted, and incorporated reference methods included in the Desert Tortoise Translocation Plan.
BIO-10 Desert Tortoise Translocation Plan	Deleted "Relocation" from the title "desert Tortoise Relocation/Translocation", replaced the trigger for verification timing from post-Energy Commission Decision to pre-construction.
BIO-11 Desert Tortoise Compliance Verification	Minor clarifications on monitoring during grubbing and grading and notification in the event of an injured desert tortoise.
BIO-12 Desert Tortoise Compensatory Mitigation	Extensively revised to clarify requirements for security; added a provision to allow fulfillment of mitigation requirements by depositing funds into a National Fish and Wildlife Foundation account managed by the Renewable Energy Action Team.
BIO-13 Raven Management Plan	Expanded to include more specific information on the purpose of the plan and a description of the required elements of a Raven Plan; changed submittal of final Raven Plan from 10 days to 30 days prior to construction. Also expanded to include the fee payment option for the project owner submitting payment to the Project sub-account of the REAT Account held by the National Fish and Wildlife Foundation (NFWF) to support the USFWS Regional Raven Management Program.
BIO-14 Weed Management Plan	Expanded to include more specific information on the purpose of the plan and a description of the required elements of the Weed Management Plan.

Condition of Certification	Changes from SA/DEIS
BIO-15 Pre-Construction Nest Surveys	Added a reference to guide nest searching techniques; clarified that the precise location of the nest need not be determined by searchers; changed the end date of the breeding bird survey from August 31 to July 31; specified that surveyors may not concurrently search for nests and desert tortoise burrows. Based on guidance from USFWS, added guidance on how to determine the size of the protective buffer around nests, and reduced from 14 to 7 days interval between nest
BIO-16 Avian Protection Plan	Added the requirement that adaptive management measures be included to avoid and minimize avian impacts; replaced the trigger for verification timing from post-Energy Commission Decision to before commercial operation.
BIO-17 Badger and Kit Fox Avoidance and Minimization Measures-	Revised to provide alternative measures for excluding foxes and badgers from burrows, and to clarify that surveys for fox and badgers dens may be conducted concurrent with desert tortoise surveys.
BIO-18 Burrowing Owl Impact Avoidance and Minimization Measures	Added specifications that pre-construction surveys for owls must be focused exclusively on detecting burrowing owls, and must be conducted as dawn or dusk surveys within 30 days of construction; added monitoring and reporting guidelines for the relocation site; replaced the trigger for verification timing from months 18 months after the Energy Commission Decision to 18 months after initiation of construction.
BIO-19 Special-Status Plant Impact Avoidance and Minimization	Extensively revised and expanded to include: a requirement to conduct summer-fall surveys; specifications for finalizing avoidance and minimization measures; thresholds for assessing significance of impacts to late season special-status plants and conditions under which avoidance or off-site mitigation would be required; and detailed guidelines and performance standards for off-site mitigation through acquisition or restoration/enhancement.
BIO-20 Sand Dune Community/Mojave Fringe-Toed Lizard Mitigation	Revised the acreage of requires acquisition lands to reflect the reduction in Project footprint by 41.4 acres; made minor changes to the criteria for acquisition lands; clarified that the final security amount for acquisition would be determined by an updated appraisal and a Property Analysis Record (PAR) analysis; replaced the trigger for verification timing from months 18 months after the Energy Commission Decision to 18 months after initiation of construction.
BIO-21 Evaporation Pond Monitoring	Provided more specific information on what monthly monitoring surveys would entail.
BIO-22 Mitigation for	Clarified that the final security amount for acquisition would

Condition of Certification	Changes from SA/DEIS
Impacts to State Waters	be determined by an updated appraisal and a PAR analysis; minor wording changes and clarifications; replaced the trigger for verification timing from post Energy Commission Decision to prior to ground-disturbing activities.
BIO-23 Decommissioning Plan	Deleted the requirement that one of the objectives of decommissioning must include restoration of the site to a relatively natural requirement; replaced the trigger for submittal of draft plan from post Energy Commission Decision to prior to ground-disturbing activities, with the final plan due before start of commercial operation.
BIO-24 Revegetation of Temporarily Disturbed Areas	Clarified the target performance standards for percent cover of native species in the temporarily disturbed areas; replaced the trigger for submittal of final plan from post Energy Commission Decision to prior to ground-disturbing activities.
BIO-25 Monitoring Groundwater Dependent Vegetation	Revised to clarify responsibility for monitoring in areas where the zone of potential groundwater effects of Genesis Solar Energy Project overlap the Palen Solar Power Project estimated zone of groundwater effect.
BIO-26 Remedial Action for Groundwater Dependent Vegetation	Added examples of remedial actions that may be implemented to meet the performance standards for mitigation.
BIO-27 Couch's Spadefoot Toad Mitigation	Replaced the trigger for submittal of final plan from post Energy Commission Decision to prior to ground-disturbing activities; added a mitigation requirement that if potential spadefoot toad breeding ponds cannot be completely avoided, the mitigation plan shall include plans to create additional breeding habitats that are capable of holding water for at least nine days during the spadefoot toad breeding season.
BIO-28 Golden Eagle Inventory & Monitoring	New condition. Requires annual inventories for golden eagles during construction and implementation of a monitoring and management plan if nests are detected within 10 miles of Project boundaries.
BIO-29 In-Lieu Fee Mitigation Option	New condition. Provides an option for the project owner to satisfy mitigation obligations by paying an in lieu fee instead of acquiring compensation lands, pursuant to Fish and Game code sections 2069 and 2099.

DESIGNATED BIOLOGIST SELECTION AND QUALIFICATIONS⁶

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

The Designated Biologist 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 the desert tortoise, and be approved by the USFWS; and
5. Possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise.

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

No fewer than 30 days prior to construction-related ground disturbance, the Project owner shall submit the names of the Designated Biologists(s) along with the completed USFWS Desert Tortoise Authorized Biologist Request Form (www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS, and the CPM for review and final approval. No construction-related ground disturbance, grading, boring, or trenching 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

⁶ USFWS <www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to the USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are responsible for the implementation of all desert tortoise measures for which a project is approved and are permitted to then approve specific Biological Monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for Biological 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.

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 and for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The Project owner shall ensure that the Designated Biologist performs the activities described below during any site mobilization activities, construction-related ground disturbance, grading, boring or trenching activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the Project owner and the CPM. The Designated Biologist Duties shall include the following:

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. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
5. 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 (e.g., parking lots) for animals in harm's way;
6. Notify the Project owner and the CPM of any non-compliance with any biological resources condition of certification;
7. Respond directly to inquiries of the CPM regarding biological resource issues;
8. 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 Compliance Report;
9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness

Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Database.

Verification: The Designated Biologist shall provide copies of all written reports and summaries that document biological resources compliance activities in the Monthly Compliance Reports submitted to the CPM. If actions may affect biological resources during operation a 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 his or her duties cease, as approved by the CPM.

BIOLOGICAL MONITOR SELECTION AND QUALIFICATIONS

BIO-3 The Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to the CPM. The resume shall demonstrate, to the satisfaction of the CPM, the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>.

Verification: The Project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site mobilization or construction-related ground disturbance, grading, boring and trenching. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) has 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 and for approval at least 10 days prior to their first day of monitoring activities.

BIOLOGICAL MONITOR DUTIES

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, fencing, grading, boring, trenching and reporting. The Designated Biologist shall remain the contact for the Project owner and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a 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 cease, as approved by the CPM.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-5 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. The Project owner shall provide Energy Commission staff with reasonable access to the Project site under the control of the Project owner and shall otherwise fully cooperate with the Energy Commission's efforts to verify the Project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. 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, boring, trenching and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;
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 them of any corrective actions that have been taken or would be instituted as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The Project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the morning following 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, or 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 would be notified by the CPM that coordination with other agencies would require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

BIO-6 The Project owner shall develop and implement a Project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site preconstruction, construction, operation, and closure. The WEAP shall:

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, including photographs of protected species, is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the Project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that no snakes, reptiles, or other wildlife shall be harmed;
3. Place special emphasis on desert tortoise, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;
4. Include a discussion of fire prevention measures to be implemented by workers during Project activities; request workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;
5. Describe the temporary and permanent habitat protection measures to be implemented at the Project site;
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 30 days prior to start of construction-related ground disturbance the Project owner shall provide to the CPM a copy of the final 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 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 construction-

related ground disturbance activities the Project owner shall submit two copies of the CPM-approved final WEAP.

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

Throughout the life of the Project, the WEAP shall be repeated annually for permanent employees, and shall 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 shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the Project owner and shall be made available to the CPM and upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

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

BIO-7 The Project owner shall develop a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), and shall submit two copies of the proposed BRMIMP to the CPM for review and approval. The Project owner shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Desert Tortoise Translocation Plan, the Raven Management Plan, the Closure, Conceptual Restoration Plan, the Burrowing Owl Mitigation and Monitoring Plan, and the Weed Management Plan, and all other individual biological mitigation and/or monitoring plans associated with the Project.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall include accurate and up-to-date maps depicting the location of sensitive biological resources that require temporary or permanent protection during construction and operation. The BRMIMP shall include complete and detailed descriptions of the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the Project owner;
2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;
3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;
4. All sensitive biological resources to be impacted, avoided, or mitigated by Project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;
6. All measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
7. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
8. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
9. All performance standards and remedial measures to be implemented if performance standards are not met;
10. Biological resources-related facility closure measures including a description of funding mechanism(s);
11. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval; and
12. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the Project site, or during Project surveys, to the California Natural Diversity Data Base (CNDDDB) per CDFG requirements.

Verification: The Project owner shall submit the draft BRMIMP to the CPM at least 30 days prior to start of any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and the final BRMIMP at least 7 days prior to start of any construction-related ground disturbance, grading, boring, and trenching. The BRMIMP shall contain all of the required measures included in all biological Conditions of Certification. No construction-related ground disturbance, grading, boring or trenching may occur prior to approval of the final BRMIMP by the CPM.

If any permits have not yet been received when the final BRMIMP is 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(s). The Project owner shall submit to the CPM the revised or supplemented BRMIMP within 10 days following the Project owner's receipt of any additional permits. Under no circumstances shall ground disturbance proceed without implementation of all permit conditions.

To verify that the extent of construction disturbance does not exceed that described in this analysis, the Project owner shall submit aerial photographs, at an approved scale, taken before and after construction to the CPM. The first set of aerial photographs shall reflect site conditions prior to any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and shall be submitted prior to initiation of such activities. The second set of aerial photographs shall be taken subsequent to completion of construction, and shall be submitted to the CPM no later than 90 days after completion of construction. The Project owner shall also provide a

final accounting of the acreages of vegetation communities/cover types present before and after construction.

Any changes to the approved BRMIMP must be approved by the CPM and in consultation with CDFG and USFWS.

Implementation of BRMIMP measures (for example, construction activities that were monitored, species observed) shall 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 which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the Project's preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, and which mitigation and monitoring items are still outstanding.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-8 The Project owner shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. Limit Disturbance Areas. The boundaries of all areas to be 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 and topsoil shall be stockpiled in disturbed areas lacking native vegetation and 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, Project 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 would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route shall 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 all roads. Signs shall be established at appropriate locations (for example, at Arizona crossings of drainages) to remind drivers to be aware of the potential for desert tortoise and other wildlife occurring on the roadways.

4. Monitor During Construction. In areas that have not been fenced with desert tortoise exclusion fencing and cleared, including during fence construction, the Designated Biologist shall be present at the construction site during all Project activities that have potential to disturb soil, vegetation, and wildlife. The Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities in unfenced habitat (i.e., outside of the cleared and fenced Plant Site).
5. Minimize Impacts of 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. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources.
6. Implement APLIC Guidelines. 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 1994) to reduce the likelihood of large bird electrocutions and collisions.
7. Avoid Use of Toxic Substances. Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.
8. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat. Lighting shall be kept to the minimum level for safety and security needs by using motion or infrared light sensors and switches to keep lights off when not required, and shielding operational lights downward to minimize skyward illumination. No high intensity, steady burning, bright lights such as sodium vapor or spotlights shall be used. FAA visibility lighting shall employ only strobed, strobe-like or blinking incandescent lights, preferably with all lights illuminating simultaneously. Minimum intensity, maximum "off-phased" dual strobes are preferred, and no steady burning lights (e.g., L-810s) shall be used.
9. Minimize Noise Impacts. A continuous low-pressure technique shall be used for steam blows, to the extent possible, in order to reduce noise levels in sensitive habitat proximate to the Genesis Project. Loud construction activities (e.g., unsilenced high pressure steam blowing and pile driving, or other) shall be avoided from February 15 to April 15 when it would result in noise levels over 60 dBA in nesting habitat.

10. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by 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. If a desert tortoise is observed, it shall be left to move on its own. A Designated Biologist or Biological Monitor under the Designated Biologist's direct supervision may remove and relocate the animal to a safe location as described in the Applicant's Desert Tortoise Translocation Plan.
11. Avoid Wildlife Pitfalls: To avoid trapping desert tortoise and other wildlife in trenches, pipes or culverts, the following measures shall be implemented:
 - a. Backfill Trenches. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the area fenced with desert tortoise exclusion fencing 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 desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing shall be inspected periodically throughout the day, at the end of each workday and at the beginning of each day 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 as described in the Desert Tortoise Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.
 - b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on elevated pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.
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 and common ravens to construction sites. A Biological

Monitor shall patrol these areas to ensure water does not puddle and shall take appropriate action to reduce water application where necessary.

13. Dispose of Road-killed Animals. During construction, road killed animals or other carcasses detected by personnel on roads associated with the Project area will be reported immediately to a Biological Monitor or Designated Biologists, who will remove the roadkill promptly. During operations, the Project Environmental Compliance Monitor will be notified of any roadkills and promptly remove and dispose of any roadkills. For special-status species roadkill, the Biological Monitor shall contact CDFG and USFWS within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall report the special-status species record as described in **BIO-11** below.
14. 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.
15. 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. Vehicular traffic 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 when traveling on dirt access routes within desert tortoise habitat shall not exceed 25 miles per hour.
16. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter "Waters of the State". Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the stream. 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 drainages shall be stabilized to reduce erosion potential.

17. Monitor Ground Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities 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.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall 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.

DESERT TORTOISE CLEARANCE SURVEYS AND FENCING

BIO-9 The Project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence specification and installation, tortoise handling, artificial burrow construction, egg handling and other procedures shall be consistent with those described in the USFWS' 2009 *Desert Tortoise Field Manual* <http://www.fws.gov/ventura/speciesinfo/protocols_guidelines> or more current guidance provided by CDFG and USFWS. The Project owner shall also implement all terms and conditions described in the Biological Opinion prepared by USFWS. These measures include, but are not limited to, the following:

1. Desert Tortoise Exclusion Fence Installation. Per the Applicant's Desert Tortoise Translocation Plan, in order to avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the permanent perimeter security fence; along the utility corridors, fencing or monitoring will be used to protect desert tortoises and temporarily installed along the utility corridors. The proposed alignments for the permanent perimeter fence and utility rights-of-way fencing shall be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter fence and utility rights-of-way alignments shall be conducted by the Designated Biologist(s) using techniques outlined in the USFWS' 2009 *Desert Tortoise Field Manual* and may be conducted in any season with USFWS and CDFG approval. Biological Monitors may assist the Designated Biologist under his or her supervision. These fence clearance surveys shall provide 100-percent coverage of all areas to be disturbed 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 15 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 the USFWS' 2009 *Desert Tortoise Field*

Manual. Any desert tortoise located during fence clearance surveys shall be handled by the Designated Biologist(s) in accordance with the Applicant's Translocation Plan.

- a. Timing, Supervision of Fence Installation. The exclusion fencing shall be installed prior to the onset of 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 be constructed in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 8 – Desert Tortoise Exclusion Fence).
 - c. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time.
 - d. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent fencing shall be inspected monthly and during and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing shall be inspected weekly and, where drainages intersect the fencing, during and within 24 hours 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 for tortoise.
2. Desert Tortoise Clearance Surveys within the Plant Site. Following construction of the permanent perimeter security fence and the attached tortoise exclusion fence, the permanently fenced power plant site shall be cleared of tortoises by the Designated Biologist, who may be assisted by the Biological Monitors. Clearance surveys shall be conducted in accordance with the USFWS' 2009 *Desert Tortoise Field Manual* (Chapter 6 – Clearance Survey Protocol for the Desert Tortoise – Mojave Population) and shall consist of two surveys

covering 100 percent of the project area by walking transects no more than 15-feet apart. If a desert tortoise is located on the second survey, a third survey shall be conducted. On each subsequent pass surveyors shall attempt to view all shrubs and the terrain from as many angles as possible. To achieve this, transects programmed into GPS units shall be either perpendicular, parallel but offset from transect on the previous pass, and/or approached from the opposite direction on each subsequent pass. Clearance surveys of the power plant site may only be conducted when tortoises are most active (April through May or September through October). Surveys outside of these time periods require approval by USFWS and CDFG. Any tortoise located during clearance surveys of the power plant site shall be relocated and monitored in accordance with the Desert Tortoise Translocation Plan

- a. Burrow Searches. During clearance surveys all desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined by the Designated Biologist, who may be assisted by the Biological Monitors, to assess occupancy of each burrow by desert tortoises and handled in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined, in accordance with the Desert Tortoise Translocation Plan. Tortoises taken from burrows and from elsewhere on the power plant site shall be relocated or translocated as described in the Desert Tortoise Translocation Plan.
 - b. Burrow Excavation/Handling. All potential desert tortoise burrows located during clearance surveys shall be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises, in accordance with the Desert Tortoise Translocation Plan. All desert tortoise handling and removal, and burrow excavations, including nests, shall be conducted by the Designated Biologist, who may be assisted by a Biological Monitor in accordance with the USFWS' 2009 *Desert Tortoise Field Manual*.
3. Monitoring Following Clearing. Following the desert tortoise clearance and removal from the power plant site and utility corridors, workers and heavy equipment shall be allowed to enter the Project site to perform clearing, grubbing, leveling, and trenching activities. A Designated Biologist or Biological Monitor shall be on site during clearing and grading activities to move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be relocated or translocated as described in the Desert Tortoise Translocation Plan.
 4. 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. Desert tortoise moved from within Project areas shall be marked and monitored in accordance with the Desert Tortoise Translocation Plan.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to the CPM, USFWS, and CDFG describing implementation of each of the mitigation measures listed above. 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.

DESERT TORTOISE TRANSLOCATION PLAN

BIO-10 The Project owner shall develop and implement a final Desert Tortoise Translocation Plan (Plan) that is consistent with current USFWS approved guidelines, and meets the approval of the CPM. The goals of the Desert Tortoise Translocation Plan shall be to: relocate/translocate all desert tortoises from the project site to nearby suitable habitat; minimize impacts on resident desert tortoises outside the project site; minimize stress, disturbance, and injuries to relocated/translocated tortoises; and assess the success of the translocation effort through monitoring. The final Plan shall be based on the draft Desert Tortoise Translocation Plan submitted by the Applicant (TTEC 2010a) and shall include all revisions deemed necessary by USFWS, CDFG and Energy Commission staff.

