

# **Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project**

**San Bernardino County, California**



August 2010



United States Department of the Interior  
Bureau of Land Management

**Final Environmental Impact Statement  
and Proposed Amendment to the  
California Desert Conservation Area Plan for the  
Calico Solar (formerly SES Solar One) Project,  
San Bernardino County, California**

For the

**Barstow Field Office**  
Barstow, California

**August 2010**

DOI Control No. DES-10-07

Publication Index No. BLM/CA/ES-2010-011+1793



# United States Department of the Interior

## BUREAU OF LAND MANAGEMENT

Barstow Field Office  
2601 Barstow Road  
Barstow, CA 92311



In reply refer to: 1610-5.G.1.4

August, 2010

Dear Reader:

Enclosed is the Proposed Resource Management Plan-Amendment/Final Environmental Impact Statement (PRMP-A/FEIS) for the California Desert Conservation Area Plan and Calico Solar Project. The Bureau of Land Management (BLM) prepared this PRMP-A/FEIS in consultation with cooperating agencies, taking into account public comments received during the National Environmental Policy Act (NEPA) process. The proposed decision on the plan amendment adds the Calico Solar Project site to those sites identified in the California Desert Conservation Area Plan, as amended, for solar energy production. The decision on the Calico Solar Project will be to approve with modification issuance of the right-of-way grant applied for by Tessera Solar.

This PRMP-A/FEIS for the Calico Solar Project has been developed in accordance with NEPA and the Federal Land Policy and Management Act of 1976. The PRMP-A is fully based on the Agency Preferred Alternative, Alternative 1a. The Draft Resource Management Plan-Amendment/Draft Environmental Impact Statement (DRMP-A/DEIS), was released on April 2, 2010. The PRMP-A/FEIS for the Calico Solar Project contains the proposed plan and project decisions, a summary of changes made between the DRMP-A/DEIS and PRMP-A/FEIS, an analysis of the impacts of the decisions, a summary of the written and oral comments received during the public review period for the DRMP-A/DEIS and responses to comments.

The BLM will be accepting additional public comment on the PRMP-A/FEIS within 30 days after the Environmental Protection Agency publishes the Notice of Availability in the *Federal Register*. Comments can be sent to Jim Stobaugh, BLM National Project Manager, by mail: P.O. Box 12000, Reno, Nevada 89520; or email: [cacalicospp@blm.gov](mailto:cacalicospp@blm.gov). All substantive comments will be reviewed and responded to in the Record of Decision.

Pursuant to the BLM's planning regulations at 43 CFR 1610.5-2, any person who participated in the planning process for the PRMP-A and has an interest that is or may be adversely affected by the planning decision may protest the planning decision within 30 days from the date the Environmental Protection Agency publishes the Notice of Availability in the *Federal Register*. Unlike the planning decision, issuance of the proposed right-of-way grant is an implementation decision that is not subject to protest under the BLM planning regulations.

For further information on filing a protest, please see the accompanying protest regulations in the pages that follow (labeled as Attachment #1). The regulations specify the required elements in a protest. Protesting parties should take care to document all relevant facts and, as much as possible, reference or cite the planning documents or available planning records (e.g., meeting minutes or summaries, correspondence, etc.). To aid in ensuring the completeness of the protest, a protest checklist is attached to this letter (labeled as Attachment #2).

Protests must be in writing and mailed to the following address:

Regular Mail:  
Director (210)  
Attention: Brenda Williams  
P.O. Box 66538  
Washington, D.C. 20035

Overnight Mail:  
Director (210)  
Attention: Brenda Williams  
1620 L Street, N.W., Suite 1075  
Washington, D.C. 20036

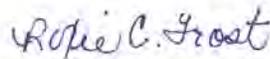
Before including your address, phone number, e-mail address, or other personal identifying information in your protest, be advised that your entire protest – including your personal identifying information – may be made publicly available at any time. While you can ask us in your protest to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Emailed and faxed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed or faxed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct faxed protests to the attention of Brenda Hudgens-Williams - BLM Protest Expeditor at 202-912-7129, and emailed protests to [Brenda\\_Hudgens-Williams@blm.gov](mailto:Brenda_Hudgens-Williams@blm.gov).

The BLM Director will make every attempt to promptly render a decision on each valid protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior. Responses to protest issues will be compiled in a Director's Protest Resolution Report that will be made available to the public following issuance of the decisions.

Upon resolution of all protests, the BLM may issue a Record of Decision (ROD) adopting the Approved RMP-A and making a decision regarding issuance of the right-of-way grant. Copies of the ROD will be mailed or made available electronically to all who participated in this NEPA process and will be available to all parties through the "Planning" page of the BLM national website (<http://www.blm.gov/planning>), or by mail upon request.

Sincerely,



Roxie Trost  
Field Manager

*Attachment #1*

**Protest Regulations**

[CITE: 43CFR1610.5-2]

TITLE 43--PUBLIC LANDS: INTERIOR  
CHAPTER II--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR  
PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents  
Subpart 1610--Resource Management Planning  
Sec. 1610.5-2 Protest procedures.

- (a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.
- (1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.
- (2) The protest shall contain:
- (i) The name, mailing address, telephone number and interest of the person filing the protest;
  - (ii) A statement of the issue or issues being protested;
  - (iii) A statement of the part or parts of the plan or amendment being protested;
  - (iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
  - (v) A concise statement explaining why the State Director's decision is believed to be wrong.
- (3) The Director shall promptly render a decision on the protest.
- (b) The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

**Resource Management Plan Protest  
Critical Item Checklist**

**The following items *must* be included to constitute a valid protest  
whether using this optional format, or a narrative letter.  
(43 CFR 1610.5-2)**

BLM's practice is to make comments, including names and home addresses of respondents, available for public review. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment--including your personal identifying information--may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so. All submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations and businesses, will be available for public inspection in their entirety.