Verification: Within 30 days prior to site mobilization or construction-related ground disturbance, the Project owner shall provide the CPM with the final version of a Plan that has been reviewed and approved by the CPM in consultation with USFWS and CDFG. All modifications to the approved Plan shall be made only after approval by the CPM, in consultation with USFWS and CDFG.

Within 30 days after initiation of relocation and/or translocation activities, the Designated Biologist shall provide to the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan.

DESERT TORTOISE COMPLIANCE VERIFICATION

BIO-11 The Project owner shall provide Energy Commission staff with reasonable access to the Project site and compensation lands under the control of the Project owner and shall otherwise fully cooperate with the Energy Commission's efforts to verify the Project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The Project owner shall hold the Designated Biologist and the Energy Commission harmless for any costs the Project owner incurs in

complying with the management measures, including stop work orders issued by the CPM or the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notification. Notify the CPM and at least 14 calendar days before initiating construction-related ground disturbance activities; immediately notify the CPM in writing if the Project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification.
2. Monitoring During Grubbing and Grading. Remain onsite daily in areas located outside of permanent desert tortoise exclusion fencing while vegetation salvage, grubbing, grading and other ground-disturbance construction activities are taking place to avoid or minimize take of listed species, and verify personally or use Biological Monitors to check for compliance with all impact avoidance and minimization measures, including checking all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protective zones.
3. Monthly Compliance Inspections. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, and grading are completed and submit a monthly compliance report to the CPM, USFWS, and CDFG during construction.
4. Notification of Injured or Dead Listed Species. If an injured or dead listed species is detected within or near the Project Disturbance Area the CPM, CDFG, and USFWS shall be notified immediately by phone. Notification shall 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 listed species. Written follow-up notification via FAX or electronic communication shall be submitted to these agencies within two calendar days of the incident and shall include the following information as relevant:
 - a. Injured Desert Tortoise. If a desert tortoise is injured as a result of Project-related activities during construction, the Designated Biologist or approved Biological Monitor shall immediately take it to a CDFG-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals shall be paid by the Project owner. Following phone notification as required above, the CPM, CDFG, and USFWS shall determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.
 - b. Desert Tortoise Fatality. If a desert tortoise is killed by Project-related activities during construction or operation, a written report

with the same information as an injury report shall be submitted to the CPM, CDFG, and USFWS. These desert tortoises shall be salvaged according to guidelines described in *Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise* (Berry 2001). The Project owner shall pay to have the desert tortoises transported and necropsied. The report shall include the date and time of the finding or incident.

5. Stop Work Order. The CPM may issue the Project owner a written stop work order to suspend any activity related to the construction or operation of the Project to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The Project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than 2 days following the above required notification of a sighting, injury, kill, or relocation of a listed species, the Project owner shall deliver to the CPM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of injury, kill, or relocation of a listed species, identifying who was notified, and explaining when the incidents occurred. In the case of a sighting in an active construction area, the Project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to the CPM, CDFG and USFWS.

No later than 45 days after initiation of Project operation the Designated Biologist shall provide the CPM a Final Listed Species Mitigation Report that includes, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about Project-related incidental take of listed species; 3) information about other Project impacts on the listed species; 4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for Project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future Projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the Project.

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-12 To fully mitigate for habitat loss and potential take of desert tortoise, the Project owner shall provide compensatory mitigation at a 1:1 ratio for impacts to 1749 acres, and at a 5:1 ratio for impacts to 23 acres of critical habitat, adjusted to reflect the final Project footprint. For purposes of this condition, the Project footprint means all lands disturbed in the construction and operation of the Genesis Project, including all linears, as well as undeveloped areas inside the Project's boundaries that will no longer provide viable long-term habitat for the desert tortoise. To satisfy this condition, the Project owner shall acquire, protect and transfer no fewer than 1,864 acres of desert tortoise habitat lands (adjusted to reflect the final Project footprint), and shall also

provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and comply with other related requirements in this condition. Costs of these requirements are estimated to be \$4,249,920 based on the acquisition of 1,864 acres and estimated per-acre costs of \$500 for acquisition, \$330 for initial habitat improvement, and \$1,450 for long-term management. The actual costs to comply with this condition will vary depending on the final footprint of the Project, the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a PAR report. The 1,864-acre habitat requirement, and associated funding requirements based on that acreage, will be adjusted up or down if there are changes in the final footprint of the Project.

Condition **BIO-29** may provide the Project owner with another option for satisfying some or all of the requirements in this condition.

The requirements for the acquisition, initial improvement, protection and long-term maintenance and management of compensation lands include all of the following:

1. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:
 - a. be within the Colorado Desert Recovery Unit, with potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise designated critical habitat, known populations of desert tortoise, and/or other preserve lands;
 - b. provide habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;
 - c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;
 - d. be connected to lands where desert tortoises can be reasonably expected to occur currently occupied by desert tortoise, based on habitat or historic occurrences, ideally with populations that are stable, recovering, or likely to recover;
 - e. not have a history of intensive recreational use or other disturbance that does not have the capacity to regenerate naturally when disturbances are removed or might make habitat recovery and restoration infeasible;
 - f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;

- g. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and
 - h. have water and mineral rights included as part of the acquisition, unless the CPM, in consultation with CDFG, BLM and USFWS, agrees in writing to the acceptability of land without these rights.
2. Review and Approval of Compensation Lands Prior to Acquisition. The Project owner shall submit a formal acquisition proposal to the CPM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above, and must be approved by the CPM. The CPM will share the proposal with and consult with CDFG, BLM and the USFWS before deciding whether to approve or disapprove the proposed acquisition.
 3. Compensation Lands Acquisition Requirements. The Project owner shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, has approved the proposed compensation lands:
 - a. Preliminary Report. The Project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the CPM. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, in consultation with CDFG, BLM and the USFWS. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.
 - b. Title/Conveyance. The Project owner shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement, as required by the CPM in consultation with CDFG. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM or other public agency approved by the CPM in consultation with CDFG. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFG or another entity approved by the CPM. If an entity other than CDFG holds a conservation easement over the compensation lands, the CPM may require that CDFG or another entity approved by the CPM, in consultation with CDFG, be named a third party beneficiary of the conservation easement. The Project owner

shall obtain approval of the CPM, in consultation with CDFG, of the terms of any transfer of fee title or conservation easement to the compensation lands.

- c. Initial Protection and Habitat Improvement. The Project owner shall fund activities that the CPM, in consultation with the CDFG, USFWS and BLM, requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities is estimated at \$330 an acre, but will vary depending on the measures that are required for the compensation lands. A non-profit organization, CDFG or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965), if it meets the approval of the CPM in consultation with CDFG, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.
- d. Property Analysis Record. Upon identification of the compensation lands, the Project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the CPM, in consultation with CDFG, before it can be used to establish funding levels or management activities for the compensation lands.
- e. Long-term Maintenance and Management Funding. The Project owner shall provide money to establish an account with non-wasting capital that will be used to fund the long-term maintenance and management of the compensation lands. The amount of money to be paid will be determined through an approved PAR or PAR-like analysis conducted for the compensation lands. The amount of required funding is initially estimated to be \$1,450 for every acre of compensation lands. If compensation lands will not be identified and a PAR or PAR-like analysis completed within the time period specified for this payment (see the verification section at the end of this condition), the Project owner shall either provide initial payment of \$2,702,800 (calculated at \$1,450 an acre for 1,864 acres) or the Project

owner shall include \$2,702,800 to reflect this amount in the security that is provided to the Energy Commission under section 3.h. of this condition. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project footprint as described above. If an initial payment is made based on the estimated per-acre costs, the Project owner shall deposit additional money as may be needed to provide the full amount of long-term maintenance and management funding indicated by a PAR or PAR-like analysis, once the analysis is completed and approved. If the approved analysis indicates less than \$1,450 an acre will be required for long-term maintenance and management, the excess paid will be returned to the Project owner. The Project owner must obtain the CPM's approval of the entity that will receive and hold the long-term maintenance and management fund for the compensation lands. The CPM will consult with CDFG before deciding whether to approve an entity to hold the Project's long-term maintenance and management funds.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fund holder/manager to ensure the following requirements are met:

- i. Interest. Interest generated from the initial capital long-term maintenance and management fund 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 that is approved by the CPM in consultation with CDFG and is designed to protect or improve the habitat values of the compensation lands.
- ii. Withdrawal of Principal. The long-term maintenance and management fund principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or by the approved third-party long-term maintenance and management fund manager, to ensure the continued viability of the species on the compensation lands.
- iii. Pooling Long-Term Maintenance and Management Funds. An entity approved to hold long-term maintenance and management funds for the Project may pool those funds with similar non-wasting funds that it holds from other projects for long-term maintenance and management of compensation lands for local populations

of desert tortoise. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the CPM and CDFG..

- f. Other expenses. In addition to the costs listed above, the Project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to the title and document review costs incurred from other state agency reviews, overhead related to providing compensation lands to CDFG or an approved third party, escrow fees or costs, environmental contaminants clearance, and other site cleanup measures.
- g. Management plan. The Project owner or approved third party shall prepare a management plan for the compensation lands in consultation with the entity that will be managing the lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.
- h. Mitigation Security. The Project owner shall provide financial assurances to the CPM, with copies of the final document to CDFG, to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing Project activities. Financial assurances shall be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security (“Security”) approved by the CPM in consultation with CDFG. Prior to submitting the Security to the CPM, the Project owner shall obtain the CPM’s approval, in consultation with CDFG, of the form of the Security. The CPM may draw on the Security if the CPM determines the Project owner has failed to comply with the requirements specified in this condition. The CPM may use money from the Security solely for implementation of the requirements of this condition, The CPM’s use of the Security to implement measures in this condition may not fully satisfy the Project owner’s obligations under this condition. The Security shall be returned to the Project owner in whole or in part upon successful completion of the associated requirements in this condition.

Security shall be provided in the amount of \$4,249,920, calculated as follows but adjusted as specified below:

- i. land acquisition costs for compensation land, calculated at \$500/acre = \$932,000.

- ii. initial protection and habitat improvement activities on the compensation land, calculated at \$330/acre = \$615,120.
- iii. long-term maintenance and management on the compensation land calculated at \$1,450/acre = \$2,702,800.

The amount of security shall be adjusted for any change in the Project footprint as described above. In addition, the amount of Security specified in this section may be reduced in proportion to any of the secured mitigation requirements that the Project owner has completed at the time the Security is required to be submitted. For example, if the Project owner transfers funds for long-term management of the compensation lands to an entity approved to hold those funds, the Security would not include any amount for long-term maintenance and management of the lands. The Project owner will be entitled to partial or complete release of the Security as the secured mitigation requirements are successfully completed.

- i. The Project owner may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF). To use this option, the Project owner must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the Project owner, the Project owner shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, or the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the applicant, the remaining balance shall be returned to the Project owner.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat

conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM, in consultation with CDFG, BLM and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

Verification: The Project owner shall provide the CPM with written notice at least 30 days prior to the start of ground-disturbing activities on the Project site.

If the mitigation actions required under this condition are not completed at least 30 days prior to the start of ground-disturbing activities, the Project owner shall provide the CPM with approved Security at least 30 days prior to the start of Project ground-disturbing activities

No later than 12 months after the start of ground-disturbing Project activities, the Project owner shall submit a formal acquisition proposal to the CPM describing the parcels intended for purchase, and shall obtain approval from the CPM, in consultation with CDFG, BLM and USFWS, prior to the acquisition. If NFWF or another approved third party is handling the acquisition, the Project owner shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The Project owner or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM, CDFG, BLM and USFWS of such completion, no later than 18 months after the start of Project ground-disturbing activities. If NFWF or another approved third party is being used for the acquisition, the Project owner shall ensure that funds needed to accomplish the acquisition are transferred in timely manner to facilitate the planned acquisition and to ensure the land can be acquired and transferred prior to the 18-month deadline,

The Project owner shall complete and submit to the CPM a PAR or PAR-like analysis no later than 60 days after the CPM approves compensation lands for acquisition. The Project owner shall fully fund the required amount for long-term maintenance and management of the compensation lands no later than 30 days after the CPM approves a PAR or PAR-like analysis of the anticipated long-term maintenance and management costs of the compensation lands. Written verification shall be provided to the CPM and CDFG to confirm payment of the long-term maintenance and management funds.

No later than 60 days after the CPM determines what activities are required to provide for initial protection and habitat improvement on the compensation lands, the Project owner shall make funding available for those activities and provide written verification to the CPM of what funds are available and how costs will be paid. Initial protection and habitat improvement activities on the compensation lands shall be completed, and written verification provided to the CPM, no later than six months after the CPM's determination of what activities are required on the compensation lands.

The Project owner, or an approved third party, shall provide the CPM, CDFG, BLM and USFWS with a management plan for the compensation lands within 180 days of the land or easement purchase, as determined by the date on the title. The CPM, in consultation

with CDFG, BLM and the USFWS, shall approve the management plan after its content is acceptable to the CPM.

Within 90 days after completion of all project related ground disturbance, the Project owner shall provide to the CPM, CDFG, BLM and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during Project construction. This shall be the basis for the final number of acres required to be acquired.

RAVEN MANAGEMENT PLAN

BIO-13 The Project owner shall implement a raven monitoring and control plan that is consistent with the most current USFWS-approved raven management guidelines, and which meets the approval of the CPM, in consultation with USFWS. The draft Common Raven Monitoring, Management, and Control Plan (Raven Plan) submitted by the Applicant (TTEC 2010r) shall provide the basis for the final plan, subject to review and revisions and approval from the CPM and USFWS. The Raven Plan shall include but not be limited to a program to monitor increased raven presence in the Project vicinity and to 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 threshold for implementation of raven control measures shall be any increases in raven numbers from baseline conditions, as detected by monitoring proposed in the Raven Plan. In addition, to offset the cumulative contributions of the Project to desert tortoise from increased raven numbers, the Project owner shall also contribute to the USFWS Regional Raven Management Program. The Project owner shall do all of the following:

1. Prepare and Implement a Raven Management Plan that includes the following:
 - 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, and;
 - e. Discuss reporting requirements.
2. Contribute to the USFWS Regional Raven Management Program. 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 USFWS Regional Raven Management Program. The amount shall be a one-time payment of \$105 per acre of permanent disturbance.

Verification: No less than 30 days prior to any construction-related ground disturbance activities, the Project owner shall provide the CPM, USFWS, and CDFG with the final version of a Raven Plan. All modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written 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.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of raven management and control activities for the year; a discussion of whether raven control and management goals for the year were met; and recommendations for raven management activities for the upcoming year.

WEED MANAGEMENT PLAN

BIO-14 The Project owner shall implement a Weed Management Plan that meets the approval of the CPM. The objective of the Weed Management Plan shall be to prevent the introduction of any new weeds and the spread of existing weeds as a result of Project construction, operation, and decommissioning. The draft Weed Management Plan submitted by the Applicant (TTEC 2009g) shall provide the basis for the final plan, subject to review and revisions from the CPM. The Final Weed Management Plan shall include at a minimum the following information: specific weed management objectives and measures for each target non-native weed species; baseline conditions; a map of the Weed Management Areas; weed risk assessment and measures to prevent the introduction and spread of weeds; monitoring and surveying methods; and reporting requirements.

To ensure that weed management does not have unintended adverse effects on special-status species, the final Weed Management Plan shall be revised to be consistent with guidelines for safe use of herbicides in natural areas provided by The Nature Conservancy's The Global Invasive Species Team: <http://www.invasive.org/gist/products/library/herbsafe.pdf> The final Plan shall include detailed specifications for avoiding herbicide and soil stabilizer drift, and shall include a list of herbicides and soil stabilizers that will be used on the Project with manufacturer's guidance on appropriate use. The Plan shall indicate where the herbicides will be used, and what techniques will be used to avoid chemical drift or residual toxicity to special-status species and their pollinators, and consistent with the Nature Conservancy guidelines and the criteria under #2, below.

The final plan shall only include weed control measures for target weeds with a demonstrated record of success, based on the best available information from The Nature Conservancy's The Global Invasive Species

Team, California Invasive Plant Council: http://www.cal-ipc.org/ip/management/plant_profiles/index.php , and the California Department of Food & Agriculture Encyclopedea: http://www.cdfa.ca.gov/phpps/ipc/encyclopedea/encyclopedea_h p.htm. The methods shall meet the following criteria:

1. **Manual:** well-timed removal of plants or seed heads with hand tools; seed heads and plants must be disposed of in accordance with guidelines from the Riverside County Agricultural Commissioner.
2. **Chemical:** Herbicides known to have residual toxicity, such as pre-emergents and pellets, shall not be used in natural areas or within the engineered channels. Only the following application methods may be used: wick (wiping onto leaves); inner bark injection; cut stump; frill or hack & squirt (into cuts in the trunk); basal bark girdling; foliar spot spraying with backpack sprayers or pump sprayers at low pressure or with a shield attachment to control drift, and only on windless days, or with a squeeze bottle for small infestations (see Nature Conservancy guidelines described above);
3. **Biological:** Biological methods may be used subject to review and approval by CDFG and USFWS and only if approved for such use by CDFG, and are either locally native species or have no demonstrated threat of naturalizing or hybridizing with native species;
4. **Mechanical:** disking, tilling, and mechanical mowers or other heavy equipment shall not be employed in natural areas but hand weed trimmers (electric or gas-powered) may be used. Mechanical trimmers shall not be used during periods of high fire risk and shall only be used with implementation of fire prevention measures (GSEP 2009a).

Verification: No less than 10 days prior to start of any Project-related ground disturbance activities, the Project owner shall provide the CPM with the final version of a Weed Management Plan that has been reviewed and approved by Energy Commission staff, USFWS, and CDFG. Modifications to the approved Weed Control Plan shall be made only after consultation with the Energy Commission staff, USFWS, and CDFG.

Within 30 days after completion of Project construction, the Project owner shall provide to the CPM for review and approval, a written report identifying which items of the Weed Management 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.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM that includes: a summary of the results of noxious weeds surveys and management activities for the year; a discussion of whether weed management goals for the year were met; and recommendations for weed management activities for the upcoming year.

PRE-CONSTRUCTION NEST SURVEYS AND AVOIDANCE MEASURES

BIO-15 Pre-construction nest surveys shall be conducted if construction activities would occur at any time during the period of February 1 through July 31. The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993). The goal of the nesting surveys shall be to identify the general location of the nest sites, sufficient to establish a protective buffer zone around the potential nest site, and need not include identification of the precise nest locations. Surveyors performing nest surveys shall not concurrently be conducting desert tortoise surveys. The bird surveyors shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the Project site or within 500 feet of the boundaries of the site (including linear facilities);
2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys shall be conducted within the 7-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks, 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 buffer zone and monitoring plan shall be developed. The size of the buffer zone shall be developed in consultation with CDFG and shall be determined based on the species specific alert distance and flush initiation distance⁷. Nest locations shall be mapped and submitted, along with a 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, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: At least 10 days prior to the start of any Project-related ground disturbance activities, 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(s) that would be avoided during project construction.

⁷ Alert distance refers to the distance between an animal and an activity when the animal becomes visibly alert (as evidenced by cessation of feeding and scrutiny of activity). Flush initiation distance, also called flight distance, refers to the distance between the animal and an activity when the animal takes flight (Taylor and Knight 2003).

No later than January 31st of every year following construction a follow-up report shall be provided to the CPM, CDFG, and USFWS describing the success of the buffer zones in preventing disturbance to nesting activity and a brief description of the outcome of the nesting effort (for example, whether young were successfully fledged from the nest or if the nest failed).

AVIAN PROTECTION PLAN

BIO-16 The Project owner shall prepare and implement an Avian Protection Plan to monitor 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 Project owner shall use the monitoring data to inform and develop an adaptive management program that would avoid and minimize Project-related avian impacts. Project-related bird deaths or injuries shall be reported to the CPM, CDFG and USFWS. The CPM, in consultation with CDFG and USFWS, shall determine if the Project-related bird deaths or injuries warrant implementation of adaptive management measures contained in the Avian Protection Plan. The study design for the Avian Protection Plan shall be approved by the CPM in consultation with CDFG and USFWS, and, once approved, shall be incorporated into the project's BRMIMP and implemented.

Verification: No less than 30 days prior to the start of construction-related ground disturbance activities the Project owner shall submit to the CPM, USFWS and CDFG a final Avian Protection Plan. Modifications to the Avian Protection Plan shall be made only after approval from the CPM.

For one year following the beginning of power plant 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 deaths or injuries detected during the monitoring study or at any other time, and describe adaptive management measures implemented to avoid or minimize deaths or injuries. 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.

No later than January 31st of every year 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 and adaptive management measures are necessary. After two years of data collection the project owner or contractor shall prepare a report that describes the study design and monitoring results of the Avian Protection Plan. The report shall be submitted to the CPM, CDFG and USFWS no later than the third year after onset of Project operation.

AMERICAN BADGER AND DESERT KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-17 To avoid direct impacts to American badgers and desert kit fox, pre-construction 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 and kit fox dens in the Project area, including areas within 250 feet of all Project facilities, utility corridors, and access roads. Surveys may be concurrent with desert tortoise surveys. If dens are detected each den shall be classified as inactive, potentially active, or definitely active.

Inactive dens 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 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, and especially if high or low ambient temperatures could potentially result in harm to kit fox or badger from burrow exclusion, various passive hazing methods may be used to discourage occupants from continued use. 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. BLM approval may be required prior to release of badgers on public lands.

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, impact avoidance and minimization measures implemented, and the results of those measures.

BURROWING OWL IMPACT AVOIDANCE, MINIMIZATION, AND COMPENSATION MEASURES

BIO-18 The Project owner shall implement the following measures to avoid, minimize and offset impacts to burrowing owls:

1. Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after or from one hour before to two hours after sunrise. The survey area shall include the Project Disturbance Area and surrounding 500 foot survey buffer.

2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the Project Disturbance Area the following avoidance and minimization measures shall be implemented:
 - a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.
 - b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.
3. Relocation of Burrowing Owls. If pre-construction surveys indicate the presence of burrowing owls within the Project Disturbance Area (the Project Disturbance Area means all lands disturbed in the construction and operation of the Genesis Project), the Project owner shall prepare and implement a Burrowing Owl Relocation and Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Relocation and Mitigation Plan shall be approved by the CPM, in consultation with USFWS, BLM and CDFG, and shall:
 - a. Identify and describe suitable relocation sites within 1 mile of the Project Disturbance Area, and describe measures to ensure that burrow installation or improvements would not affect sensitive species habitat or existing burrowing owl colonies in the relocation area;
 - b. Provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, including a discussion of timing of burrow improvements, specific location of burrow installation, and burrow design. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG, BLM and USFWS;
 - c. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area; and
 - d. Prepare a monitoring and management of the relocated burrowing owl site, and provide a reporting plan. The objective of the plan

shall be to manage the relocation area for the benefit of burrowing owls, with the specific goals of:

- i. maintaining the functionality of the burrows
- ii. 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 percent cover of the shrub and herb layers.

4. Acquire Compensatory Mitigation Lands for Burrowing Owls. The following measures for compensatory mitigation shall apply only if burrowing owls that are detected within the Project Disturbance Area. The Project owner shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. Staff anticipates displacement of two owls for a total of 39 acres of compensatory mitigation land. The Project owner shall provide funding for the enhancement and long-term management of these compensation lands. The acquisition and 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. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat.

- a. Criteria for Burrowing Owl Mitigation Lands. The terms and conditions of this acquisition or easement shall be as described in Paragraph 1 of **BIO-12** [Desert Tortoise Compensatory Mitigation], with the additional criteria to include: 1) the 39 acres of mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be within dispersal distance from an active burrowing owl nesting territory (generally approximately 5 miles). The 39 acres of burrowing owl mitigation lands may be included with the desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the 39 acre of burrowing owl mitigation land is separate from the acquisition required for desert tortoise compensation lands, the Project owner shall fulfill the requirements described below in this condition.
- b. Security. The Security measures described below is based on the assumption that two owls would be impacted by construction of the Project, and would therefore require 39 acres of compensatory mitigation land. If the 39 acres of burrowing owl mitigation land is separate from the acreage required for desert tortoise compensation lands the Project owner or an approved third party

shall complete acquisition of the proposed compensation lands prior to initiating ground-disturbing Project activities. Alternatively, financial assurance can be provided by the Project owner to the CPM with copies of the document(s) to CDFG, BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measure described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG, BLM and the USFWS to ensure funding. As of the publication of the RSA, this amount is \$44,460 but this amount may change based on land costs or the estimated costs of enhancement and endowment (see subsection C.2.4.2, Desert Tortoise, for a discussion of the assumptions used in calculating the Security, which are based on an estimate of \$2,280 per acre to fund acquisition, enhancement, and long-term management). The final amount due will be determined by the PAR analysis conducted pursuant to **BIO-12**.

Verification: If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM, BLM, CDFG and USFWS documentation indicating that non-disturbance buffer fencing has been installed at least 10 days prior to the start of any construction-related ground disturbance activities. The Project owner shall report monthly to the CPM, CDFG, BLM and USFWS for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the Project owner shall provide to the CPM, BLM, CDFG and USFWS a written construction termination report identifying how mitigation measures described in the plan have been completed.

If pre-construction surveys detect burrowing owls within the Project Disturbance Area, the Project owner shall notify the CPM, BLM, CDFG and USFWS no less than 10 days of completing the surveys that a relocation of owls is necessary. The Project owner shall do all of the following if relocation of one or more burrowing owls is required:

- a. Within 30 days of completion of the burrowing owl pre-construction surveys, submit to the CPM, CDFG and USFWS a Burrowing Owl Relocation and Mitigation Plan.
- b. No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Project owner, or an approved third party, shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the 39-acre parcel intended for purchase. At the same time the Project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.
- c. Within 90 days 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, BLM and USFWS, for the compensation lands and associated funds.

- d. No later than 30 days prior to the start of construction-related ground disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification.
- e. No later than 18 months after the start of construction-related ground disturbance activities, the Project owner shall provide written verification to the CPM, BLM, CDFG and USFWS that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient.
- f. On January 31st of each year following construction for a period of five years, the Designated Biologist shall provide a report to the CPM, USFWS, BLM and CDFG that describes the results of monitoring and management of the burrowing owl relocation area. The annual report shall provide an assessment of the status of the relocation area with respect to burrow function and weed infestation, and shall include recommendations for actions the following year for maintaining the burrows as functional burrowing owl nesting sites and minimizing the occurrence of weeds.

SPECIAL-STATUS PLANT IMPACT AVOIDANCE, MINIMIZATION AND COMPENSATION

BIO-19 The Project owner shall implement the following measures to avoid, minimize, and mitigate impacts to special-status plant species:

Section A: Special-Status Plant Avoidance and Minimization Measures

To protect all special-status plants located within 100 feet of the permitted Project Disturbance Area (including access roads, staging areas, laydown areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure, the Project owner shall implement the following measures:

1. Designated Botanist. An experienced botanist who meets the qualifications described in Section **B-2** below shall oversee compliance with all special-status plant avoidance, minimization, and compensation measures described in this condition throughout construction, operation, and closure. The Designated Botanist shall oversee and train all other Biological Monitors tasked with conducting botanical survey and monitoring work.
2. Special-Status Plant Impact Avoidance and Minimization Plan. The Project owner shall develop and implement a Special-Status Plant Impact Avoidance and Minimization Plan and shall incorporate the Plan into the BRIMP (**BIO-7**). The Plan shall include the following elements:
 - a. Site Design Modifications: Incorporate site design modifications to minimize impacts to special-status plants along the Project linears: limiting the width of the work area; adjusting the location of staging areas, lay downs, spur roads and poles or towers; driving and crushing vegetation as an alternative to blading temporary roads to preserve the

seed bank, and minor adjustments to the alignment of the roads and pipelines within the constraints of the ROW. Modify the engineered channel discharge points to maintain the natural surface drainage patterns between the engineered channel and the outlet of the natural washes at Ford Dry Lake. These modifications shall be clearly depicted on the grading and construction plans, and on report-sized maps in the BRMIMP;

- b. Establish Environmentally Sensitive Areas (ESAs). Before construction establish ESAs to protect avoided plants. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. The boundaries of the ESAs shall be placed a minimum of 20 feet from the uphill side of the occurrence and 10 feet from the downhill side, and shall be clearly delineated in the field with temporary construction fencing and signs prohibiting movement of the fence under penalty of work stoppages and additional compensatory mitigation. ESAs shall also be permanently marked (with signage or other markers) to ensure that avoided plants are not inadvertently harmed during construction, operation, or closure.
- c. Special-Status Plant Worker Environmental Awareness Program (WEAP). The Plan shall include training components specific to protection of special-status plants, and shall be incorporated into the WEAP described in **BIO-6**;
- d. Herbicide and Soil Stabilizer Drift Control Measures. The Plan shall provide detailed specifications for avoiding herbicide and soil stabilizer drift, and shall include a list of herbicides and soil stabilizers that will be used on the Project with manufacturer's guidance on appropriate use. The Plan shall indicate where the herbicides will be used, and what techniques will be used to avoid chemical drift or residual toxicity to special-status plants, consistent with guidelines provided by the Nature Conservancy's The Global Invasive Species Team <<http://www.invasive.org/gist/products.html>>
- e. Erosion and Sediment Control Measures. The Plan shall include measures to ensure that erosion and sediment control measures do not inadvertently impact special-status plants (e.g., by using invasive or non-native plants in seed mixes, introducing pest plants through contaminated seed or straw, etc.). These measures shall be incorporated in the Storm Water Pollution Prevention Plan.
- f. Avoid Special-Status Plant Occurrences. Designate spoil areas; equipment, vehicle, and materials storage areas; parking; equipment and vehicle maintenance areas, and; wash areas at least 100 feet from any ESAs.

- g. Monitoring and Reporting Requirements. The Designated Botanist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences during construction, operation, or decommissioning activities within 100 feet of the occurrences, and quarterly monitoring for the remainder of construction. The Project owner shall also conduct annual monitoring of the avoided occurrences on-site, and off-site occurrences that are adjacent to the Project, for the life of the Project (see Verification, below).
- h. Seed Collection. Conduct pre-construction collection of seed (or other propagules) of the affected special-status plants within the Project Disturbance Area in the summer-fall season prior to the start of construction and according to the seed collection and storage guidelines contained in (Wall 2009a; Bainbridge 2007). Collection of seed (or other propagules) shall be done by the Rancho Santa Ana Botanic Garden (RSABG) Conservation Program staff or other qualified seed or restoration specialist. The Project owner shall be responsible for all costs associated with seed storage. All seed storage shall occur at RSABG or other qualified seed dealer and at least 40 percent of the collected seed shall remain in long-term storage at RSABG Seed Conservation Program, San Diego Natural History Museum, or other qualified seed conservation program, and made available for contingency efforts in the event of on-site or off-site mitigation failure.

Section B: Conduct Late-Season Botanical Surveys

The Project owner shall conduct late-summer/fall botanical surveys for late-season special-status plants as described below:

1. Survey Timing. Surveys shall be timed to detect: a) summer annuals triggered to germinate by the warm, tropical summer storms (which may occur any time between June and October), and b) fall-blooming perennials that respond to the cooler, later season storms that originate in the Pacific northwest (typically beginning in September or October). The surveys shall not be timed to coincide with the statistical peak bloom period of the target species but shall instead be based on plant phenology and the timing of a significant storm event (i.e., a 10mm or greater rain or storm event, as measured at or within 1 mile of the Project site). Surveys for summer annuals shall be timed to occur approximately 4 to 7 weeks following a warm, tropical storm. Re-surveys shall occur as many times as necessary to ensure that surveys are conducted during the appropriate identification period for the target taxa, which may be blooms, fruit, seed characteristics, or vegetative characteristics, depending on the taxon.
2. Surveyor Qualifications and Training. Surveys shall be conducted by a qualified botanist knowledgeable in the complex biology of the local flora, and consistent with CDFG protocols (CDFG 2009). The botanical survey crew shall be prepared to mobilize quickly to conduct appropriately timed surveys. Each surveyor shall be equipped with a GPS unit and record a

complete tracklog; these data shall be compiled and submitted along with the Summer-Fall Survey Botanical Report (described below). Prior to the start of surveys, all crew members shall, at a minimum, visit reference sites (where available) and/or review herbarium specimens of all BLM Sensitive plants, CNPS List 1B or 2 (Nature Serve rank S1 and S2) or proposed List 1B or 2 taxa (including Coachella Valley milk-vetch), and any new reported or documented taxa, to obtain a search image. Because range extensions are likely to be found, the list of potentially occurring special-status plants shall include all special-status taxa known to occur within the Sonoran Desert region and the eastern portion of the Mojave in California. The list shall also include taxa with bloom seasons that begin in fall and extend into the early spring as many of these are reported to be easier to detect in fall, following the start of the fall rains.

3. Survey Coverage. At a minimum, the Applicant shall conduct comprehensive surveys (i.e., 100 percent visual coverage) of the washes, playa margins, dune swales, and other lowlands within the Project Disturbance Area and downstream to the playa margin to capture the full extent of the washes that will be affected by diversions into the engineered channel. In the intervening uplands (dry areas), surveys shall be conducted to ensure a 25 percent visual coverage. Other special or unique habitats associated with rare plants (such as dunes, washes, and chenopod scrubs at the playa margin) shall also be surveyed at 100 percent visual coverage. Transects shall be “intuitive controlled” (per Whiteaker et al. 1998) to ensure a focus on habitat most likely to support rare plants (such as desert washes or dunes), rather than on pre-defined, evenly-spaced survey grids. In the one-mile CEC buffer areas (outside the Project Disturbance Area), washes, dunes, and other habitats strongly associated with rare plants shall also be surveyed comprehensively (i.e., 100 percent visual coverage) if they will be affected by diversions into the engineered channel but the intervening uplands or habitat not strongly associated with rare plants may be spot-checked or sampled at approximately 10 percent visual coverage.
4. Documenting Occurrences. If a special-status plant is detected, the full extent of the population shall be assessed, both onsite and offsite. The number of individuals shall be counted (or sub-sampled and the population size estimated in the event of large populations). The boundaries of all occurrences shall be recorded with hand-held GPS units of one meter or better accuracy and then plotted on aerial photo base maps of a scale similar to that used in the AFC (GSEP 2009a). All but the smallest populations (e.g., a population occupying less than 100 square feet) shall be recorded as area polygons; small populations may be recorded as point features. All GPS-recorded occurrences shall include: the number of plants, phenology, observed threats (e.g., OHV or invasive exotics), and habitat or community type. The map of occurrences submitted with the progress reports and final botanical report shall be prepared to ensure consistency with mapping protocol and definitions of occurrences in CNDDDB: occurrences found within 0.25 miles of another

occurrence of the same taxon, and not separated by significant habitat discontinuities, shall be combined into a single 'occurrence'. The Project Owner shall also submit the raw GPS shape files and metadata.

5. Reporting. Progress Reports shall be submitted during surveys (as described below in verification), and shall include: a) the raw GPS data and metadata; b) a spreadsheet of the data (from the 'dbf' file), and c) a map of the data showing occurrence locations (labeled with their corresponding occurrence number from the GPS files) and Project features on a USGS topographic base map.

The Final Summer-Fall Botanical Survey Report shall be prepared consistent with CDFG guidelines (CDFG 2009), and BLM guidelines (Lund pers comm) and shall include the following components:

- a. the BLM designation, NatureServe Global and State Rank of each species or taxon found (or proposed rank, or CNPS List);
- b. the number or percent of the occurrence that will be directly affected, and indirectly affected by changes in drainage patterns or altered geomorphic processes;
- c. the habitat or plant community that supports the occurrence and the total acres of that habitat or community type that occurs in the Project Disturbance Area;
- d. an indication of whether the occurrence has any local or regional significance (e.g., if it exhibits any unusual morphology, occurs at the periphery of its range in California, represents a significant range extension or disjunct occurrence, or occurs in an atypical habitat or substrate);
- e. a completed CNDDDB field form for every occurrence, and;
- f. two maps: one that depicts the raw GPS data (as collected in the field) on a topographic base map with Project features; and a second map that follows the CNDDDB protocol for occurrence mapping, which lumps two or more occurrences of the same species within one-quarter mile or less of each other into one occurrence.

Section C: Triggers for Implementation of Mitigation for Special-Status Plants Detected in the Summer/Fall 2010 Surveys

The standards listed below establish criteria that would trigger implementation of additional mitigation measures for impacts to late summer/fall season special status plant species (if detected during the surveys required under Section B of this Condition). These mitigation measures, described in Section D below, would reduce impacts to any special-status plant species detected during the late summer/fall plant surveys to less than significant levels. These rankings are based on the internationally accepted Natural Heritage Methodology, available online at:

<http://www.natureserve.org/prodServices/heritagemethodology.jsp> Included in this methodology is the NatureServe global and state ranking process (www.natureserve.org/explorer/ranking) which provides an estimate of extinction risk worldwide and in California (Master et al. 2009). Avoidance and Minimization Measures described in Section A of this condition are required for all special-status plants, regardless of NatureServe rank or CNPS List.