**Resource Management Plan (RMP) or Amendment (RMPA) being protested:**

**Name:**

**Address:**

**Phone Number: ( )**

**Your interest in filing this protest (how will you be adversely affected by the approval or amendment of this plan?):**

**Issue or issues being protested:**

**Statement of the part or parts of the plan being protested:**

**Attach copies of all documents addressing the issue(s) that were submitted during the planning process by the protesting party, OR an indication of the date the issue(s) were discussed for the record.**

**Date(s):**

**A concise statement explaining why the State Director's decision is believed to be wrong:**

**Barstow Field Office  
Calico Solar Project  
Final Environmental Impact Statement**

Lead Agency: Bureau of Land Management (BLM)  
Barstow Field Office  
Barstow, California

For further information, contact: Jim Stobaugh  
National Project Manager  
BLM Nevada State Office

**Abstract**

This Final Environmental Impact Statement (FEIS) addresses the possible Bureau of Land Management (BLM) approval of an amendment to the *California Desert Conservation Area (CDCA) Plan* to allow solar energy development on a proposed project site, up to 8,230 acres in size, 37 miles east of Barstow, California. The FEIS also evaluates Calico Solar, Limited Liability Corporation's (LLC) right-of-way (ROW) grant application to BLM to construct, operate, and decommission the Calico Solar Project on the proposed project site. The FEIS identifies impacts from the proposal related to air quality, biological resources, cultural resources, land use, recreation, transportation, visual resources, water resources, and other resources.

Three action, one No Action, and two land use plan (LUP) amendment alternatives are presented in Chapter 2. The action alternatives include the following—Alternative 1: Proposed Action (850 megawatts [MW], 8,230 acres); Alternative 1a: Agency Preferred Alternative (850 MW, 6,215 acres); Alternative 2: Reduced Acreage Alternative (275 MW, 2,600 acres); and Alternative 3: Avoidance of Donated and Acquired Lands Alternative (850 MW, 7,050 acres). The No Action Alternative (Alternative 4) denies the Calico Solar Project ROW Grant and does not amend the CDCA Plan Amendment. The two LUP alternatives include Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site and Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend the CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site. The Agency Preferred Alternative is also the Environmentally Preferred Alternative.

Chapter 3 describes the existing conditions on and in the vicinity of the project site. Chapter 4 analyzes the potential environmental impacts expected under each alternative.

The Field Manager of the Barstow Field Office has the authority for site management of future activities related to the ROW grant and is the BLM Authorized Officer for this FEIS who will be signing the Record of Decision for the two decisions being considered.

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## List of Abbreviations

AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ADT	average daily traffic
AERMOD	ARMS/EPA Regulatory Model
AFC	Application for Certification
AO	Authorized Officer
APE	Area of Potential Effect
ARRA	American Recovery and Reinvestment Act
BLM	Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe Railway
C <sub>2</sub> F <sub>6</sub>	Hexafluoroethane
CAA	Clean Air Act
CAISO	California Independent System Operator
Cal-IPC	California Invasive Plant Council
Cal/OSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CAT	California Climate Action Team
CBC	California Building Code
CBO	Chief Building Official
CBOC	California Burrowing Owl Consortium
CSSC	California Species of Special Concern (wildlife)
CDCA	California Desert Conservation Area
CDD	California Desert District
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDWR	California Department of Water Resources
CEC	California Energy Commission

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CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CF <sub>4</sub>	Tetrafluoromethane
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CGS	California Geological Survey
CH <sub>4</sub>	Methane
Chloroethene	Vinyl Chloride
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO <sub>2</sub>	Carbon Dioxide
COC	Condition of Certification
CO <sub>2</sub> E	Carbon Dioxide equivalent
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted decibel
DESCP	Drainage, Erosion, and Sediment Control Plan
DNA	Determination of NEPA Adequacy
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DWMA	Desert Wildlife Management Area
EEMP	Equipment Emissions Mitigation Plan
EMS	Emergency Medical Services
EO	Executive Order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency

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FLPMA	Federal Land Policy Management Act
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
FR	Federal Register
FRA	Federal Railroad Administration
FRCC	Fire Regime Condition Class
FTA	Federal Transit Administration
GHG	Greenhouse Gases
GWP	Global Warming Potential
H <sub>2</sub> S	hydrogen sulfide
HA	Herd Areas
HDPE	High-Density Polyethylene
HFC	Hydrofluorocarbons
HMA	Herd Management Areas
HMAP	Herd Management Area Plans
HMBP	Hazardous Materials Business Plan
HMMP	Hazardous Materials Management Plan
I-15	Interstate 15
I-40	Interstate 40
IM	Instruction Memorandum
IPCC	Intergovernmental Panel on Climate Change
KOP	Key Observation Point
kV	Kilovolt
KW	Kilowatt
L <sub>dn</sub>	Day-Night Sound Level
L <sub>eq</sub>	Equivalent Continuous Sound Level
LGIA	Large Generator Interconnection Agreement
LGIP	Large Generator Interconnection Procedures
LLC	Limited Liability Company
LOS	Level of Service
LT	Long-term Measurement Locations
LUP	Land Use Plan
LWCF	Land and Water Conservation Fund
MOU	Memorandum of Understanding