1. Triggers. The following triggers for implementation of mitigation are not intended for use beyond their use in the application of this Condition (Subsection C):
 - a. Level 1 Trigger. BLM requests 100 percent avoidance for BLM Sensitive species (most G1 or G2 species are BLM Sensitive) but BLM's State Botanist will decide the level of avoidance on a case-by-case basis. Any impacts to non-BLM Sensitive species with a NatureServe Global Rank of G1 or G2 will trigger mitigation as described in Section D below.
 - b. Level 2 Trigger. Any impact to a taxon with a NatureServe Global Rank of G3 or G4 and a CNDDDB State Rank of S1 or S2 will trigger mitigation described in Section D below. Off-site mitigation shall be required as described in Section D, below, for impacts to greater than 25 percent of the total population of a G3 or G4 taxa with a state rank of S1 or S2.
 - c. Level 3 Trigger. If the project would impact more than 30 percent of the total known and documented occurrences of a taxon with a NatureServe Global Rank of G3, G4, or G5 and a CNDDDB State Rank of S3, off-site mitigation shall be required, as described in Section D below.
2. Adjustments for Triggers. The levels of protection for a taxon may be adjusted under the following scenarios:
 - a. State- or Federal-Listed Species. If a state or federal-listed species is detected, the Project owner shall immediately notify the CDFG, USFWS, and the CPM, and comply with all measures contained in this condition as well as the terms and conditions of any applicable federal permit, including avoidance and reconfiguration if required.
 - b. Local or Regional Significance. CNPS List 4 (typically assigned a State rank of 3) shall be adjusted to a higher level of protection if the plant occurrence has local or regional significance not captured by the above rankings. According to CDFG protocol (CDFG 2009): "List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity shall be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. CNPS List 3 and 4 may be considered regionally significant if, e.g., the occurrence is located at

the periphery of the species' range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate.”

A plant occurrence of any rank may be assigned a five percent higher level of protection in its ranking if the plant occurrence exhibits one or more of the following features:

- i. occurs at the outermost periphery of its range in California;
 - ii. represents a significant range extension or disjunct occurrence (e.g., is located outside of the 9-quad region centered on the nearest known occurrence);
 - iii. is in an atypical habitat, region, or elevation for the taxon that suggests that the occurrence may have genetic significance (e.g., that may increase its ability to survive future threats), or;
 - iv. exhibits any unusual morphology that is not clearly attributable to environmental factors that may indicate a potential new variety or sub-species.
- c. Significant Cumulative Effects. The assessment of known threats from over 50 sources are considered and reflected in the CNDDDB threat rank, including renewable energy (see http://www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf , “Threats”).
- d. Ownership/Management Threats. The degree to which a taxon’s occurrences are adequately protected and managed is not included in the set of core factors used for NatureServe rankings that pre-date the 2009 revised protocols (Master et al. 2009). The threats to special-status plants with many occurrences on private lands without conservation easements, or on BLM lands managed for multiple uses (outside of a DWMA) will be captured in the new rankings available in summer 2010.
- e. New, Un-Described Taxa and Other Occurrences of Questionable Taxonomic Status. BLM will treat new un-described taxa as if they are BLM Sensitive, and requests 100 percent avoidance, but BLM’s State Botanist will decide the level of avoidance on a case-by-case basis. Proposed additions to the CNPS Inventory, including any new un-described taxa that are proposed additions to the CNPS Inventory, will be treated as Proposed unless rejected by the CNPS Rare Plant Botanist after the initial literature review and consultation with the network of botanists, representing state and federal agencies, consulting firms, and academic institutions. A description of the peer review process is available at: <http://www.cnps.org/cnps/rareplants/>. Typically, under NatureServe and CNPS ranking protocol, plants with a questionable taxonomy are assigned a lower conservation priority with

the caveat that resolution of this uncertainty may result in a status change that may be lower or higher than originally assigned.

3. Basis for Assessing Total Documented Occurrences. The accounting or inventory of the species' total known or documented occurrences shall be based on the following sources: CNDDDB processed and unprocessed data; California Consortium of Herbaria and other herbaria records; BLM records; survey data from other renewable energy projects and other related projects for which survey data is available; and reported occurrences by qualified botanists accompanied by a completed CNDDDB or similar field form (with or without voucher specimens). Data considered unreliable include: range implied in literature but without collection numbers or specific location information and anecdotal reports without documentation or from non-credible sources. Occurrences based on historic (pre-CEQA, or pre-1972) collections that have not since been verified will not be considered unless verified and documented by one of the sources described above.

Section D: Mitigation Measures for Special-Status Plants

Special-Status Plant Mitigation Plan. Upon completion of the summer-fall 2010 surveys, (see Section B of this Condition), the Project owner shall prepare a Special-Status Plant Mitigation Plan that includes all of the mitigation requirements described in the special-status plant impact analysis of this Revised Staff Assessment (see Section C.2.4.2) for: Harwood's eriastrum; Harwood's milk-vetch; desert unicorn plant, and ribbed cryptantha. The Plan shall also include the mitigation requirements for any additional special-status plants found during the summer-fall 2010 surveys (see Sections B and C of this Condition) in accordance with the mitigation triggers described above (Section C of this condition) and that meet the performance standards specified below. Avoidance and Minimization Measures described in Section A of this condition are required for all special-status plants, regardless of NatureServe rank or CNPS List.

1. On-Site Avoidance. BLM requests 100 percent avoidance for BLM Sensitive species but BLM's State Botanist will decide the level of avoidance on a case-by-case basis. On-site avoidance shall also be required if the impact to a special-status species with a NatureServe Global Rank of G1 or G2 exceeds 10 percent of the species' known and documented occurrences (see 'Level 1 Trigger', Section C of this Condition). Under this scenario, the Project owner shall be required to avoid a minimum of 75 percent of the total population. For perennial taxa the percent avoidance shall be measured based on the percentage of the total individuals affected; for annuals the percent avoidance shall be measured based on the total area occupied by the occurrence plus any additional habitat deemed essential for maintaining healthy, reproductive populations (BLM CDD 2002). The Project owner shall implement all measures described in Section A of this Condition to protect the avoided occurrence from accidental direct and indirect effects during construction, operation, and closure.

2. Off-Site Compensatory Mitigation. One or more of the following options for mitigation may be used to reduce Level 2 and Level 3 impacts to special-status plants (see Section C of this Condition) to less than significant levels:
 - a. Acquire Off-Site Compensatory Land. To fully mitigate for the loss of special-status plants, the Project owner shall provide compensatory mitigation by acquiring, in fee title or conservation easement, lands meeting the specific criteria outlined in D-3 below, and in an amount equal to the amount of occupied special-status plant habitat disturbed by the final Project footprint. The Project footprint means all lands disturbed in the construction and operation of the Project, including all Project linears. To satisfy this condition, the Project owner shall also provide associated funding for the acquired lands, as specified in **BIO-12** Section A.
 - b. Habitat Enhancement. Implement a Habitat Enhancement Project for the rescue of an off-site occurrence that is currently assessed with a long-term decline, with an immediate threat, or an overall threat impact that is High to Very High (see NatureServe Threat Ranking system, at http://www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf , “Threats”).
 - c. Third Party. The responsibilities for implementation of an approved Habitat Enhancement Plan may be delegated by written agreement of the Energy Commission in consultation to the NFWF or other qualified land trust or public resource agency responsible for managing lands containing the site of the enhancement project. The Project owner shall deposit into the NFWF account an amount equivalent to the cost of implementing the enhancement project, subject to approval by the CPM. This Habitat Enhancement option may be implemented on public lands protected under a designation that assures management for the benefit of species and the enhancement lands, or on private lands protected in perpetuity under a conservation easement.
3. Criteria for Compensatory Acquisition Lands. If this option is selected to meet the mitigation obligations, the Project owner shall acquire, in fee title or conservation easement, lands that meet the criteria below. The responsibilities for acquisition and management of the compensation lands may be delegated by written agreement to a qualified third party, such as a non-governmental organization dedicated to habitat conservation. Additional funds shall be provided for basic long-term stewardship of the conservation easement. At a minimum, long-term management shall consist of the activities described in Land Trust Standards and Practices (Land Trust Alliance 2004, Practice 12A) <http://www.landtrustalliance.org/learning/sp/land-trust-standards-and-practices> for start-up and annual management activities, including preparation of a long-term management and monitoring plan. The amount of the long-term management and maintenance fund shall be based on PAR or PAR-like analysis. The terms and conditions for acquisition shall

be as described in **BIO-12**. The acquisition lands must be within California, and must meet one or more of the following additional requirements:

- a. Occupied and with good to excellent site integrity. Contains an occurrence of the target special-status plant. The occurrence may be smaller than the affected occurrence but must be a viable reproducing occurrence, stable or increasing (in size and reproduction), with good or better habitat quality than the affected occurrence, and with a reasonable expectation of long-term sustainability. The amount of land to be acquired shall be equivalent to the total acres of the affected occupied habitat mitigated at a ratio of 3:1 (3 acres acquired for every one acre of occupied habitat affected).
- b. Occupied but with threats to habitat quality and accompanied by an approved restoration plan. The occurrence or the site may contain threats to its integrity as long as the population or the site can be reasonably expected to recover with minor restoration (e.g., barricading ORV, excluding grazing, or minor pest plant removal) and is accompanied by a restoration plan that meets the minimum standards described in **D-5** below. The amount of land to be acquired shall be equivalent to the total acres of affected occupied habitat mitigated at a ratio of 3:1 (3 acres acquired for every one acre of occupied habitat affected), with the additional expense of preparing and implementing an approved habitat restoration plan, including long-term monitoring. The restoration plan shall be prepared in accordance with all guidelines described below.
- c. Unoccupied but adjacent to occupied habitat. The acquired habitat may be unoccupied but it improves the defensibility and long-term sustainability of the occupied habitat by expanding the buffer of protection around the occurrence so as to prevent future development of adjacent habitat and protect its connectivity to undisturbed habitat. Buffer lands may or may not be dominated by the same habitats that support the special-status plants but must provide some habitat continuity between the occupied habitat and undisturbed habitats of a high integrity beyond the buffer lands. Habitat integrity, connectivity, defensibility, and potential threats shall also be addressed in the proposal. The amount of land to be acquired shall be equivalent to the total acres of affected occupied habitat mitigated at a ratio of 4:1 (4 acres acquired for every one acre of occupied habitat affected).
- d. Unoccupied and not adjacent to occupied habitat. Must contain high-quality habitat that is critical to the maintenance or sustainability of the affected species and represent a potential reserve in the future (for either natural colonization or artificial). Good to high quality dune or playa margin habitat, sandy washes, or sand fields within Chuckwalla Valley, would be an example of acquisition not adjacent and not currently occupied but may be an important site for natural or artificial establishment of Harwood's milk-vetch and other rare plants of dune

and sandy habitats in Chuckwalla Valley. Acquired lands may also focus on linkages for species dispersal between major populations and refugia at higher elevations/more mesic habitats to accommodate species migration with future climate change. Habitat integrity, connectivity, defensibility, and potential threats shall also be addressed in the proposal. The amount of land to be acquired shall be equivalent to the total acres of affected occupied habitat mitigated at a ratio of 5:1 (5 acres acquired for every one acre of occupied habitat affected).

If all or any portion of the acquired Desert Tortoise, Mojave Fringe-toed Lizard, Dunes, Waters of the State or other required compensation lands meets the criteria above for special-status plant compensation lands, the portion of the other species' or habitat compensation lands that meets any of the criteria above may be used to fulfill that portion of the obligation for special-status plant mitigation.

4. Habitat Enhancement. As an alternative to acquisition, and subject to approval by the CPM, the Project owner may prepare and implement a Habitat Enhancement Plan that meets the following performance standards:
 - a. The proposed habitat enhancement project must achieve the rescue of an off-site occurrence that is currently assessed with: a long-term decline >30%, or; an immediate threat that affects >30% of the population, or; has an overall threat impact that is High to Very High (see NatureServe Threat Ranking system, at: http://www.natureserve.org/publications/ConsStatusAssess_StatusFactors.pdf , "Threats").
 - b. The proposed enhancement must achieve an improvement in the occurrence trend to "stable" or "increasing" status, or downgrading of the overall threat rank to slight or low (from "High" to "Very High").
 - c. Enhancement projects may include one or more of the following types of projects: i) control unauthorized vehicle use into an occurrence (or pedestrian use if clearly damaging to the species); ii) control noxious weeds that infest or pose an immediate threat to an occurrence; iii) exclude grazing by wild burros or livestock from an occurrence; or iv) restore lost or degraded hydrologic or geomorphic functions critical to the species by restoring previously diverted flows, removing obstructions to the wind sand transport corridor above an occurrence, or increasing groundwater availability for dependent species.
 - d. Other types of enhancement projects may be considered if they meet the performance standard described above. The Project owner may elect to implement the enhancement, subject to approval by the CPM. Any enhancement mitigation proposal shall be accompanied by a detailed habitat restoration and/or enhancement plan prepared in accordance with the guidelines below.

- e. In the event of failure to achieve the restoration or enhancement goals by the end of monitoring, the Project owner shall pay an amount equal to the cost of acquiring an equal number of acres of affected habitat, at a mitigation ratio of 3:1. The Habitat Enhancement Plan, subject to approval by the CPM, shall be prepared in accordance with all guidelines contained below **D-5**.
5. Guidelines for the Preparation of Habitat Enhancement/Restoration Plans. If the Habitat Enhancement option is selected (according to the criteria under **D-4**, above), the Project owner shall submit a detailed Habitat Enhancement or Restoration Plan that includes all of the following components and according to the guidelines in (a) through (j) below:
- a. Define the goals of the restoration or enhancement project and a measurable course of action developed to achieve those goals. The goals and objectives must meet the performance standard described in **D-4**, above;
 - b. Estimate the pre-impact or historical conditions (before the site was degraded by weeds or grazing or ORV, etc.), and the desired conditions;
 - c. Describe other site characteristics relevant to the restoration or enhancement project (e.g., composition of native and pest plants, topography and drainage patterns, soil types, geomorphic and hydrologic processes important to the site or species);
 - d. Describe other important ecological factors of the species being protected, restored, or enhanced such as total population, reproduction, distribution, pollinators, etc.;
 - e. Describe the restoration methods that will be used (e.g., invasive exotics control, site protection, seedling protection, propagation techniques, etc.) and the long-term maintenance required. The implementation phase of the enhancement must be completed within five years;
 - f. Provide a detailed budget and time-line, develop clear, measurable, objective-driven annual success criteria;
 - g. Develop clear, measurable monitoring methods that can be used to evaluate the effectiveness of the restoration and the benefit to the affected species. The Plan shall include a minimum of five years of quarterly monitoring and annual monitoring for the remainder of the life of the Project. At a minimum the progress reports shall include: quantitative measurements of the projects progress in meeting the enhancement project success criteria, detailed description of remedial actions taken or proposed, and contact information for the responsible parties.

- h. Ensure accountability with a reporting program that includes progress toward goals and success criteria. Include names of responsible parties.
- i. Describe the contingency plan for failure to meet annual goals.
- j. Include proof of long-term protection for the restoration site. For private lands this would include conservations easements or other deed restrictions; projects on public lands must be contained in a DWMA, WHMA, or other land use protections that will protect the mitigation site and target species.

Mitigation Security. The Project owner shall provide financial assurances to the CPM, to guarantee that an adequate level of funding is available to implement the mitigation measures described above. These funds shall be used solely for implementation of the measures associated with the Project in the event the Project owner fails to comply with the requirements specified in this condition. The CPM's use of the security to implement measures in this condition may not fully satisfy the Project owner's obligations under this condition. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account, or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with BLM, to ensure funding. The amount of the security shall be determined according to the mitigation ratios described in **D-3** (a) through (d) and **D-4** of this condition. The amount of security shall be adjusted for any change in the Project footprint as described above.

In lieu of acquiring lands or undertaking the habitat enhancements itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section A.3(i) in Condition of Certification **BIO-12**. Condition of Certification **BIO-29** may provide the Project owner with another option for satisfying some or all of the requirements in this condition. The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a qualified land trust or other non-governmental organization supportive of habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the CPM in consultation with BLM prior to land acquisition, enhancement, or management activities.

Verification: Progress reports for the late summer/fall botanical surveys shall be submitted to the CPM and BLM's State Botanist on September 30, 2010 and October 30, 2010. The Final Summer-Fall Botanical Survey Report, GIS shape files and metadata shall be submitted to the BLM State Botanist and the CPM no less than 30 days prior to the start of ground-disturbing activities.

No less than 30 days prior to the start of ground-disturbing activities the Project owner shall submit grading plans and construction drawings depicting the location of Environmentally Sensitive Areas and the Avoidance and Minimization Measures contained in Section A of this Condition.

No less than 30 days prior to ground-disturbing activities the Project owner shall submit to the CPM for review and approval, in consultation with the BLM State Botanist, a draft Special-Status Plant Mitigation Plan. If state or federal listed plants are potentially affected, the Project owner shall also submit the Special-Status Plant Mitigation Plan to CDFG and USFWS. The Plan shall contain, at a minimum, a conceptual proposal for compensatory mitigation through acquisition or restoration (habitat enhancement), or both. If the habitat enhancement option is selected, the Project owner shall also submit a conceptual Habitat Enhancement Plan that includes all of the components described in Section D-5 of this condition. If avoidance is mandatory (in accordance with Section C-1 and D-1 of this condition) the draft Plan shall include grading plans and other relevant construction drawings clearly depicting the location of the avoided plants.

Within 90 days after completion of Project construction, the Project owner shall provide to the CPM an analysis with the final accounting, based on GIS analysis of post-construction aerial photography, of the amount of special-status plants and their habitat disturbed during Project construction. This shall be the basis for the final number of acres of habitat required for acquisition, as described in Section C.

The Project owner may elect to fund the acquisition and initial improvement of compensation lands through NFWF by depositing funds for that purpose into NFWF's REAT Account. Payment of the initial funds for acquisition and initial improvement must be made at least 30 days prior to the start of ground-disturbing activities.

No fewer than 90 days prior to acquisition of the property, the Project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS, and BLM describing the parcels intended for purchase and shall obtain approval from the CPM and CDFG prior to the acquisition. The PAR Analysis shall be completed no later than 18 months of the start of ground-disturbing activities, after which the amount will be adjusted.

If habitat enhancement is proposed, the final Habitat Enhancement Plan, prepared in accordance with Section D-5 shall be submitted to the CPM for review and approval no later than six months following the start of ground-disturbing activities. If acquisition is proposed, the Project owner shall submit to the CPM for review and approval, in consultation with the BLM State Botanist, a final Special-Status Plant Mitigation Plan for proposed acquisition lands no later than 18 months from the start of ground-disturbing activities.

Habitat Enhancement (if selected) shall be initiated no later than 12 months from the start of construction. The implementation phase of the enhancement project shall be completed within five years of initiation. Until completion of the five-year implementation portion of the enhancement action, a report shall be prepared and submitted as part of the Annual Compliance Report. This report shall provide, at a minimum: a summary of activities for the preceding year and a summary of activities for the following year; quantitative measurements of the Project's progress in meeting the enhancement

project success criteria; detailed description of remedial actions taken or proposed; and contact information for the responsible parties.