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MCAGCC	Marine Corps Air Ground Combat Center
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
mg/L	Milligrams per liter
MRZ	Mineral Resource Zone
MSA	Metropolitan Statistical Areas
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NAP	Not A Part
N <sub>2</sub> O	Nitrous Oxide
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCS	National Landscape Conservation System
NO	nitric oxide
NO <sub>2</sub>	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO <sub>x</sub>	nitrogen oxides (nitric oxide or nitrogen dioxide)
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWCG	National Wildfire Coordinating Group
O <sub>3</sub>	ozone
OHV	Off-highway Vehicle
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PCC	Portland Cement Concrete
PCE	Passenger Car Equivalent
PCU	Power Conversion Unit
PFC	perfluorocarbons
PG&E	Pacific Gas and Electric

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PM <sub>10</sub>	inhalable particulate matter
PM <sub>2.5</sub>	fine particulate matter
POD	Plan of Development
PPA	Power Purchase Agreement
PSD	Prevention of Significant Deterioration
PV	Photovoltaic
PVC	Polyvinyl Chloride
RECs	Recognized Environmental Conditions
RMP	Risk Management Plan
RO	Reverse Osmosis
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
ROW	Right-of-way
RPS	Renewable Portfolio Standard
RWQCB	Regional Water Quality Control Board
SA/DEIS	Staff Assessment/Draft Environmental Impact Statement
SBC	San Bernardino County Development Code
SBCFD	San Bernardino County Fire Department
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCEC	Southern California Earthquake Center
SES	Stirling Energy Systems
SF <sub>6</sub>	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO	Secretarial Order
SO <sub>2</sub>	sulfur dioxide
SO <sub>4</sub>	sulfates
SO <sub>x</sub>	sulfur-oxygen compounds
SPCC	Spill Prevention, Control, and Countermeasures
SR	Sensitive Receiver
SRMA	Special Recreation Management Area
SSA	Supplemental Staff Assessment
ST	State listed Threatened (wildlife)

STATSGO	State Soil Geographic
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
TDS	total dissolved solids
Twentynine Palms	Marine Corps Air Ground Combat Center at Twentynine Palms
UPA	Unusual Plant Assemblage
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VRM	Visual Resource Management
WA	Wilderness Area
Waters	waters of the United States
WEMO	West Mojave Plan
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WSS	Web Soil Survey

# Executive Summary

## ES.1 Background and Organization of the Final Environmental Impact Statement

In 2007, the Bureau of Land Management (BLM) and the California Energy Commission (CEC) signed a Memorandum of Understanding (MOU) that allowed the two agencies to jointly conduct environmental reviews of solar thermal power projects on BLM land in California in compliance with National Environment Policy Act (NEPA), California Environmental Quality Act (CEQA) and with other federal and state laws and regulations pertaining to power generation sites. The joint Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) for the proposed Calico Solar Project and possible amendment to the California Desert Conservation Area (CDCA) Plan was released on March 30, 2010. The Environmental Protection Agency (EPA) published its Notice of Availability (NOA) in the Federal Register on April 2, 2010, initiating the 90-day public comment period. The BLM issued an additional NOA on April 19, 2010.

After release of the SA/DEIS, the BLM and the CEC decided to prepare separate environmental review documents. Accordingly, the BLM has prepared this Final Environmental Impact Statement (FEIS), and the CEC has prepared a Supplemental Staff Assessment (SSA). Upon completing the FEIS, the BLM will issue a record of decision (ROD) determining whether to approve a land use plan amendment and approve a right-of-way (ROW) grant for the proposed project. The ROD is anticipated to be completed in the fall of 2010.

## ES.2 Project Description

The Calico Solar Project is an electric-generating facility with a nominal capacity of 850 megawatts (MW) using concentrated solar power. The main objective of the Calico Solar Project is to provide clean, renewable, solar-powered electricity to the State of California. The electricity from the Calico Solar Project would assist the State in meeting its objectives as mandated by the California Renewable Portfolio Standard (RPS) Program and the California Global Warming Solutions Act. The project site is in the Mojave Desert in San Bernardino County, California, north of Interstate 40 (I-40), approximately 37 miles east of Barstow; approximately 57 miles northeast of Victorville; and approximately 115 miles east of Los Angeles (Figure 1-1).

The Agency Preferred Alternative is a 6,215-acre solar energy power plant project that was developed in the FEIS as a modification of the 8,230-acre Proposed Action. The Agency Preferred Alternative is also the Environmentally Preferred Alternative. This alternative would accommodate 34,000 SunCatchers generating 850 MW. The boundaries of this alternative were

developed after extensive consultation with federal and state regulatory agencies with responsibilities for management of biological and cultural resources. Accordingly, the north boundary of the project footprint has been adjusted to avoid 1,770 acres of habitat for desert tortoises, bighorn sheep, and rare plants. The south boundary was also modified to remove 245 acres from the project footprint so that no cultural resources are adversely affected. Within the project boundary, there are 6.65 acres of environmentally sensitive areas that will exclude project development to protect rare plants.

### **ES.3 Organization of the Final Environmental Impact Statement**

This FEIS provides detailed descriptions of the Calico Solar Project's Proposed Action, the Agency Preferred Alternative (which is also the Environmentally Preferred Alternative), two additional action alternatives, a No Action Alternative, and two land use plan (LUP) amendment alternatives. The FEIS describes the existing environmental setting and the potential impacts of the reasonable alternatives. Mitigation measures for adverse impacts are also provided. Section 1.5 provides a detailed description of the organization and content of this FEIS.