Implementation of the special-status plant impact avoidance and minimization measures shall be reported in the Monthly Compliance Reports prepared by the Designated Botanist. Within 30 days after completion of Project construction, the Project owner shall provide to the CPM, for review and approval in consultation with the BLM State Botanist, a written construction termination report identifying how measures have been completed.

The Project owner shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided special-status plants to the CPM and BLM State Botanist. The monitoring report shall include: dates of worker awareness training sessions and attendees, an inventory of the special-status plant occurrences and description of the habitat conditions, an indication of population and habitat quality trends, and description of the remedial action, if warranted and planned for the upcoming year.

SAND DUNES/MOJAVE FRINGE-TOED LIZARD MITIGATION

BIO-20 The Project owner shall mitigate for direct and indirect impacts to stabilized and partially stabilized sand dunes and other Mojave fringe-toed lizard habitat by acquisition of 190 acres of Mojave fringe-toed lizard habitat. The Project owner shall provide funding for the acquisition, initial habitat improvements and long-term management of the compensation lands. The 190-acre acquisition requirement, and associated funding requirements based on that acreage, will be adjusted if there are changes in the final footprint of the Project. In lieu of acquiring lands itself, the Project owner may satisfy the requirements of this condition by depositing funds into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i. of Condition of Certification **BIO-12**. Condition of Certification **BIO-29** may provide the Project owner with another option for satisfying some or all of the requirements in this condition.

The requirements for acquisition, initial improvement and long-term management of compensation lands include all of the following:

1. Criteria for Compensation Lands: The compensation lands selected for acquisition shall:
 - a. Provide suitable habitat for Mojave fringe-toed lizards, and may include stabilized and partially stabilized desert dunes or sand drifts over playas or Sonoran creosote bush scrub;
 - b. Be within the Chuckwalla Valley with potential to contribute to Mojave fringe-toed lizard habitat connectivity and build linkages between known populations of Mojave fringe-toed lizards and preserve lands with suitable habitat;

- c. Be connected to lands that are either currently occupied or have high potential to be occupied by Mojave fringe-toed lizard based on patch size and habitat quality;
 - d. Be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;
 - e. Not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;
 - f. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;
 - g. Not contain hazardous wastes;
 - h. Not be subject to property constraints (i.e. mineral leases, cultural resources); and
 - i. Be on land for which long-term management is feasible.
2. Security for Implementation of Mitigation: The Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding is available to implement the acquisitions and enhancement of Mojave fringe-toed lizard habitat as described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit, a pledged savings account or Security prior to initiating ground-disturbing project activities. The Security shall be approved by the CPM, in consultation with CDFG and the USFWS, to ensure sufficient funding. As of the publication of the RSA, this amount is \$433,200. This amount may change based on land costs or the estimated costs of enhancement and endowment (see subsection C.2.4.2, Desert Tortoise, for a discussion of the assumptions used in calculating the Security, which are based on an estimate of \$1,450 per acre to fund acquisition, enhancement and long-term management).
3. Preparation of Management Plan: The Project owner shall submit to the CPM, CDFG and USFWS a draft Management Plan that reflects site-specific enhancement measures for the Mojave fringe-toed lizard habitat on the acquired compensation lands. The objective of the Management Plan shall be to enhance the value of the compensation lands for Mojave fringe-toed lizards, and may include enhancement actions such as weed control, fencing to exclude livestock, erosion control, or protection of sand sources or sand transport corridors. A final Management Plan, approved by the CPM, shall be incorporated into the BRMIMP.

Verification: No later than 30 days prior to beginning construction-related ground-disturbing activities, the Project owner shall provide written verification of Security in accordance with this condition of certification. The Project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of construction-related ground-disturbing activities.

The Project owner, or an approved third party, shall provide the CPM, CDFG and USFWS with a management plan for the compensation lands and associated funds within 180 days of the land or easement purchase, as determined by the date on the title. The CPM shall review and approve the management plan, in consultation with CDFG and the USFWS.

No less than 90 days prior to acquisition of the property, the Project owner shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcels intended for purchase. At the same time the project owner shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, in consultation with BLM, CDFG and USFWS.

Within 90 days after completion of Project construction, the Project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of Mojave fringe-toed lizard habitat disturbed during Project construction.

The Project owner shall provide written verification to the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient no later than 18 months after the initiation of construction related ground-disturbance activities.

EVAPORATION POND NETTING AND MONITORING

BIO-21 The Project owner shall cover the evaporation ponds prior to any discharge with 1.5-inch mesh netting designed to exclude birds and other wildlife from drinking or landing on the water of the ponds. Netting with mesh sizes other than 1.5-inches may be installed if approved by the CPM in consultation with CDFG and USFWS. The netted ponds shall be monitored regularly to verify that the netting remains intact, is fulfilling its function in excluding birds and other wildlife from the ponds, and does not pose an entanglement threat to birds and other wildlife. The ponds shall include a visual deterrent in addition to the netting, and the pond shall be designed such that the netting shall never contact the water. Monitoring of the evaporation ponds shall include the following:

1. Monthly Monitoring. The Designated Biologist or Biological Monitor shall regularly survey the ponds at least once per month starting with the first month of operation of the evaporation ponds. The purpose of the surveys shall be to determine if the netted ponds are effective in excluding birds, if the nets pose an entrapment hazard to birds and wildlife, and to assess the structural integrity of the nets. The monthly survey shall be conducted in one day for a minimum of two hours following sunrise (i.e., dawn), a minimum of one hour mid-day (i.e.,

1100 to 1300), and a minimum of two hours preceding sunset (i.e., dusk) in order to provide an accurate assessment of bird and wildlife use of the ponds during all seasons. Surveyors shall be experienced with bird identification and survey techniques. Operations staff at the Project site shall also report finding any dead birds or other wildlife at the evaporation ponds to the Designated Biologist within one day of the detection of the carcass. The Designated Biologists shall report any bird or other wildlife deaths or entanglements within two days of the discovery to the CPM, CDFG, and USFWS.

2. Dead or Entangled Birds. If dead or entangled birds are detected, the Designated Biologist shall take immediate action to correct the source of mortality or entanglement. The Designated Biologist shall make immediate efforts to contact and consult the CPM, CDFG, and USFWS by phone and electronic communications prior to taking remedial action upon detection of the problem, but the inability to reach these parties shall not delay taking action that would, in the judgment of the Designated Biologist, prevent further mortality of birds or other wildlife at the evaporation ponds.
3. Quarterly Monitoring. If after 12 consecutive monthly site visits no bird or wildlife deaths or entanglements are detected at the evaporation ponds by or reported to the Designated Biologist, monitoring, as described in paragraph 1, can be conducted on a quarterly basis.
4. Biannual Monitoring. If after 12 consecutive quarterly site visits no bird or wildlife deaths or entanglements are detected by or reported to the Designated Biologist and with approval from the CPM, USFWS and CDFG, future surveys may be reduced to two surveys per year, during the spring nesting season and during fall migration. If approved by the CPM, USFWS and CDFG, monitoring outside the nesting season may be conducted by the Environmental Compliance Manager.
5. Modification of Monitoring Program. CDFG or USFWS may submit a request for modifications to the evaporation pond monitoring program based on information acquired during monitoring, and may also suggest adaptive management measures to remedy any problems that are detected during monitoring or modifications if bird impacts are not observed. Modifications to the evaporation pond monitoring described above and implementation of adaptive management measures shall be made only after approval from the CPM, in consultation with USFWS and CDFG.

Verification: No less than 30 days prior to operation of the evaporation ponds the project owner shall provide to the CPM as-built drawings and photographs of the ponds indicating that the bird exclusion netting has been installed. For the first year of operation the Designated Biologist shall submit quarterly reports to the CPM, CDFG, and USFWS describing the dates, durations and results of site visits conducted at the evaporation ponds. Thereafter the Designated Biologist shall submit annual monitoring reports with this information. The quarterly and annual reports shall fully describe any

bird or wildlife death or entanglements detected during the site visits or at any other time, and shall describe actions taken to remedy these problems. The annual report shall be submitted to the CPM, CDFG, and USFWS no later than January 31st of every year for the life of the project.

MITIGATION FOR IMPACTS TO STATE WATERS

BIO-22 The Project owner shall implement the following measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and to satisfy requirements of California Fish and Game Code sections 1600 and 1607.

1. Acquire Off-Site State Waters: The Project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes at least 132 acres of state jurisdictional waters, or the area of state waters directly or indirectly impacted by the final Project footprint. The Project footprint means all lands disturbed by construction and operation of the Genesis Project, including all Project linears. The parcel or parcels comprising the 132 acres of ephemeral washes shall include at least 48 acres of microphyll woodland. If the Reduced Acreage Alternative were constructed the mitigation requirements for impacts to state waters would be a minimum of 109 acres that included at least 48 acres of microphyll woodland. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-12**, #2 and #3. Mitigation for impacts to state waters shall occur within the Chuckwalla-Ford Dry Lake or surrounding watersheds, as close to the Project site as possible. The 132-acre acquisition of state waters may be integrated with the desert tortoise mitigation acquisition if the criteria described in this condition are met.
2. Security for Implementation of Mitigation: The Project owner shall provide financial assurances to the CPM and CDFG to guarantee that an adequate level of funding is available to implement the acquisitions and enhancement of state waters as described in this condition. These funds shall be used solely for implementation of the measures associated with the project. Financial assurance can be provided to the CPM and CDFG in the form of an irrevocable letter of credit, a pledged savings account or Security prior to initiating construction-related ground disturbing activities. Prior to submittal to the CPM, the Security shall be approved by the CPM, in consultation with CDFG and the USFWS, to ensure sufficient funding. As of the publication of the RSA, this amount is \$300,960. These amounts may change based on changes in land costs or the estimated costs of enhancement and endowment (see subsection C.2.4.2, Desert Tortoise, for a discussion of the assumptions used in calculating the Security, which are based on an estimate of \$2,280 per acre to fund acquisition, enhancement and long-term management). The final amount due shall be determined by an updated appraisals and the PAR analysis conducted as described in **BIO-12**.

3. **Title/Conveyance.** The Project owner shall transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM in consultation with CDFG. Transfer of either fee title or an approved conservation easement will usually be sufficient, but some situations, e.g., the donation of lands burdened by a conservation easement to BLM, will require that both types of transfers be completed. Any transfer of a conservation easement or fee title must be to CDFG, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965), or to BLM under terms approved by the CPM in consultation with CDFG. If an approved non-profit organization holds title to the compensation lands, a conservation easement shall be recorded in favor of CDFG in a form approved by the CPM. If an approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary.
4. **Preparation of Management Plan:** The Project owner shall submit to the CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control.
5. **Stop Work Provisions.** The Project owner shall provide a copy of this condition (Condition of Certification **BIO-22**) from the Energy Commission Final Decision to all contractors, subcontractors, and other on-site personnel. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the Project owner and the CPM if the CPM, in consultation with CDFG, determines that the Project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:
 - a. The information provided by the Applicant regarding impacts to waters of the state is incomplete or inaccurate;
 - b. New information becomes available that was not known to staff in preparing the terms and conditions; or
 - c. The Project or Project activities as described in the Staff Assessment have changed.
6. **Notification:** The project owner shall notify the CPM and CDFG in writing before conducting Project activities in jurisdictional areas. The Project owner shall notify the CPM and CDFG of any change of conditions to the Project, the jurisdictional impacts, or the mitigation

efforts, if the conditions at the site of a proposed Project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed Project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project as defined below. A copy of the notifying change of conditions report shall be included in the annual reports. A change of conditions is defined as follows:

- a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the Project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the Project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.
 - b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or substantial changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.
 - c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.
7. Best Management Practices: The Project owner shall also comply with the following conditions to protect drainages near the approved impact areas as defined in the approved construction documents:
- a. The Project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.
 - b. The Project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

- c. The Project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the Project owner to ensure compliance.
- d. Spoil sites shall be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.
- e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from Project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage, shall be removed immediately.
- f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into waters of the state.
- g. When operations are completed, any excess materials or debris shall be removed from the work area.
- h. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

Verification: No less than 30 days prior to the start of construction-related ground disturbance activities potentially affecting waters of the state, the Project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that the above best management practices shall be implemented. The Project owner shall also provide a discussion of work in waters of the state in Compliance Reports for the duration of the Project.

No less than 30 days prior to beginning construction-related ground-disturbing activities the Project owner shall provide written verification of Security in accordance with this condition of certification. The Project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of construction-related ground-disturbing activities.

The Project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of construction-related ground-disturbing activities in jurisdictional state waters and at least five days prior to completion of Project activities in jurisdictional areas. The Project owner shall notify the CPM and CDFG of any change of conditions to the Project, impacts to state waters, or the mitigation efforts. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions

is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a Project; the biological and physical characteristics of a Project area; or the laws or regulations pertinent to the Project as defined below. A copy of the notifying Change of Conditions report shall be included in the annual reports or until it is deemed unnecessary by the CPM, in consultation with CDFG.

The Project owner, or an approved third party, shall provide the CPM, CDFG and USFWS with a draft management plan for the compensation lands and associated funds within 180 days of the land or easement purchase, as determined by the date on the title. The CPM shall review and approve the management plan, in consultation with CDFG.

Within 90 days after completion of Project construction, the Project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of jurisdictional state waters disturbed during Project construction.

The Project owner shall provide written verification to the CPM, USFWS and CDFG that the compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient no later than 18 months after the start of construction-related ground-disturbing activities.

On January 31st of each year following construction the Designated Biologist shall provide a report to the CPM, BLM, USFWS and CDFG that describes the results of monitoring and management of the acquisition lands. The annual report shall describe actions taken to implement the management plan (for example, fencing, erosion control, weed control) during the year and recommendations for enhancement actions that should be implemented the following year.

DECOMMISSIONING AND CLOSURE PLAN

BIO-23 Upon Project closure the Project owner shall implement a final Decommissioning and Closure Plan for the Project site. The Decommissioning and Closure Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities, and shall be consistent with the guidelines in BLM's 43 CFR 3809.550 et seq., subject to review and revisions from the CPM in consultation with BLM, USFWS, and CDFG. The Project owner shall submit a draft Decommissioning and Closure Plan for review to the CPM, BLM, USFWS and CDFG. The Project owner shall finalize the plan only after approval from the CPM, in consultation with BLM, USFWS, and CDFG. Throughout the life of the Project the Project owner plan shall regularly submit the plan to the CPM for review and updating, if warranted, as described in Verification below. Modifications to the final Decommissioning and Closure Plan shall be made only after approval from the CPM, in consultation with BLM, USFWS, and CDFG.

Verification: No less than 30 days prior to initiating construction-related ground disturbance activities, the Project owner shall provide to BLM and the CPM a draft Decommissioning and Closure Plan. The plan shall be finalized prior to the start of commercial operation and reviewed every five years thereafter and submitted to the

CPM for approval, in consultation with BLM. Modifications to the approved Decommissioning and Closure Plan shall be made only after approval from the CPM, in consultation with BLM, USFWS, and CDFG.

No less than 10 days prior to initiating construction-related ground disturbance activities the Project owner shall provide financial assurances to the CPM to guarantee that an adequate level of funding would be available to implement measures described in the Decommissioning and Closure Plan, consistent with the provisions set forth in 43 C.F.R. sections 2805.12 and 3809.500-.599.

REVEGETATION OF TEMPORARILY DISTURBED AREAS

BIO-24 The Project owner shall prepare and implement a Revegetation Plan to restore all areas subject to temporary disturbance. The final Revegetation Plan shall be based on the draft Revegetation Plan submitted by the Applicant (TTEC 2010i) and shall include all revisions deemed necessary by the CPM in consultation with BLM. The objectives of the Revegetation Plan shall be to stabilize disturbed soils, minimize erosion and sedimentation impacts to soil and water resources, prevent colonization by noxious weeds and other non-native plants, salvage native plantings and seed from Project Disturbance Areas, and to achieve restoration of disturbed areas to functioning, established early-successional native plant communities.

Target performance standards at the end of the monitoring period shall be as follows:

- a. total absolute cover of all plants shall equal at least 30 percent;
- b. survivorship of salvaged and transplanted cacti and other native plantings shall equal 30% percent;
- c. at least 90 percent (relative cover) of the perennial species observed within the temporarily disturbed areas shall be locally native species that naturally occur in the adjacent desert scrub or dune habitats;
- d. relative cover of perennial plant species shall equal at least 60 percent of the total vegetative cover; and
- e. Relative cover of non-native plants within the temporarily disturbed areas shall not exceed the relative cover of non-native plants in the adjacent habitats.

Verification: No less than 30 days prior to construction-related ground-disturbance activities the Project owner shall submit to the CPM a final agency-approved Revegetation Plan that has been reviewed and approved by the CPM. All modifications to the Revegetation Plan shall be made only after approval from the CPM.

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 Revegetation

Plan have been completed, a summary of all modifications to revegetation measures made during the Project's construction phase, and which items are still outstanding.

The Designated Biologist shall provide reports to the CPM according to the reporting schedule in the Revegetation Plan that includes: a summary of revegetation activities for the year, a discussion of whether revegetation performance standards for the year were met; and recommendations for revegetation remedial action, if warranted, planned for the upcoming year. Reports shall be submitted on January 31st following the relevant reporting year.

GROUNDWATER DEPENDENT VEGETATION MONITORING

BIO-25 The Applicant shall prepare and implement a Draft Groundwater-Dependent Vegetation Monitoring Plan (Vegetation Monitoring Plan). The objectives of the Vegetation Monitoring Plan shall be to monitor the Project effects of groundwater pumping on groundwater-dependent vegetation (phreatophytes) and, in conjunction with **BIO-26**, to ensure that the Project has a less than significant effect on groundwater-dependent ecosystems. The Vegetation Monitoring Plan shall be consistent with guidance for designing vegetation monitoring plans and conducting statistical analysis in *Measuring and Monitoring Plant Populations* (Elzinga et al. 1998). Monitoring shall focus on areas containing obligate or facultative phreatophytes (mesquite, ironwood, bush seep-weed, palo verde, cat's claw, smoke tree, and tamarisk) in areas that are most likely to be influenced by groundwater (low-lying areas in the basin floor). Monitoring sites shall include:

1. Reference Monitoring Sites: sites outside of the zone of Project influence that can be compared to sites influenced by Project pumping and used to distinguish Project effects from the effects of climate change or normal drought cycles; sites located in state or national parks are least likely to be influenced by human-caused hydrologic alterations.
2. Project Monitoring Sites: sites within the predicted worst-case scenario drawdown cone around the Project pumping well (Figure 3 of the Groundwater Resources Cumulative Impacts Analysis [Worley-Parsons 2009]), an area within a radius of approximately 10 miles from the Project pumping well. Ford Dry Lake, and the old-growth ironwood forest along the Palen wash are also included within this zone.
3. Distant Monitoring Sites: sites located near Palen Dry Lake within the predicted worst-case scenario drawdown cone around the Project pumping well around Palen Dry Lake where near-surface groundwater has been detected and where plant communities dominated by phreatophytes occur (including bush seep-weed-dominant alkali sink scrubs). In areas where the Project's estimated end of operation effects overlap the Palen Solar Power Project's estimated zone of water table effects (AECOM 2010a, Figures DR-ALT-207-1 & 2), the Project shall not be responsible for monitoring groundwater-dependent

vegetation unless the Palen project (or other project at same site) is not constructed and/or no groundwater pumping is proposed by that project.

Baseline data shall be collected at all sites prior to the start of pumping, and annual monitoring for the life of the Project shall be required at Project, Distant, and Reference Monitoring sites. A statistician shall be retained to use the first year of baseline data to conduct a “priori power analysis” (Elzinga et al. 1998) and evaluate the adequacy of the sampling design.

The Vegetation Monitoring Plan shall:

1. Be prepared by a qualified plant ecologist with a demonstrated understanding of desert plant ecology and physiology. The plant ecologist overseeing the monitoring and preparing the annual reports shall be approved by the CPM;
2. Identify Project Monitoring Sites within the zone of potential Project effect depicted in Figure 3 of the Groundwater Resources Cumulative Impacts Analysis (Worley-Parsons 2009). Monitoring shall focus on areas containing obligate or facultative phreatophytes in areas that are the most likely to be influenced by groundwater (versus surface water) such as low lying areas in the basin floor outside of the stream channels;
3. Identify Distant Monitoring sites around Palen Dry Lake where near-surface groundwater and plant communities dominated by phreatophytes occur, including mesquite stands, bush seepweed-dominant sink scrubs, and dune scrubs;
4. Identify Reference Monitoring Sites within the Sonoran or Colorado Desert regions of California that contain examples of the target groundwater-dependent plant communities represented at the Project and Distant Monitoring Sites. Reference sites shall be characterized by surface and groundwater hydrology unaltered by anthropogenic influences such as groundwater pumping or other diversions. Sites located in state park and national park lands or wilderness areas are likely candidates for reference sites;
5. Provide a detailed description of sampling protocol for collecting a minimum of three years of baseline data from the Reference, Project, and Distant Monitoring Sites. The sampling protocol shall include a requirement that monitoring data be collected from all three monitoring sites at the same time of year at the start of the growing season (for example, March 15). A statistician shall be consulted during the design phase to conduct a “priori power analysis” (Elzinga et al. 1998) prior to determining an appropriate sample size achieve adequate power;
6. Provide a detailed description of the long-term data collection approach including: sampling objectives (target/threshold, change/trend-based) attributes measured, field techniques, minimum standards for monitoring

personnel, data management, statistical analysis, monitoring schedule, reporting requirements, and responsible parties;

7. Include appropriate field techniques for measuring drought response, including (at a minimum): percent dieback; live crown density; percent cover of live (versus dead or residual) vegetation, and any other vigor indicators that detect subtle changes over time; percent cover/frequency of associated species, changes over time in percent composition of native versus non-native species, and facultative wetland plants present. A detailed description of monitoring protocol shall also be included (for example, photo monitoring at permanent photo stations, among other monitoring techniques);
8. Include a description of the biological and ecological characteristics of groundwater-dependent species and natural communities, such as whether species are obligate vs. facultative; root growth and water acquisition; morphological adaptations to the desert environment; reproduction and germination; general and micro-habitat preferences; salt tolerance; role in the morphology of dunes; wildlife uses, etc;
9. Describe annual reporting requirements, which shall include (at a minimum): summaries of the results of the Groundwater Well Monitoring (**Soil&Water-5**) and a comparison of predicted versus actual water table declines during the early spring monitoring period, summary of the Vegetation Monitoring data, sampling and monitoring techniques used, field measurements employed, names and contact information for the monitoring personnel and responsible parties, description of data management, statistical analysis, photos, and conclusions.

Trigger for Remedial Action: The Project owner shall implement remedial action, as described in Condition of Certification **BIO-26**, if the monitoring described in **BIO-25** detects declining spring water tables—in any amount greater than the normal year-to-year variability—combined with a decline in plant vigor in groundwater dependent vegetation at the Project Monitoring Sites compared to the Reference Monitoring Sites. The baseline spring water table depth, as measured in groundwater monitoring conducted pursuant to Soil & Water-4 and 5, shall be established based on the normal range of variability in area shallow water tables in spring (March 15-April 1).

The project owner may not pump groundwater from the site until the final Vegetation Monitoring Plan has been reviewed and approved by the CPM.

Verification: No more than 60 days following the docketing of the Energy Commission Final Decision, the Project owner shall submit to the CPM a final Vegetation Monitoring Plan that has been reviewed and approved by the CPM. All modifications to the Vegetation Monitoring Plan shall be made only after approval from the CPM.

Monitoring shall begin no later than April 1st following docketing of the Energy Commission Final Decision and shall occur every year during the same one to two week time period in early spring.

On January 31st of each year following the start of data collection, the Designated Biologist shall provide a report, prepared by the plant ecologist supervising the study and analyzing the data, to the CPM that describes monitoring activities and results, including recommendations for remedial action. If monitoring detects declining spring water tables—in any amount greater than the normal year-to-year variability of spring water tables—combined with a decline in plant vigor in groundwater dependent vegetation at the Project Monitoring Sites that is not also detected in the Reference Sites (by comparing monitoring site data with reference site data), the supervising plant ecologist shall prepare a summary of the data analysis within 30 days of completion of that monitoring.

REMEDIAL ACTION FOR ADVERSE EFFECTS TO GROUNDWATER-DEPENDENT BIOLOGICAL RESOURCES

BIO-26 The Project owner shall implement remedial action if the monitoring described in **BIO-25** detects project-related declining spring water tables—in any amount greater than the normal year-to-year variability—combined with a decline in plant vigor in groundwater dependent vegetation at the Project Monitoring Sites compared to the Reference Monitoring Sites. The baseline spring water table depth, as measured in groundwater monitoring conducted pursuant to **Soil & Water-4 and 5**, shall be established based on the normal range of variability in area_shallow water tables in spring (March 15-April 1). The Project owner shall submit a detailed proposal for remedial action to be approved by the CPM. Remedial measures must include one of the following measures to meet the performance standard of restoring the spring groundwater tables to baseline levels: 1) Relocating the Project pumping well to another location farther from the groundwater-dependent vegetation (and where the dependent vegetation is no longer within the drawdown cone of depression), or—alternatively—constructing a new well farther away and reducing water usage in the well closest to the dependent plant communities; 2) Reducing the Project water usage through water conservation methods or new technologies.

The proposal shall clearly demonstrate that the proposed remedial action would restore the spring groundwater tables to baseline levels to sustain healthy ecological functioning in the affected plant communities. The Project owner may choose the most feasible method of restoring baseline spring water table levels providing it meets this performance standard.

The Project owner must implement remedial action, as approved by the CPM.

Verification: Within 90 days following submission of the data summary described in **BIO-25** that triggers remedial action according to the threshold described in **BIO-25**, the Project owner shall submit to the CPM a draft, or conceptual plan for remedial action. The draft plan shall summarize the data and observations describing the adverse effect, including all calculations and assumptions made in development of the report data and interpretations. The draft plan must include, but not limited to, one of the remedial measures described above to meet the performance standard of restoring the spring

groundwater table to baseline levels. A final plan shall be submitted to the CPM within 60 days of receipt of the CPM's comments.

No later than one year following approval of the remedial action plan, the Project owner shall provide to the CPM for review and approval, documentation of completed remedial action.

If, after review of the annual monitoring data described in **BIO-25** and in **Soil & Water-5**, the CPM agrees, monitoring measurements and frequencies may be revised or eliminated.

COUCH'S SPADEFOOT TOAD IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-27 The Project owner shall prepare and implement a Couch's Spadefoot Toad Protection and Mitigation Plan (Protection and Mitigation Plan) to avoid, minimize or mitigate impacts to Couch's spadefoot toads and their breeding habitat during construction and operation of the Project. The Protection and Mitigation Plan shall be approved by the CPM in consultation with CDFG, and shall be incorporated into the Project's BRMIMP and implemented. It is expected that, as currently proposed, the Project could avoid the known breeding pond south of I-10 near Wiley Well Road and minimize impacts to the surrounding upland buffer. The Protection and Mitigation Plan shall address methods to achieve this avoidance and minimization, and shall include avoidance, minimization, and mitigation measures that would be required if additional habitat is found during habitat surveys. The Protection and Mitigation Plan shall include, at a minimum:

1. Habitat Survey Results:
 - a. Survey methodology;
 - b. Survey results, including a detailed discussion of potential breeding sites, and a description of areas determined not to include breeding habitat; and
 - c. Figures showing the areas surveyed and the location of potential breeding habitat in relation to proposed Project features.
2. Impacts Assessment from:
 - a. Habitat disturbance from construction;
 - b. Noise from construction, operations, and potential ORV traffic;
 - c. Increased access for vehicles from road construction or improvements;
 - d. Changes in breeding habitat due to changes in flow levels and flow patterns to breeding ponds;

- e. Increased traffic from construction and operations;
 - f. Increased risk of predation.
3. Avoidance and Minimization Measures:
- a. Description of measures that would be implemented to avoid impacts to potential breeding ponds, such as design strategies; protective fencing or other barriers, worker's education, minimizing construction traffic within the vicinity of breeding ponds, and biological monitoring;
 - b. Designation of a Management Area around breeding ponds that includes an appropriate upland buffer, and a description of measures used to minimize impacts within this buffer.
4. Mitigation: If complete avoidance of the pond south of I-10 or other breeding sites identified during surveys is not possible, the Protection and Mitigation Plan shall include plans to create additional breeding habitats (ephemeral pond) at least equal in area to the acreage of ponds being impacted. The created ponds shall be capable of holding water for at least nine days during the spadefoot toad breeding season, and shall be established as close as possible (no more than ¼ mile) from the location of the impacted ponds. The created ponds shall be monitored and managed to ensure fulfillment of this performance standard by site visits at the pond following summer rainfall events. If the created ponds fail to achieve this standard, remedial action shall be implemented (for example, by compacting the soil in the pond to increase water-holding capacity).

Verification: No less than 30 days prior to construction-related ground-disturbance the Project owner shall submit to the CPM and CDFG a final Protection and Mitigation Plan. Modifications to the Protection and Mitigation Plan shall be made only after approval from the CPM, in consultation with CDFG.

If the Protection and Mitigation Plan includes creation of ponds, the number and acreage of created ponds shall be described in the plan. No less than 90 days prior to operation of Project the Project owner shall provide to the CPM as-built drawings and photographs of the created ponds and maps showing the size and location of the ponds in relation to project features. On January 31st of every year following initiation of operation of the Project the Project owner shall submit reports to the CPM documenting the capacity of the created ponds to hold water for at least 9 days during the spadefoot toad breeding season. If ponds fail to hold water as described above the Project owner shall implement remedial actions. The annual reporting may be terminated upon satisfactory demonstration of this performance standard, and with approval of the CPM.

GOLDEN EAGLE INVENTORY AND MONITORING

BIO-28 The Project owner shall implement the following measures to avoid or minimize Project-related construction impacts to golden eagles.

1. Annual Inventory During Construction. For each calendar year during which construction will occur an inventory shall be conducted to determine if golden eagle territories occur within 10 miles of the Project boundaries. Survey methods for the inventory shall be as described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS.
2. Inventory Data: Data collected during the inventory shall include at least the following: territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful); nest location, nest elevation; age class of golden eagles observed; nesting chronology; number of young at each visit; digital photographs; and substrate upon which nest is placed.
3. Determination of Unoccupied Territory Status: A nesting territory or inventoried habitat shall be considered unoccupied by golden eagles ONLY after completing at least 2 full aerial surveys in a single breeding season. In circumstances where ground observation occurs rather than aerial surveys, at least 2 ground observation periods lasting at least 4 hours or more are necessary to designate an inventoried habitat or territory as unoccupied as long as all potential nest sites and alternate nests are visible and monitored. These observation periods shall be at least 30 days apart for an inventory, and at least 30 days apart for monitoring of known territories.
4. Monitoring and Adaptive Management Plan: If an occupied nest⁸ is detected within 10 miles of the Project boundaries, the Project owner shall prepare and implement a Golden Eagle Monitoring and Management Plan for the duration of construction to ensure that Project construction activities do not result in injury or disturbance to golden eagles. The monitoring methods shall be consistent with those described in the Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations (Pagel et al. 2010) or more current guidance from the USFWS. The Monitoring and Management Plan shall be prepared in consultation with the USFWS. Triggers for adaptive management shall include any evidence of Project-related disturbance to nesting golden eagles, including but not limited to: agitation behavior (displacement, avoidance, and defense); increased

⁸ An occupied nest is one used for breeding by a pair of golden eagles in the current year. Presence of an adult, eggs, or young, freshly molted feathers or plucked down, or current years' mutes (whitewash) also indicate site occupancy. Additionally, all breeding sites within a breeding territory are deemed occupied while raptors are demonstrating pair bonding activities and developing an affinity to a given area. If this culminates in an individual nest being selected for use by a breeding pair, then the other nests in the nesting territory will no longer be considered occupied for the current breeding season. A nest site is considered occupied throughout the periods of initial courtship and pair - bonding, egg laying, incubation, brooding, fledging, and post - fledging dependency of the young.

vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The Monitoring and Management Plan shall include a description of adaptive management actions, which shall include, but not be limited to, cessation of construction activities that are deemed by the Designated Biologist to be the source of golden eagle disturbance.

Verification: No fewer than 30 days from completion of the golden eagle inventory the project owner shall submit a report to the CPM, CDFG, and USFWS documenting the results of the inventory.

If an occupied nest is detected within 10 miles of the Project boundary during the inventory, 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 Monitoring and Management Plan. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS. If no occupied nests are detected during the inventory 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.

IN-LIEU FEE MITIGATION OPTION

BIO-29 The Project owner may choose to satisfy its mitigation obligations identified in this Decision by paying an in lieu fee instead of acquiring compensation lands, pursuant to Fish and Game code sections 2069 and 2099 or any other applicable in-lieu fee provision, to the extent the in-lieu fee provision is found by the Commission to be in compliance with CEQA and CESA requirements.

Verification: If electing to use this provision, the Project owner shall notify the Commission that it would like a determination that the Project's in-lieu fee proposal meets CEQA and CESA requirements.

C.2.14 REFERENCES

The tn: 00000 in some of the references below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker search and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

AECOM 2010 – AECOM/ W. Graham (tn:56734) Responses to questions from the April 28, 29 and May 7, 2010 CEC workshops, Palen Solar Energy Project; Mojave fringe-toed lizard mitigation. 5/14/10.

AECOM 2010a- AECOM Environment (tn: 55035). Palen Solar Energy Project Data Responses, Set 1 (#1-280), dated 1/22/2010.

AECOM 2010b- AECOM/ W. Graham (tn: 56734). Palen Solar Energy Project - Mojave Fringe-Toed Lizard Lands in the Chuckwalla Valley, dated 4/14/2010.

- AECOM 2010c- AECOM/ W. Graham (tn: 56625). Palen Solar Energy Project – Preliminary Spring Survey Results for Desert Tortoise, Rare Plants and Jurisdictional Waters, dated 5/7/10.
- AECOM 2010d- AECOM (tn 56623) – Blythe Solar Energy Project - Preliminary Spring 2010 Survey Results for Desert Tortoise, Rare Plants and Jurisdictional Waters, submitted 5/14/2010.
- AECOM 2010e- AECOM (tn: 55037), Data Responses, Set 1 (#1-260), Vol A, dated 1/6/2010, submitted to California Energy Commission Docket Unit on 1/22/10.
- Anderson, D. E., O. J. Rongstad, and W. R. Mytton. 1990. Home-range changes in raptors exposed to increased human activity levels in southeastern Colorado. *Wildlife Society Bulletin* 18:134-142.
- Ansley, R.J., Boutton, T.W., and P. W. Jacoby. Mesquite root distribution and water use efficiency in response to long-term soil moisture manipulations. In: Sosebee et al 2004: Proceedings: Shrubland dynamics -- fire and water; August 10-12; Proceedings RMRS-P-47. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 96-103.
- APLIC 1994-- Avian Power Line Interaction Committee, Mitigating Bird Collisions with Power Lines: the State of the Art in 1994, Edison Electric Institute, Washington, DC.
- _____. 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006, Edison Electric Institute, APLIC, and the California Energy Commission, Washington, D.C. and Sacramento, CA.
- Averill-Murray, R.C. 2001. Program MARK survival analysis of tortoises voiding their bladders during handling, Proceeding of the 2001 Desert Tortoise Council Symposium. p. 48.
- Averill-Murray, R.C. and A. Averill-Murray. 2005. Regional-Scale Estimation of Density and Habitat Use of the Desert Tortoise (*Gopherus agassizii*) in Arizona. *Journal of Herpetology* 39(1):65–72.
- Avise, J.C. 2004. Molecular markers, natural history, and evolution. Second edition. Sinauer. Sunderland, Massachusetts.
- Barbour, M. G. Keeler-Wolf, T., and A. A. Schoenherr. 2007. Terrestrial vegetation of California. –3rd ed. New York: John Wiley and Sons: pp 361-380.
- Barrows C.W. 1996. An ecological model for the protection of a dune ecosystem. *Conservation Biology* 10(3):888-891.
- Barrows, C.W. and M.F. Allen. 2007. 2005-2006 Coachella Valley MSHCP Monitoring Framework Priorities: Impacts of Exotic Weed Species including Saharan Mustard (*Brassica tournefortii*). UC Riverside: Center for Conservation Biology.