### **ES.4 Lead Agency Roles and Responsibilities**

The BLM's responsibility for the Proposed Action includes compliance with the Federal Land Policy and Management Act (FLMPA) of 1976, Section 211 of the Energy Policy Act of 2005 (EPAAct), and the BLM's Solar Energy Development Policy. The FLMPA authorizes the BLM to issue ROW grants for renewable energy projects. The EPAAct requires that the Secretary of the Interior should seek to have approved a minimum of 10,000 MW of renewable energy generating capacity on public lands by 2015. BLM's authority extends to the BLM lands in the California Desert District, which are governed by the CDCA Plan (BLM 1999). Because the CDCA would need to be amended to allow the Calico Solar Project on the project site, the BLM would also oversee the CDCA Plan amendment process.

The CEC has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants in California that generate 50 or more MW. The CEC certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law. The CEC must review power plant Applications for Certification (AFCs) to assess potential environmental impacts and compliance with applicable laws, ordinances, regulations, and standards. The CEC analyses regarding the Calico Solar Project in the SA/DEIS were prepared in accordance with the requirement of the CEQA.

The Applicant has applied to the Department of Energy (DOE) for a loan guarantee under Title XVII of the EPAAct, as amended by Section 406 of the American Recovery and Reinvestment Act

(ARRA) of 2009, Public Law 11-5. The DOE has decided to enter into negotiation of a loan guarantee with the Applicant, and as such the DOE has become a cooperating agency in developing the FEIS.

## **ES.5 Purpose and Need**

The BLM's purpose and need for action is to respond to the application under Title V of FLPMA for a ROW grant to construct, operate and decommission the Calico Solar Project and associated infrastructure in compliance with FLPMA, BLM ROW regulations, and other applicable laws. The decision for BLM is to approve, approve with modification, or deny issuance of a ROW grant to Calico Solar, Limited Liability Company (LLC) for the proposed Calico Solar Project. The BLM's actions would also include concurrent consideration of amending the CDCA Plan (BLM 1999).

The purpose and need for action by the DOE is to comply with its mandate under the EPAct to select eligible projects that meet the goals of the Act.

## **ES.6 Proposed Action and Alternatives to the Proposed Action**

### **ES.6.1 Alternative 1: Proposed Action**

The Proposed Action is an 8,230-acre solar energy power plant (Figure 1-2) designed to produce 850 MW, as described in the AFC to the CEC (SES 2008). The Proposed Action project site contains 1,180 acres of lands that were either donated to BLM or acquired by the BLM through the federal Land and Water Conservation Fund (LWCF) program. The Proposed Action is described in detail in B.1 of the SA/DEIS and has been updated in this FEIS in Chapter 2 based on agency consultation and documented through subsequent revisions of the Plan of Development (POD) (Tessera Solar 2010).

Due to limitations in Southern California Edison's (SCE) transmission system, the Proposed Action would be developed in two phases. Phase I would include 11,000 SunCatchers located on approximately 2,320 acres and would generate 275 MW of solar energy. For Phase I, the project would include a new on-site 230-kilovolt (kV) Calico electrical substation near the center of the project area, and an approximately 2-mile-long 230-kV transmission line from the proposed Calico Substation to SCE's existing Pisgah Substation. Phase I would require an expansion and upgrade to the existing Pisgah Substation to increase the voltage to 500 kV. Phase I would also require installation of a fiber optic link on SCE's Pisgah to Lugo and Pisgah to Gale transmission lines.

Phase II would include 23,000 SunCatchers located on approximately 5,910 acres and would generate 575 MW of solar energy. Phase II of the project would require removing 65 miles of the existing 220-kV Lugo-Pisgah No. 2 transmission line between the Lugo Substation and the Pisgah Substation and then replacing the transmission line with approximately 65 miles of 500-kV transmission line between the substations. Approximately 10 of these 65 miles would require new ROW. Additionally, Phase II would require either an expansion of the Pisgah Substation or a newly located substation. These SCE upgrades are considered to be a reasonably foreseeable future action in this FEIS.

### **ES.6.2 Alternative 1a: Agency Preferred Alternative**

The Agency Preferred Alternative is a 6,215-acre solar energy power plant project that was developed in the FEIS as a modification of the 8,230-acre Proposed Action. This alternative would accommodate 34,000 SunCatchers and generate 850 MW. The boundaries of this alternative were developed after extensive consultation with federal and state regulatory agencies with responsibilities for management of biological and cultural resources. Accordingly, the north boundary of the project footprint has been redesigned to avoid 1,770 acres of habitat for desert tortoises, bighorn sheep, and rare plants. The south boundary was also modified so that no cultural resources eligible for listing on the National Register of Historic Places are adversely affected (removal of 245 acres from the Proposed Project footprint). Within the project boundary, there are 6.65 acres of environmentally sensitive areas that will exclude project development to protect rare plants. The Agency Preferred Alternative is also the Environmentally Preferred Alternative.

### **ES.6.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative is a 2,600-acre solar energy power plant project (Figure 2-8) and is described in detail in Chapter B.1 of the SA/DEIS. This alternative would accommodate approximately 11,000 SunCatchers. As discussed in the SA/DEIS, the Reduced Acreage Alternative was developed to avoid sensitive cultural resources, areas that were mapped as occupied desert tortoise habitat (live tortoise and/or active burrows and sign), and sensitive desert washes and donated and acquired lands. The Reduced Acreage Alternative also avoids donated and LWCF-acquired lands, and responds to public scoping comments requesting a scaled-down project footprint.

#### **ES.6.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative was developed to avoid all donated land and acquired lands funded by the federal LWCF and would occupy approximately 7,050 acres (Figure 2-10). In the SA/DEIS, this alternative was estimated to accommodate approximately 28,800 SunCatchers to generate 720 MW. Following publication of the SA/DEIS, the Applicant conducted additional analysis of site design and determined that 34,000 SunCatchers could be accommodated to generate 850 MW while still avoiding the donated and acquired lands.