- Barrows, C. W., E. B. Allen, M. L. Brooks, and M. F. Allen. 2009. Effects of an invasive plant on a desert sand dune landscape. *Biological Invasions* 11:673-686.
- Barrows, C.W. and M. F. Allen. 2010. Patterns of Occurrence of Reptiles Across a Sand Dune Landscape. *Journal of Arid Environments*, Volume 74, Issue 2, February 2010, Pages 186-192.
- Berry, K.H. 1974. Desert tortoise relocation project: Status report for 1972. California Department of Transportation.
- Berry, K.H. 1984. A description and comparison of field methods used in studying and censusing desert tortoises. Appendix 2. Pp 1-33 in K.H. Berry (ed.): The status of the desert tortoise (*Gopherus agassizii*) in the United States. Report to the U.S. Fish and Wildlife Service from the Desert Tortoise Council. Order No. 11310-0083-81.
- Berry, K.H. 1986a. Desert tortoise (*Gopherus agassizii*) relocation: Implications of social behavior and movements. *Herpetologica* 42:113-125.
- Berry 1997. Demographic consequences of disease in two desert tortoise populations in California, USA. In: Proceedings: Conservation and management of turtles and tortoises – an international conference, J. van Abbema (ed.), New York Turtle and Tortoise Society, West Orange, NJ. pp. 91–97.
- _____. 2001. Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-roaming Desert Tortoises (*Gopherus agassizii*) prepared for Federal Fish and Wildlife Permit TE006556-11. Revised June 2003. Available at: http://www.werc.usgs.gov/tortoise/salvaging_protocol.htm.
- Bjurlin, C.D., and J.A. Bissonette. 2004. Survival during early life stages of the desert tortoise (*Gopherus agassizii*) in the south-central Mojave Desert. *Journal of Herpetology* 38:527-535.
- Black, J.H. 1976. Observations on courtship behavior of the desert tortoise. *Great Basin Naturalist* 36:467-470.
- Bleich, V.C., J.D. Wehausen, R.R. Ramey II, and J.L. Rechel. 1996. Metapopulation theory and mountain sheep: implications for conservation. pp. 453-473, In: D. R. McCullough, (ed.), *Metapopulations and wildlife conservation management*. Island Press, Washington, D.C.
- BLM 1990. Bureau of Land Management. Draft raven management plan for the California Desert Conservation Area. Prepared by U.S. Bureau of Land Management, California Desert District, Riverside, California. April 1990.
- _____. 1999. California Desert Conservation Area Plan 1980, as amended. Map 4, Sensitive, Rare, Threatened, and Endangered Fish and Wildlife.
- _____. 2006. Record of Decision, West Mojave Plan: Amendment to the California Desert Conservation Area Plan. BLM California Desert District. March 2006.

- ____ 2009. Bureau of Land Management, Palen/McCoy Wilderness. Accessed December 28, 2009 from: <http://www.blm.gov/ca/pa/wilderness/wa/areas/palen-mccoy.html>.
- ____ 2009a. (tn 52620) Letter from J. Abbott, BLM, California State Office, to K. Hunting, CDFG, regarding coordination of mitigation for BrightSource solar development. Dated July 23, 2009. Submitted to California Energy Commission Docket Unit on July 23, 2009.
- ____ 2009b. Bureau of Land Management. Oregon/Washington Bureau of Land Management Policy for 43 CFR 3809 Notice- and Plan-Level Operations, 43 CFR 3715 Use and Occupancy, and Reclamation Cost Estimates. EMS TRANSMISSION- 05/05/2009 - Instruction Memorandum No. OR-2009-032 (Expires: 09/30/2010).
- BLM CDD 2002. Bureau of Land Management California Desert District and California Department of Fish and Game Inland, Desert, and Eastern Sierra Region. Proposed Northern and Eastern Colorado Desert Coordinated Management Plan and Final EIS, July 2002.
- Bloom 2003. Letter to California Fish and Game Commission. Dated December 2, 2003. Available at:
http://www.biologicaldiversity.org/species/birds/western_burrowing_owl/pdfs/bloom-comment.pdf.
- Boarman, W.I. 2002. Reducing predation by common ravens on desert tortoises in the Mojave and Colorado Deserts. Unpublished report prepared for the Bureau of Land Management. July 18, 2002. 33 pp.
- ____ 2002a. Threats to desert tortoise populations: A critical review of the literature. U.S. Geological Survey, Western Ecological Research Center, Sacramento, California.
- Brooks, M. L., C. M. D'Antonio, D. M. Richardson, J. B. Grace, J. E. Keeley, J. M. DiTomaso, R. J. Hobbs, M. Pellant, and D. Pyke. 2004. Effects of invasive alien plants on fire regimes. *BioScience* 54, pp. 677-688.
- Brooks, M.L., and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1–14 in K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species. Fire Conference 2000: the First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, FL.
- Brossard, C. C., J. M. Randall, and M. C. Hoshovsky, editors. 2000. Invasive plants of California's wildlands. University of California Press, Berkeley, California, USA.
- Brown, D.E. and R. A. Minnich. 1986. Fire and changes in creosote bush scrub of the western Sonora Desert, California. In: *American Midland Naturalist*. Vol 116: pp 411-422.

- Burge, B.L. 1977. Daily and seasonal behavior, and areas utilized by the desert tortoise, *Gopherus agassizii*, in southern Nevada. Proceedings of the Desert Tortoise Council Symposium 1977:59-94.
- Bury, R.B. 1987. Off-road vehicles reduce tortoise numbers and well-being. U.S. Department of the Interior, Fish and Wildlife Service, National Ecology Research Center, Fort Collins, Colorado. Research Information Bulletin Number 87-6.
- CEC 2009d. California Energy Commission/M. Monasmith (tn:54067) Data Requests, Set1A (#1-227). 11/13/2009.
- _____ 2010d. CEC/M. Monasmith (tn: 55636) ROC regarding Tetra Tech table titled – “Anticipated Direct and Indirect Effects to Vegetation Communities” 2/22/2010.
- _____ 2010e. California Energy Commission. Palen Solar Power Project Staff Assessment and Environmental Impact Statement. March 2010.
- California Interagency Watershed Mapping Committee 1999. California Interagency Watershed Map of 1999 (CalWater Version 2.2.1). Available at: <http://cain.ice.ucdavis.edu/calwater>.
- Cal-IPC 2006. California Invasive Plant Council. California Invasive Plant Inventory. Cal IPC Publication 2006-02. California Invasive Plant Council, Berkeley. Available at: www.cal-ipc.org.
- CalPIF 2006. California Partners in Flight. Version 1.0. The Desert Bird Conservation Plan: a Strategy for Protecting and Managing Desert Habitats and Associated Birds in California. Available at: <http://www.prbo.org/calpif/plans.html>.
- CBOC 1993. California Burrowing Owl Consortium. Burrowing Owl Survey Protocol and Mitigation Guidelines. April 1993.
- CCH 2010. Consortium of California Herbaria. Database of herbarium collections provided by participants of the Consortium of California Herbaria. Accessed January 31, 2009 from: <http://ucjeps.berkeley.edu/consortium/>.
- CDFA 2007. California Department of Food and Agriculture. List of noxious weeds. Available at: http://www.cdfa.ca.gov/phpps/ipc/noxweedinfo/noxweedinfo_hp.htm.
- CDFG 1993. California Department of Fish and Game. 5-year status review: Swainson’s hawk (*Buteo swainsoni*). Accessed January 2010 from: <http://www.dfg.ca.gov/rap/projects/swainsonhawk/docs/SWHAprogress2005-06.pdf>
- _____ 2003. List of Natural Communities Recognized by the California Natural Diversity Database. California Department of Fish and Game, Wildlife Habitat Analysis Branch. Available at: www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf.

- _____. 2007. California Department of Fish and Game. Chapter 8: Colorado Desert Region in. California wildlife: Conservation challenges (California's Wildlife Action Plan). Report of Calif. Dept. Fish & Game prepared by the Wildlife Diversity Project, Wildlife Health Center, Univ. Calif., Davis. Published 2007. Available at: www.dfg.ca.gov/habitats/wdp/report.html.
- _____. 2009. Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities. California Natural Resources Agency, Department of Fish and Game, November 24 2009.
- _____. 2010. California Department of Fish and Game (tn: pending). Electronic communication from Magdalena Rodriguez, CDFG, to Tricia Bernhard, TetraTech, with attached figures depicting revisions to state waters delineation. 3/1/2010.
- CNDDDB 2010. Rarefind 4, BETA. CDFG's Electronic database, Sacramento, California. Data search for the following 7.5 minute USGS Quadrangles: McCoy Peak, Ripley, Big Maria Mountains SW, Arlington Mine, Inca, McCoy Wash, McCoy Spring, Hopkins Well, and Roosevelt Mine or for San Bernardino, Riverside, and Imperial counties.
- CNPS 2009. California Native Plant Society, Inventory of Rare and Endangered Plants, online edition V7-09d. Accessed December 30, 2009 from: <http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi>.
- Collison, A. 2010. (tn pending) Genesis Solar Energy Project, Analysis of Impacts to Sand Transport Corridor. Memo to M. Monasmith. June 2, 2010.
- CVAG 2007. Coachella Valley Association of Governments. Final Recirculated Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan, September 2007. Accessed January 5, 2010 from: http://www.cvmshcp.org/Plan_Documents.htm#eir.
- Davis F. W., D. M. Stoms, A. D. Hollander, K. A. Thomas, P. A. Stine, D. Odion, M. I. Borchert, J. H. Thorne, M. V. Gray, R. E. Walker, K. Warner, and J. Graae. 1998. The California Gap Analysis Project--Final Report. University of California, Santa Barbara, CA. Available at: http://www.biogeog.ucsb.edu/projects/gap/gap_rep.html.
- Deacon JE, AE Williams, C Deacon Williams, and JE Williams. 2007. Fueling Population growth in Las Vegas: How large-scale groundwater withdrawal could burn regional biodiversity. *BioScience* 57(8): 688-698.
- Dimmitt M.A. 1977. Distribution of Couch's spadefoot toad in California (preliminary report). Unpublished report filed with the United States Bureau of Land Management, Riverside District Office, California, Under C-062, 6500, and 1792 Sundesert, May 10, 1977, Riverside, California.
- Dixon J. B. 1937. The golden eagle in San Diego County, California. *Condor* 39:49-56.

- DTRO 2009. Desert Tortoise Recovery Office. Science Advisory Committee Meeting Summary, March 13, 2009. Accessed August 22, 2009 from: www.fws.gov/nevada/desert_tortoise/documents/sac/20090313_SAC_meeting_summary.pdf.
- Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. *Journal of Wildlife Management* 63:1181-1192.
- Dooling and Popper 2007. The Effects of Highway Noise on Birds. Prepared for the California Department of Transportation, Division of Environmental Analysis. September 30.
- Eamus, D. and R. Froend. 2006. Groundwater dependent ecosystems: the where, what and why of GDEs. *Australian Journal of Botany* 54: 91-96.
- Elmore A. J., S. J. Manning, J. F. Mustard and J. M. Craine. 2006a. Decline in alkali meadow vegetation cover in California: The effects of groundwater extraction and drought. *Journal of Applied Ecology* 43: 770-779.
- Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1998. Measuring and monitoring plant populations. BLM Technical Reference 1730-1, Denver, CO. 477 pages.
- Epps, C.W., P.J. Palsbøll, J.D. Wehausen, G.K. Roderick, R.R. Ramey, D.R. McCullough. 2005. Highways block gene flow and cause a rapid decline in genetic diversity of desert bighorn sheep. *Ecology Letters* 8:1029–1038.
- Esque, T.C. 1994. Diet and diet selection of the desert tortoise (*Gopherus agassizii*) in the northeastern Mojave Desert. Master's Thesis. Colorado State University, Fort Collins.
- Evans, R. 2001. Free-roaming dog issues at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Proceedings of the 2001 Desert Tortoise Council Symposium. p. 61.
- Evans, J.M. and S. Hartman. 2007. Vegetation survey and classification for the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO). CNPS Vegetation Program. Sacramento, CA.
- EPTC 1999. Evaporation Ponds Technical Committee, the San Joaquin Valley Drainage/Implementation Program and the University of California Salinity/Drainage Program. Task 4 Final Report: Technical Committee on Evaporation Ponds for San Joaquin valley Drainage Implementation Program. February.
- Fitton S. 2008. LeConte's Thrasher (*Toxostoma lecontei*). In. Shuford, W. D., and Gardali, T., eds. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

- GSEP 2009a. Genesis Solar Energy Project/T. Bernhardt (tn:53083) Application for Certification for the Genesis Solar Energy Project. Submitted to California Energy Commission Docket Unit on August 31, 2009.
- _____ 2009c. Genesis Solar Energy Project/S. Busa (tn:53614) Data Adequacy Supplement . 10/13/2009.
- _____ 2009d. Genesis Solar Energy Project/T. Bernhardt (tn:53830) Data Adequacy Supplement 1A. 10/26/2009.
- _____ 2009f. Genesis Solar Energy Project/T. Bernhardt (tn:54453) Data Responses Set 1A (# 1-227) for the Genesis Solar Energy Project. 12/15/2009.
- Gehring, et. al. 2009. Communication towers, lights, and birds: successful methods of reducing the frequency of avian collisions. *Ecological Applications* 19(2): 505-514.
- Germano, D.J. 1994. Comparative life histories of North American tortoises. Pages 175-185 in R.B. Bury and D.J. Germano (eds.), *Biology of North American Tortoises*. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.
- Germano, D.J., R.B. Bury, T.C. Esque, T.H. Fritts, and P.A. Medica. 1994. Range and habitat of the desert tortoise. Pages 57-72 in R.B. Bury and D.J. Germano (eds.), *Biology of the North American Tortoises*. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.
- Gervais, J. A., D. K. Rosenberg, and L.A. Comrack. 2008. Burrowing Owl (*Athene cunicularia*). In: Shuford, W. D., and Gardali, T., eds. *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
- Gibson. A. C., M. R. Sharifi and P.W. Rundel. 2004. Resprout characteristics of creosote bush (*Larrea tridentata*) when subjected to repeated vehicle damage. *Journal of Arid Environments* 57(4): 411-429.
- Griffiths P.G., Webb, R.H., Lancaster, N., Kaehler, C.A., and Lundstrom, S.C., 2002, Long-term sand supply to Coachella Valley fringe-toed lizard (*Uma inornata*) habitat in the northern Coachella Valley, California: U.S. Geological Survey Water-Resources Investigations Report 02-4013, 49.
- Hagerty, B.E. 2008. Ecological genetics of the Mojave Desert tortoise. Ph.D. Dissertation. University of Nevada, Reno.
- Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, and W.K. Hayes. 2009. Home range, spatial overlap, and burrow use of the desert tortoise in the West Mojave Desert. *Copeia* 2009:378-389.

- Haug E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). In: The Birds of North America, No. 61 (A. Poole and F. Gill [eds.]). Philadelphia: The Academy of Natural Sciences; Washington D.C.: The American Ornithologist's Union.
- Henen, B.T. 1997. Seasonal and annual energy budgets of female desert tortoises (*Gopherus agassizii*). *Ecology* 78:283-296.
- Henen, B.T., C.D. Peterson, I.R. Wallis, K.H. Berry, and K.A. Nagy. 1998. Effects of climatic variation on field metabolism and water relations of desert tortoises. *Oecologia* 117:365-373.
- Ho C.K., C.M. Ghanbari, and R.B. Diver. 2009. Hazard Analyses of Glint and Glare from Concentrating Solar Power Plants, in proceedings of SolarPACES 2009, Berlin, Germany, September 15-18, 2009.
- Hoff, K.V.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.
- Hickman J.C. (ed.). 1993. The Jepson Manual. Berkeley, CA: University of California Press.
- Holland 1986. Preliminary list of terrestrial natural communities of California. Department of Fish and Game, Sacramento, CA.
- Hollingsworth B. D., and K. R. Beaman. 1999. Mojave Fringe-loed Lizards (*Uma scoparia*). Species Accounts – West Mojave Plan. Available at: www.blm.gov/ca/pdfs/cdd_pdfs/fringe1.pdf.
- Humple D. 2008. Loggerhead Shrike (*Lanius ludovicianus*). In. Shuford, W. D., and Gardali, T., eds. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
- Hunsaker 2001. The Effects of Aircraft Operations on Passerine Reproduction. In Proceedings of the Effects of Noise on Wildlife Conference. Institute for Environmental Monitoring and Research. August 22 to 23, 2000. pp. 41-49.
- Jaroslow B.N. 1979. A review of factors involved in bird-tower kills, and mitigative procedures. The Mitigation Symposium: a National Workshop on Mitigating Losses of Fish and Wildlife Habitats. U.S. Forest Service General Technical Report.
- Jennings M. R. and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game. Rancho Cordova 255 p.

- Katra I., Scheidt, S., and Lancaster, N. 2009. Changes in active aeolian sand at northern Coachella Valley, California. *Geomorphology* 105: 277-290.
- Kerlinger P. 2004. Attraction of Night Migrating Birds to FAA and Other Types of Lights," Proc. Onshore Wildlife Interactions with Wind Developments: Research Meeting V, Lansdowne, Virginia, November 3–4, 2004, prepared for the Wildlife Subcommittee of the National Wind Coordinating Committee by RESOLVE, Inc., Washington, D.C.
- Kochert M.N., K. Steenhof, C.L. McIntyre, and E.H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Available at: <http://bna.birds.cornell.edu/bna/species/684doi:bna.684>.
- Krausman, P.R., S. Torres, L.L. Ordway, J.J. Hervert, and M. Brown. 1985. Diel activity of ewes in the Little Harquahala Mountains, Arizona. Desert Bighorn Council. Trans. 29, pp. 24-26.
- Langford RP, JM Rose, and DE White. Groundwater salinity as a control on development of eolian landscape : An example from the White Sands of New Mexico. *Geomorphology* 105(1-2): 39-49.
- Lemly AD 1996. Assessing the Toxic Threat of Selenium to Fish and Aquatic Birds. *Environmental Monitoring and Assessment*. 43:19-35.
- Longcore, T., C. Rich, and S. A. Gauthreaux. 2008. Height, guy wires, and steady-burning lights increase hazard of communication towers to nocturnal migrants: a review and meta-analysis. *Auk* 125(2): 485–492.
- Loarie, S.R., Carter, B.E., Hayhoe, K., McMahon, S., and Moe, R. 2008. Climate Change and the Future of California's Endemic Flora. PLoS ONE 3(6): e2502. doi:10.1371/journal.pone.0002502
- Lovich J. E. 1999. Invasive Exotics in California: a Perspective from Inland Southern California. In, M. Kelly, E. Wagner, and P. Warner (eds.). Proceedings of the California Exotic Pest Plant Council Symposium. 4:7-10.
- Lovich, J. E., and D. Bainbridge. 1999. Anthropogenic Degradation of the Southern California Desert Ecosystem and Prospects for Natural Recovery and Restoration. *Environmental Management* Vol. 24, No. 3, pp. 309–326.
- 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.
- Mace, G.M., and A. Purvis. 2008. Evolutionary biology and practical conservation: bridging a widening gap. *Molecular Ecology* 17:9-19.