#### **ES.6.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under this No Action Alternative, the BLM would deny the Calico Solar Project ROW grant and would not amend the CDCA Plan. This is the only alternative in this FEIS that does not include a proposed amendment to the CDCA Plan. As a result, the proposed Calico Solar Project would not be constructed on the project site, and BLM would continue to manage the site consistent with the agency's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality (43 United States Code [USC] 1781[b]) in conformance with applicable statutes, regulations, policies, and the existing CDCA Plan. Other renewable energy projects may be constructed in the CDCA Plan area to meet California renewable energy portfolio mandates. However, these future renewable projects would necessitate a future CDCA Plan amendment for implementation.

#### **ES.6.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the BLM would deny the Calico Solar Project ROW grant and would amend the CDCA Plan to allow other solar projects on the 8,230-acre project site described under the Proposed Action. The BLM would continue to manage the site consistent with the CDCA Plan and approve an amendment to the Energy Production and Utility Corridors Element of the plan to allow future solar energy development on the project site. Future ROW grant applications for solar power development would require the BLM to conduct a NEPA analysis for a proposed project, but the agency would not be required to conduct a NEPA analysis for a CDCA plan amendment for siting.

### **ES.6.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the BLM would deny the Calico Solar Project ROW grant and would amend the CDCA Plan to prohibit other solar projects on the 8,230-acre project site described under the Proposed Action. The BLM would continue to manage the site consistent with the amended CDCA Plan. In the absence of the Proposed Action, other renewable energy projects may be constructed in other locations in the CDCA Plan area to meet renewable energy portfolio mandates.

### **ES.6.8 Upgrades to the SCE Transmission Line**

As of publication of this FEIS, a ROW application from SCE for the transmission system upgrades required for Phase II of the proposed project has not been submitted to BLM. Therefore, the SCE transmission system upgrades are not considered connected actions as described by NEPA. In this document, the BLM has retained the system upgrades as reasonably foreseeable future actions. These upgrades are described briefly below.

### **ES.6.9 Proposed SCE Upgrades for up to 275 MW of Solar Energy Generation**

Construction of the 275-MW Phase I of the Proposed Action would require an upgrade of the existing Pisgah Substation to a 500/220-kV substation designed for four 500/220-kV transformer banks. An upgrade would also be required to implement Phase 1 of the Agency Preferred Alternative, the Reduced Acreage Alternative, and the Avoidance of Donated and Acquired Lands Alternative. These upgrades would require an approved ROW grant from BLM.

### **ES.6.10 Proposed SCE Upgrades for more than 275 MW of Solar Energy Generation**

Delivery of renewable power above 275 MW to the SCE system would require the construction of additional transmission line upgrades by SCE. These upgrades would be required for transmission of power generated from Phase II of the Proposed Action; Phase II of the Agency Preferred Alternative, and Phase II of the Avoidance of Donated and Acquired Lands Alternative.

The California Public Utilities Commission (CPUC) is the lead agency for CEQA compliance, and the BLM is the lead agency for NEPA compliance on these SCE transmission line system

upgrades. The SCE would need a Certificate of Public Convenience and Necessity from the CPUC for these network upgrades in addition to an approved ROW grant from the BLM.

The upgrades required for power transmission beyond 275 MW consists of expansion of the Pisgah Substation or construction of a new substation and the installation of new transmission facilities. The major components include:

- Extending the existing Lugo 500-kV Substation east and west Buses to provide for a new 500-kV transmission line position.
- Removing 65 miles of the existing 220-kV Lugo-Pisgah No. 2 transmission line between Lugo Substation and Pisgah Substation.
- Constructing approximately 65 miles of new 500-kV transmission line between the Lugo and Pisgah Substations. Approximately 55 miles of the new transmission line would use the ROW vacated by the removal of the existing 220-kV line, and approximately 10 miles would require new ROW.
- Looping the existing Eldorado-Lugo 500-kV transmission line into the expanded Pisgah 500-kV Substation to form the Eldorado-Pisgah 500-kV transmission line and the 500-kV Lugo-Pisgah No. 1 transmission line.
- New ROW to accommodate a new 500/220-kV Pisgah Substation, estimated to require 0.6 acre adjacent to the existing substation location. Alternatively, SCE may propose construction of a new substation along the transmission line south of I-40.
- Update existing ROW to support construction of the new 500-kV Lugo-Pisgah No. 2 transmission line within the existing ROW.
- Approximately 10 miles of new ROW (near Lugo, California) to support construction of the new 500-kV Lugo-Pisgah No. 2 transmission line when use of the existing ROW is not feasible.

### **ES.6.11 Other Renewable Resource Projects**

A large number of renewable projects have been proposed on BLM-managed land, state land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California that were in various stages of the environmental review process or under construction. As of December 2009, 49 of these projects, representing approximately 10,500 MW, were planning on requesting ARRA funds from the federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including

approximately 1 million acres of the California desert (Figure A-18). State and private lands have also been approached for renewable solar and wind projects.

## **ES.7 Summary of the Affected Environment**

The Calico Solar Project site is located in an undeveloped area of San Bernardino County, California, approximately 37 miles east of Barstow, California and north of I-40, and between approximately 1,925 to 3,050 feet above mean sea level. The Proposed Action is located on approximately 8,230 acres of public land administered by the BLM and is subject to the applicable land use management requirements in the CDCA Plan (BLM 1999).

The project site slopes gently to the northeast, with steeper sloping beyond the northeast boundary line. The central and western portions of the project site are characterized by low and moderate relief alluvial zones and washes. The few existing residences and farming areas are located approximately 2 miles to the east and 4 miles west of the project site.