- Manville A.M., II. 2001. "The ABCs of avoiding bird collisions at communication towers: Next steps." Pp. 85–103 in *Avian Interactions with Utility and Communication Structures*, Proceedings of a workshop held in Charleston, South Carolina, December 2–3, 1999. R. L. Carlton, ed. Concord, California: Electric Power Research Institute.
- Manning S.J. 2006. Vegetation conversion from meadow to scrub. Owens Valley Monitor 2005-2006. Available at: http://inyowater.org/Annual_Reports/2005-2006/veg_change/veg_conversion.htm.
- _____. 2007. Linear regression based prediction of total vegetation cover in 2010 given various estimates of water table in 2010. Inyo County Water Department Draft Report. March 2, 2007.
- Manning, S. J. and M. G. Barbour. 1988. Root systems, spatial patterns, and competition for soil moisture between two desert subshrubs. *American Journal of Botany*. 75: 885-893.
- Martin, T.E. and G.R. Geupel. 1993. Nest monitoring plots: methods for locating nests and monitoring success. *J. Field Ornithology* 64: 507-519
- Mayhew W. W. 1964. Photoperiodic responses in three species of the lizard genus *Uma*. *Herpetologica* 20, pp. 95-113.
- _____. 1965. Adaptations of the amphibian, *Scaphiopus couchi*, to desert conditions. *American Midland Naturalist*. 74: 95-109.
- McCrary M. D., R. L. McKernan, R. W. Schreiber, W. D. Wagner and T. C. Sciarrotta. 1986. Avian Mortality at a Solar Energy Power Plant. *Journal of Field Ornithology*, Vol. 57, No. 2 pp. 135- 141.
- McGahan J. 1968. Ecology of the golden eagle. *Auk* 85:1-12.
- McLuckie, A.M., and R.A. Fridell. 2002. Reproduction in a desert tortoise population on the Beaver Dam Slope, Washington County, Utah. *Chelonian Conservation and Biology* 4: 288-294.
- Mojave Desert Ecosystem Program (MDEP) 2001. Publication Date: 20010423. Title: Mojave Desert Vegetation Theme. Mojave Desert vegetation information. Data characterizing the distribution of vegetational attributes or phenomenon. Dataset available online: <http://www.mojavedata.gov/datasets.php?&qclass=veg>.
- Morey S.R. 2005. *Scaphiopus couchii*: Couch's Spadefoot. in Lannoo, M., ed., *Amphibian Declines - The Conservation Status of United States Species*. Berkeley, CA, University of California Press, pp. 508-511.
- Munz, P.A. 1959. A California flora. In collaboration with D.D. Keck. Univ. of California Press. Berkeley, CA. 1681 pp.

- Murphy R. W., T. L. Trepanier, and D. J. Morafka. 2006. Conservation genetics, evolution and distinct population segments of the Mojave fringe-toed lizard, *Uma scoparia*. *Journal of Arid Environments* 67 (Supplement S), pp. 226-247.
- Murphy R.W., K.H. Berry, T. Edwards, A.M. McLuckie. 2007. A Genetic Assessment of the Recovery Units for the Mojave Population of the Desert Tortoise, *Gopherus agassizii* *Chelonian Conservation and Biology* 6(2):229-251.
- Nagy, K.A., and P.A. Medica. 1986. Physiological ecology of desert tortoises. *Herpetologica* 42:73-92.
- National Park Service 1994. Report to Congress, Report on effects of aircraft overflights on the National Park System.
- Nicholson L. 1978. The effects of roads on desert tortoise populations. In: Proceedings of the 1978 Desert Tortoise Council Symposium, 127–129.
- Norris K. S. 1958. The evolution and systematics of the iguanid genus *Uma* and its relation to the evolution of other North American desert reptiles. *Bull. Amer. Mus. Nat. Hist.* 114, pp. 247-328.
- NRCS 2005. Natural Resources Conservation Service. Low Desert Weed Management Area - Our Worst Weeds. Brochure.
- Nussear, K.E., Esque, T.C., Inman, R.D., Gass, Leila, Thomas, K.A., Wallace, C.S.A., Blainey, J.B., Miller, D.M., and Webb, R.H., 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona: U.S. Geological Survey Open-File Report 2009-1102, 18 p.
- O'Connor, M.P., J.S. Grumbles, R.H. George, L.C. Zimmerman, and J. R. Spotila. 1994. Potential hematological and biochemical indicators of stress in free-ranging desert tortoises, *Gopherus agassizii*, in the eastern Mojave desert. *Herpetological Monographs* 8:60-71.
- Okin, G.S., B. Murray and W.H. Schlesinger. 2001. Degradation of sandy arid shrubland environments: observations, process modeling, and management implications. *Journal of Arid Environments*. 47(2):123-144.
- Orloff, S. B., D. W. Cudney, C. L. Elmore, J. M. DiTomaso. 2008. Pest Notes: Russian Thistle. UC Statewide IPM Program, University of California, Davis. UC ANR Publication 7486. Revised February 8, 2008. Accessed on January 5, 2010 from: <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7486.html>.
- Pagel, J.E., D.M. Whittington and G.T. Allen. 2010. Interim Golden Eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Birds, United States Fish and Wildlife Service. February.
- Patten D.T., L. Rouse, and J.C. Stromberg. 2007. Isolated Spring Wetlands in the Great Basin and Mojave Deserts, USA: Potential Response of Vegetation to Groundwater Withdrawal. In: *Environmental Management* (2008) 41:398–413.

- Peterson, C.C. 1996a. Ecological energetics of the desert tortoise (*Gopherus agassizii*): effects of rainfall and drought. *Ecology* 77:1831–1844.
- Peterson, C.C. 1996b. Anhomeostasis: Seasonal water and solute relations in two populations of the threatened desert tortoise (*Gopherus agassizii*) during chronic drought. *Physiological Zoology* 69:1324-1358.
- Prescott B.G. 2005. Le Conte's Thrasher Species Account, West Mojave Plan, Bureau of Land Management. Final environmental impact report and statement for the West Mojave plan: a habitat conservation plan and California desert conservation area plan amendment. Moreno Valley (CA): U.S. Dept. of the Interior, Bureau of Land Management, California Desert District.
- PWA 2010a. Philip Williams & Associates, Ltd. Environmental Hydrology. Revised wind shadow estimations for Genesis Solar Energy Project, memo from A. Collision to S. Sanders and M. Monasmith, June 1, 2010
- Regional Water Quality Control Board, Colorado River Region (RWQCB). 2006. Water Quality Control Plan, Colorado River Basin – Region 7, Palm Desert, CA. June 2006.
- Reiser CH 1994. Rare Plants of San Diego County. San Diego Sierra Club. Accessed on January 4, 2010 from: <http://sandiego.sierraclub.org/rareplants/016.html>.
- Rostal, D.C., V.A. Lance, J.S. Grimble, and A.C. Alberts. 1994. Seasonal reproductive cycle of the desert tortoise (*Gopherus agassizii*) in eastern Mojave Desert. *Herpetology Monographs*. 8: 72-102.
- Rotenberry, J. T., M. A. Patten and K. L. Preston. 1999. Brewer's Sparrow (*Spizella breweri*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/390> doi:10.2173/bna.390.
- Sanderson, S.C. and H. C. Stutz. 1994. High Chromosome Numbers in Mojavean and Sonoran Desert *Atriplex canescens* (Chenopodiaceae). In: *American Journal of Botany*, Vol. 81, No. 8 (Aug., 1994), pp. 1045-1053
- Sawyer, J.O. and T. Keeler-Wolf, 1995. *A Manual of California Vegetation*, California Native Plant Society. Sacramento, CA. 471 pp.
- Sawyer, J.O. and T. Keeler-Wolf, 1995. *A Manual of California Vegetation*, California Native Plant Society. Sacramento, CA. 471 pp
- Sawyer, J.O, Keeler-Wolf, T., and J.M. Evans. 2009. *A Manual of California Vegetation*. –2nd ed. California Native Plant Society. Sacramento, CA.
- Schoenherr AA.1992. *A Natural History of California*. University of California Press.
- Shuford, W. D. and T Gardali. 2008. *California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of*

- immediate conservation concern in California. *Studies of Western Birds* 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.
- Smith D. R., Ammann, A., Bartoldus, C., and MM Brinson. 1995. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices," Technical Report WRP-DE-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A307 121.
- Solar Millennium 2009a— (tn: 52939). Application for Certification Vol 1 & 2 for the Palen Solar Power Project. Submitted to California Energy Commission Docket Unit on August 24, 2009.
- Solar Millennium 2009b—Solar Millennium (tn: 52937). Application for Certification for the Blythe Solar Power Project, Vol 1 & 2, Submitted to California Energy Commission Docket Unit on August 24, 2009.
- Sosebee, R. E.; Wan, C. 1989. Plant ecophysiology: a case study of honey mesquite. In: Wallace, Arthur; McArthur, E. Durant; Haferkamp, Marshall R., compilers. Proceedings--symposium on shrub ecophysiology and biotechnology; 1987 June 30 - July 2; Logan, UT. Gen. Tech. Rep. INT-256. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station: 103-118.
- Stebbins R.C. 1944. Some aspects of the ecology of the iguanid genus, *Uma*. *Ecological Monographs* 14(3):311-332.
- _____. 1985. *Western reptiles and amphibians*. Houghton Mifflin Company, Boston, Massachusetts.
- Steinberg P. 2001. *Prosopis glandulosa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Accessed on February 20, 2010 from: <http://www.fs.fed.us/database/feis/>.
- Steinemann A.C. 1989. Evaluation of Nonpotable Ground Water in the Desert Area of Southeastern California for Powerplant Cooling. U.S. Geological Survey Water-Supply Paper 2343. 44 pages.
- Stone R. 2008. ECOSYSTEMS: Have Desert Researchers Discovered a Hidden Loop in the Carbon Cycle? *Science*, 13 June 2008: Vol. 320. no. 5882, pp. 1409 – 1410.
- Taylor, A.R., and Knight, R.L. 2003. Behavioral responses of wildlife to human activity: Terminology and methods. *Wildlife Society Bulletin* 31:1263–1271
- Tracy, C.R., R.C. Averill-Murray, W.I. Boarman, D. Delehanty, J.S. Heaton, E.D. McCoy, D.J. Morafka, K.E. Nussear, B.E. Hagerty, and P.A. Medica. 2004. Desert Tortoise Recovery Plan Assessment. Report to the U.S. Fish and Wildlife Service, Reno, Nevada.

- TTEC 2009c – Tetra Tech/T. Bernhardt (tn:54652) Application for Incidental Take of Threatened and Endangered Species. 12/31/2009.
- _____ 2009d – Tetra Tech/T. Bernhardt (tn:54653) Notification of Lake of Streambed Alteration. 12/31/2009.
- _____ 2010a – Tetra Tech/T. Bernhardt (tn:54701) Draft Desert Tortoise Translocation Plan. 1/05/2010.
- _____ 2010f – Tetra Tech/T. Bernhardt (tn:55045) Applicant's Addenda to Data Requests 64, 65 & 120 of Set 1A. 1/26/2009.
- _____ 2010g – Tetra Tech/T. Bernhardt (tn:55123) Draft Weed Management Plan. 1/29/2010.
- _____ 2010i – Tetra Tech/T. Bernhardt (tn:55172) Applicant's Draft Revegetation Plan. 2/03/2010.
- _____ 2010j – Tetra Tech/T. Bernhardt (tn:54846) Applicant's Notification of a Lake or Streambed Alteration (Revision 2).
- _____ 2010k – Tetra Tech/T. Bernhardt (tn:54966) Applicant's Draft Raven Management Plan.
- _____ 2010l – Tetra Tech/T. Bernhardt. (tn:55590) Applicant's Letter to CDFG Regarding Revisions to Jurisdictional Waters for the Genesis Solar Energy Project. 3/13/10.
- _____ 2010m – Tetra Tech/T. Bernhardt (tn:56938) Preliminary Spring 2010 Biological Resources Field Survey Results. 5/28/10.
- _____ 2010n – Tetra Tech/T. Bernhardt (tn:pending) BIO-20 Supplemental Information Sand Dunes/Mohave Fringe-Toed Lizard Mitigation,5/18/10.
- _____ 2010o – Tetra Tech/T. Bernhardt (tn:56815) Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility. Includes Attachment A, Blythe Solar Energy Project 2010 Preliminary Survey Results. Submitted by Genesis Solar, LLC Dated May 21, 2010.
- _____ 2010p – Tetra Tech/T. Bernhardt (tn:56815) Reasonably Foreseeable Developments, Colorado River Substation. 5/19/10. TNC 2007 – The Nature Conservancy. Final Report: A Conservation Management Strategy for Nine Low Elevation Rare Plants in Clark County, Nevada. The Nature Conservancy Nevada Field Office, Reno NV. April 2007.
- Trulio L.A. 1995. Passive Relocation: A Method to Preserve Burrowing Owls on Disturbed Sites. *Journal of Field Ornithology* 66: 99-106.

- _____. 1997. Strategies for protecting western burrowing owls (*Speotyto cunicularia hypugaea*) from human activities. Pp 461-465 in Duncan, Johnson and Nicholls (Eds.). Biology and conservation of owls of the northern hemisphere. USDA Forest Service GTR NC 190.
- Turner F.B., Weaver, D.C. and Rorabaugh, J.C. 1984. Effects of reduction in windblown sand on the abundance of the fringe-toed lizard (*Uma inornata*) in the Coachella Valley, California. Copeia 1984, pp. 370-378.
- Turner, F.B., P.A. Medica, and C.L. Lyons. 1984b. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. Copeia 4:811-820.
- Turner, F.B., P. Hayden, B.L. Burge, and J.B. Roberson. 1986. Egg production by the desert tortoise (*Gopherus agassizii*) in California. Herpetologica 42:93-104.
- 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 to Southern California Edison Co., Rosemead, California.
- URS 2008 - URS (tn: 49155), San Joaquin Solar 1&2 Application for Certification. 12/1/2008.
- USEPA 2008. United States Environmental Protection Agency. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. Office of Research and Development.
- USFS 2008. USDA Forest Service Species Accounts: Animals, Golden Eagle. Available at: <http://www.fs.fed.us/r5/scfpr/projects/lmp/read.htm>.
- USFWS 1990. United States Fish and Wildlife Service, Endangered and threatened wildlife and plants; determination of threatened status for the Mojave population of the desert tortoise. Federal Register 55:12178-12191.
- _____. 1994. United States Fish and Wildlife Service. Desert Tortoise (Mojave population) Recovery Plan. Portland, Oregon. 73 pages plus appendices.
- _____. 2005. U.S. Fish and Wildlife Service (USFWS). 2005. Biological Opinion for the California Desert Conservation Area Plan [Desert Tortoise] (6840 CA930 (P)) (1 - 8-04-F-43R). Ventura Fish and Wildlife Office. Ventura, California. March 31, 2005.
- _____. 2006. Range-wide Monitoring of the Mojave Population of the Desert Tortoise: 2001-2005 Summary Report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.
- _____. 2008. U.S. Fish and Wildlife Service, Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise. U.S. Department of the Interior Fish and Wildlife Service, Ventura, California. March 2008.

- _____ 2008a. U.S. Fish and Wildlife Service, Draft revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California. 209 pp.
- _____ 2009b. Final Environmental Assessment – Proposal to Permit Take Provided Under the Bald and Golden Eagle Protection Act. Last accessed online February 1, 2010:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/BaldEagle/FEA_EagleTakePermit_Final.pdf
- _____ 2009c. Finding of No Significant Impact. Eagle Permits; Take Necessary to Protect Interest in a Particular Locality. Signed May 19, 2009, Last accessed February 7, 2010. Available online at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BaldEagle/FO NSI_EagleRule.09.pdf_____ 2010. U.S. Fish and Wildlife Service, (tn pending). U.S. Fish and Wildlife Service - Renewable Energy Development And Common Raven Predation on the Desert Tortoise -Summary. May 2010.
- USGS 2010. United States Geological Survey National Hydrographic Dataset. Accessed on February 13, 2010 from: <http://nhd.usgs.gov/techref.html>
- Van Devender T.R., Felger, R.S., Búrquez, A., 1997. Exotic Plants in the Sonoran Desert Region: Arizona and Sonora, California Exotic Pest Plant Council Annual Symposium.
- Watson J., S. R. Rae, and R. Stillman. 1992. Nesting density and breeding success of Golden Eagles in relation to food-supply in Scotland. *Journal of Animal Ecology* 61:543-550.
- WBWG 2005-2009. Western Bat Working Group. Accessed on January 19, 2010 from: <http://www.wbwg.org/>.
- Weaver D.C. 1981. Aeolian sand transport and deposit characteristics at ten sites in Coachella Valley, California. Part II. In: The effect of blowsand reduction on the abundance of the fringe-toed lizard (*Uma inornata*) in the Coachella Valley, California. A report submitted to U.S. Army Corps of Engineers, Los Angeles District.
- Wehausen, J.D. 1992. Demographic studies of mountain sheep in the Mojave Desert: report IV. Unpubl. report, Calif. Dept. of Fish and Game, Sacramento. 54 p.
- _____ 2005. Nelson Bighorn Sheep *Ovis canadensis nelsoni*. Species Account, West Mojave Plan, Bureau of Land Management. *Final environmental impact report and statement for the West Mojave plan: a habitat conservation plan and California desert conservation area plan amendment*. Moreno Valley (CA): U.S. Dept. of the Interior, Bureau of Land Management, California Desert District.
- _____ 2009. Memorandum titled: "Investigation of Little Maria Mountains relative to bighorn sheep occupancy" dated December 11, 2009. 2 pages and 6 figures.

- Weisenberger M. E. 1996. Effects of simulated jet aircraft noise on heart rate and behavior of desert ungulates. *Journal of Wildlife Management*. 60(1): 52-61.
- Wingdingstad, R.M., F.X. Kartch, R.K. Stroud, and M.R. Smith. 1987. Salt Toxicosis in Waterfowl in North Dakota. *Journal of Wildlife Disease*. 23(3):443-446.
- Whitfield D.P., Fielding, A.H., McLeod, D.R.A. and Haworth, P.F. 2008. A conservation framework for golden eagles: implications for their conservation and management in Scotland. Scottish Natural Heritage Commissioned Report No.193 (ROAME No. F05AC306).
- Woodbridge, B. 1998. Swainson's Hawk (*Buteo swainsoni*). In: *The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California*. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/riparian_v-2.html
- Woodbury, A. M., and R. Hardy. 1948. Studies of the Desert Tortoise, *Gopherus agassizi*. *Ecological Monographs* 18:145-200.
- Worley Parsons. 2009. Technical Memorandum - Groundwater Resources Cumulative Impact Analysis for Genesis Solar Power Project, Riverside County, CA. 12/31/09.
- _____. 2010b. Worley Parsons/M. Scott (tn:55636) Applicant's Draft Decommissioning and Closure Plan. 2/22/2010.
- _____. 2010c. Worley Parsons/M. Tietze (tn: 55285). Aeolian Transport Evaluation and Ancient Shoreline Delineation Report, Genesis Solar Energy Project, Riverside County, CA. 2/5/2010.
- _____. 2010d. Worley Parsons/M. Tietze (tn: 54862). Interim Preliminary Aeolian Sand Source, Migration and Deposition Letter Report for GSEP. Date.
- Yosef R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). In: *The Birds of North America*, No. 231 (A. Poole and F. Gill [eds.]). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.
- Zeiner et al. 1990. D.C. Zeiner, W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Dept. of Fish and Game, Sacramento, California. *California Wildlife Habitat Relationship System* (CWHRs). <http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx>. Accessed on January 12, 2010.

PERSONAL COMMUNICATIONS

- Andre, J. 2009. Personal communications between Jim Andre, Granite Mountains Research Station, US Reserve System, with Carolyn Chainey-Davis, California Energy Commission, regarding special-status plants known or with potential to occur in the project vicinity, and summer and fall-blooming special-status plants. September 24, 2009.