The climate of the San Bernardino County is classified as a high-desert climate characterized by low precipitation, hot summers and mild to cold winters, low humidity, and strong temperature inversions. It is separated from the Pacific coastal regions by the San Gabriel and San Bernardino mountain ranges to the south and Tehachapi Mountains to the west. The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center over the eastern Pacific. This high-pressure system effectively blocks out most mid-latitude storms, except in winter when the ridge is weaker and farther south. The coastal mountains to the southwest of San Bernardino County also have a major influence on climate, serving as a meteorological boundary that effectively removes moisture from the marine air flowing inland from the Pacific.

The lands within the project site are primarily designated Multiple-Use Class M (moderate), with a small amount of Multiple-Use Class L (limited) pursuant to the CDCA Plan, and are zoned Resource Conservation by San Bernardino County. Within the community of Newberry Springs, located approximately 17 miles west of the project site, the existing land use consists primarily of single-family homes, including a number of mobile homes on individual lots, recreation vehicle parks, and commercial lots. There are some residences within sight of the project site to the east and southwest, although the density of residences becomes higher nearer to the communities of Newberry Springs and Daggett.

There are several BLM-designated open routes located within the project site that are used currently by recreation users and owners of adjacent private lands. The project site contains a variety of vegetation types, including four special or sensitive species: white-margined beardtongue, crucifixion thorn, small-flowered androstephium, and Utah vine milkweed. A total of nine special-status wildlife species were identified within or in proximity to the project site;

these include desert tortoise, Mojave fringe-toed lizard, American badger, loggerhead shrike, Le Conte's thrasher, Bendire's thrasher, burrowing owl, golden eagle, and Swainson's hawk.

There are 404 cultural resource sites within the Calico Solar Project area of potential effect (APE). Sixty-nine resources were eliminated through project re-design in 2008-2009. The remaining 335 cultural resources within the project APE include 119 archaeological sites, 2 indeterminate rock feature sites, 206 archaeological isolates, and 10 historic built environment resources. The BLM has determined that 3 of these cultural resource sites are eligible for listing on the National Register of Historic Places.

Four Wilderness Areas (WAs) and one Wilderness Study Area (WSA) are located in the project vicinity (Figure A-9). The Cady Mountains WSA has been documented by a wilderness study report that shows the location of the individual WSA, a description of its wilderness values, and BLM's recommendation for its future suitability as wilderness as proposed by the Secretary of Interior on June 12, 1991 (BLM 2009a). There are also two areas of critical environmental concern (ACECs) in the project area (Figure A-9). The Pisgah ACEC is adjacent to the site's eastern/southeastern boundary. The Rodman Mountains Cultural Area ACEC is located southwest of the site, in the Rodman Mountains WA. The Ord-Rodman ACEC consists of the public lands within the Ord-Rodman Desert Wildlife Management Area (DWMA) (Figure A-9). This DWMA was established in the West Mohave Plan (WEMO) specifically for the conservation of the desert tortoise and contains designated critical habitat for that species. The Superior-Cronese DWMA, located northeast of the project vicinity (Figure A-2), was also established by the WEMO and includes designated critical habitat for the conservation and recovery of the desert tortoise.

There are approximately 1,180 acres of land within the project boundary that were donated to the BLM or that were acquired through the LWCF program (Figure A-8). The 2009 BLM Interim Policy Memorandum on donated and acquired lands (BLM 2009b) identifies the management policy for donated and acquired lands and is summarized in Section 3.9, Land Use.

## **ES.8 Environmental Consequences of the Proposed Action, Including Cumulative Impacts**

Table ES-1 summarizes, by alternative, the environmental impacts that would occur as a result of the construction of the Calico Solar Project. The impacts are presented according to each environmental resource element. A detailed assessment of potential impacts of the three action alternatives, the No Action Alternative, and the two LUP amendment alternatives are provided in Chapter 4 of this FEIS.

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**Table ES-1 Summary of Impacts of Calico Solar Project Alternatives**

Resource Element	Alternative 1: Proposed Action	Alternative 1a: Agency Preferred Alternative (Environmentally Preferred Alternative)	Alternative 2: Reduced Acreage Alternative	Alternative 3: Avoidance of Donated and Acquired Lands Alternative	Alternative 4: No Action: Deny Calico Solar Project ROW Grant/ No CDCA Plan Amendment	Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site	Alternative 6: LUP Amendment Alternative: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit other Solar Energy Projects on the Project Site
<b>Air Quality and Climate</b>							
	Direct and indirect impacts due to minimal contribution to violations of the most stringent PM <sub>10</sub> standards during construction and operation; cumulative adverse short-term construction and operation impacts on air quality	Direct and indirect impacts due to minimal contribution to violations of the most stringent PM <sub>10</sub> standards during construction and operation; cumulative adverse short-term construction and operation impacts on air quality	Direct and indirect impacts due to minimal contribution to violations of the most stringent PM <sub>10</sub> standards during construction and operation; cumulative adverse short-term construction and operation impacts on air quality	Direct and indirect impacts due to minimal contribution to violations of the most stringent PM <sub>10</sub> standards during construction and operation; cumulative adverse short-term construction and operation impacts on air quality	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for minimal contribution to violations of the most stringent PM <sub>10</sub> standards during construction and operation of other solar energy projects; potential for cumulative short-term construction and operation impacts on air quality if another solar energy project is developed on the project site.	No direct, indirect, or cumulative impacts on air quality since the site would not be developed
<b>Biological Resources</b>							
General vegetation	Short-term and long-term direct and indirect adverse impacts on vegetation onsite due to construction and maintenance activities, and the spread of invasive, non-native, and/or noxious weeds; incremental contribution to cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on vegetation onsite due to construction and maintenance activities, and the spread of invasive, non-native, and/or noxious weeds; incremental contribution to cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on vegetation onsite due to construction and maintenance activities, and the spread of invasive, non-native, and/or noxious weeds; incremental contribution to cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on vegetation onsite due to construction and maintenance activities, and the spread of invasive, non-native, and/or noxious weeds; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Invasive, Non-native and Noxious Weeds	Potential short-term and long-term direct and indirect adverse impacts from the spread of invasive, non-native and/or noxious weeds; incremental contribution to significant cumulative adverse impacts	Potential short-term and long-term direct and indirect adverse impacts from the spread of invasive, non-native and/or noxious weeds; incremental contribution to significant cumulative adverse impacts	Potential short-term and long-term direct and indirect adverse impacts from the spread of invasive, non-native and/or noxious weeds; incremental contribution to significant cumulative adverse impacts	Potential short-term and long-term direct and indirect adverse impacts from the spread of invasive, non-native and/or noxious weeds; incremental contribution to significant cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
General wildlife	Short-term and long-term direct and indirect adverse impacts on wildlife on the project site and in the immediate project vicinity due to increased trampling, predation, noise, light, traffic and habitat loss; incremental contribution to cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on wildlife on the project site and in the immediate project vicinity due to increased trampling, predation, noise, light, traffic and habitat loss; incremental contribution to cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on wildlife on the project site and in the immediate project vicinity due to increased trampling, predation, noise, light, traffic and habitat loss; incremental contribution to cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on wildlife on the project site and in the immediate project vicinity due to increased trampling, predation, noise, light, traffic and habitat loss; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed

Resource Element	Alternative 1: Proposed Action	Alternative 1a: Agency Preferred Alternative (Environmentally Preferred Alternative)	Alternative 2: Reduced Acreage Alternative	Alternative 3: Avoidance of Donated and Acquired Lands Alternative	Alternative 4: No Action: Deny Calico Solar Project ROW Grant/ No CDCA Plan Amendment	Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site	Alternative 6: LUP Amendment Alternative: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit other Solar Energy Projects on the Project Site
Birds	Short-term and long-term direct and indirect adverse impacts on birds due to habitat loss, increased noise, lighting, glare, bird collisions, and electrocution; incremental contribution to significant cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on birds due to habitat loss, increased noise, lighting, glare, bird collisions, and electrocution; incremental contribution to significant cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on birds due to habitat loss, increased noise, lighting, glare, bird collisions, and electrocution; incremental contribution to significant cumulative adverse impacts	Short-term and long-term direct and indirect adverse impacts on birds due to habitat loss, increased noise, lighting, glare, bird collisions, and electrocution; incremental contribution to significant cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Wildlife movement corridors	Short- and long-term direct and indirect adverse impacts on wildlife movement corridors and habitat linkages that are currently available on the project site because of the substantial barrier to wildlife movement that would be posed by the fenced solar field; incremental contribution to the loss and degradation of wildlife movement corridors and habitat linkages	Short- and long-term direct and indirect adverse impacts on wildlife movement corridors and habitat linkages that are currently available on the project site because of the substantial barrier to wildlife movement that would be posed by the fenced solar field; incremental contribution to the loss and degradation of wildlife movement corridors and habitat linkages	Short- and long-term direct and indirect adverse impacts on wildlife movement corridors and habitat linkages that are currently available on the project site because of the substantial barrier to wildlife movement that would be posed by the fenced solar field; incremental contribution to the loss and degradation of wildlife movement corridors and habitat linkages	Short- and long-term direct and indirect adverse impacts on wildlife movement corridors and habitat linkages that are currently available on the project site because of the substantial barrier to wildlife movement that would be posed by the fenced solar field; incremental contribution to the loss and degradation of wildlife movement corridors and habitat linkages	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status plants: white-margined beardtongue	Impacts would be avoided through on-site protection in Environmentally Sensitive Areas; other foreseeable future projects could result in significant adverse cumulative impacts	Impacts would be avoided through on-site protection in Environmentally Sensitive Areas; other foreseeable future projects could result in significant adverse cumulative impacts	Impacts would be avoided through on-site protection in Environmentally Sensitive Areas; other foreseeable future projects could result in significant adverse cumulative impacts	Impacts would be avoided through on-site protection in Environmentally Sensitive Areas; other foreseeable future projects could result in significant adverse cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status plants: other	Direct and indirect adverse short-term and long-term impacts due to reduction, fragmentation, and degradation of suitable habitats on the project site and in the immediate project vicinity; incremental contribution to an adverse cumulative impact to small-flowered androstephium	Direct and indirect adverse short-term and long-term impacts due to reduction, fragmentation, and degradation of suitable habitats on the project site and in the immediate project vicinity; incremental contribution to an adverse cumulative impact to small-flowered androstephium	Direct and indirect adverse short-term and long-term impacts due to reduction, fragmentation, and degradation of suitable habitats on the project site and in the immediate project vicinity; incremental contribution to an adverse cumulative impact to small-flowered androstephium	Direct and indirect adverse short-term and long-term impacts due to reduction, fragmentation, and degradation of suitable habitats on the project site and in the immediate project vicinity; incremental contribution to an adverse cumulative impact to small-flowered androstephium	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status reptiles: banded Gila monster	Direct and indirect adverse short-term and long-term impacts on banded Gila monsters, if they do occur on the project site; incremental contribution to cumulative adverse impacts	Direct and indirect adverse short-term and long-term impacts on banded Gila monsters, if they do occur on the project site; incremental contribution to cumulative adverse impacts	Direct and indirect adverse short-term and long-term impacts on banded Gila monsters, if they do occur on the project site; incremental contribution to cumulative adverse impacts	Direct and indirect adverse short-term and long-term impacts on banded Gila monsters, if they do occur on the project site; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed

Resource Element	Alternative 1: Proposed Action	Alternative 1a: Agency Preferred Alternative (Environmentally Preferred Alternative)	Alternative 2: Reduced Acreage Alternative	Alternative 3: Avoidance of Donated and Acquired Lands Alternative	Alternative 4: No Action: Deny Calico Solar Project ROW Grant/ No CDCA Plan Amendment	Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site	Alternative 6: LUP Amendment Alternative: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit other Solar Energy Projects on the Project Site
Special-status reptiles: desert tortoise	Direct and indirect short-term and long-term adverse impacts on desert tortoises on the project site, in the immediate project vicinity, and at translocation receptor sites, and to desert tortoise critical habitat within the Ord-Rodman DWMA; incremental contribution to significant cumulative adverse impacts on desert tortoise habitat and connectivity	Direct and indirect short-term and long-term adverse impacts on desert tortoises on the project site, in the immediate project vicinity, and at translocation receptor sites, and to desert tortoise critical habitat within the Ord-Rodman DWMA; incremental contribution to significant cumulative adverse impacts on desert tortoise habitat and connectivity	Direct and indirect short-term and long-term adverse impacts on desert tortoises on the project site, in the immediate project vicinity, and at translocation receptor sites, and to desert tortoise critical habitat within the Ord-Rodman DWMA; incremental contribution to significant cumulative adverse impacts on desert tortoise habitat and connectivity	Direct and indirect short-term and long-term adverse impacts on desert tortoises on the project site, in the immediate project vicinity, and at translocation receptor sites, and to desert tortoise critical habitat within the Ord-Rodman DWMA; incremental contribution to significant cumulative adverse impacts on desert tortoise habitat and connectivity	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status reptiles: Mojave fringe-toed lizard	Direct and indirect, short-term and long-term adverse impacts on Mojave fringe-toed lizards and their habitat; incremental contribution to potentially significant adverse cumulative impacts	Direct and indirect, short-term and long-term adverse impacts on Mojave fringe-toed lizards and their habitat; incremental contribution to potentially significant adverse cumulative impacts	Direct and indirect, short-term and long-term adverse impacts on Mojave fringe-toed lizards and their habitat; incremental contribution to potentially significant adverse cumulative impacts	Direct and indirect, short-term and long-term adverse impacts on Mojave fringe-toed lizards and their habitat; incremental contribution to potentially significant adverse cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status birds: Bendire's thrasher	Direct and indirect, short-term and long-term adverse impacts on Bendire's thrashers; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on Bendire's thrashers; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on Bendire's thrashers; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on Bendire's thrashers; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status birds: burrowing owl	Direct and indirect, short-term and long-term adverse impacts on burrowing owls; incremental contribution to potentially significant cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on burrowing owls; incremental contribution to potentially significant cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on burrowing owls; incremental contribution to potentially significant cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on burrowing owls; incremental contribution to potentially significant cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status birds: golden eagle	Direct and indirect, short-term and long-term adverse impacts on golden eagles; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	Direct and indirect, short-term and long-term adverse impacts on golden eagles; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	Direct and indirect, short-term and long-term adverse impacts on golden eagles; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	Direct and indirect, short-term and long-term adverse impacts on golden eagles; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status birds: Le Conte's thrasher	Direct and indirect, short-term and long-term adverse impacts on Le Conte's thrashers; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on Le Conte's thrashers; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on Le Conte's thrashers; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on Le Conte's thrashers; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed

<b>Resource Element</b>	<b>Alternative 1: Proposed Action</b>	<b>Alternative 1a: Agency Preferred Alternative (Environmentally Preferred Alternative)</b>	<b>Alternative 2: Reduced Acreage Alternative</b>	<b>Alternative 3: Avoidance of Donated and Acquired Lands Alternative</b>	<b>Alternative 4: No Action: Deny Calico Solar Project ROW Grant/ No CDCA Plan Amendment</b>	<b>Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site</b>	<b>Alternative 6: LUP Amendment Alternative: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit other Solar Energy Projects on the Project Site</b>
Special-status birds: mountain plover	Negligible direct and indirect, short-term and long-term adverse impacts on mountain plovers; negligible contribution to cumulative adverse impacts	Negligible direct and indirect, short-term and long-term adverse impacts on mountain plovers; negligible contribution to cumulative adverse impacts	Negligible direct and indirect, short-term and long-term adverse impacts on mountain plovers; negligible contribution to cumulative adverse impacts	Negligible direct and indirect, short-term and long-term adverse impacts on mountain plovers; negligible contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status birds: Swainson's hawk	Negligible direct and indirect short-term and long-term adverse impacts on any Swainson's hawks occurring in the project vicinity; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	Negligible direct and indirect short-term and long-term adverse impacts on any Swainson's hawks occurring in the project vicinity; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	Negligible direct and indirect short-term and long-term adverse impacts on any Swainson's hawks occurring in the project vicinity; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	Negligible direct and indirect short-term and long-term adverse impacts on any Swainson's hawks occurring in the project vicinity; incremental contribution to potentially significant cumulative impact through the loss of foraging habitat	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status mammals: American badger	Direct and indirect, short-term and long-term adverse impacts on American badgers on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on American badgers on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on American badgers on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on American badgers on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status mammals: desert kit fox	Direct and indirect, short-term and long-term adverse impacts on desert kit foxes on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on desert kit foxes on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on desert kit foxes on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	Direct and indirect, short-term and long-term adverse impacts on desert kit foxes on the project site and in the immediate project vicinity; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status mammals: Nelson's bighorn sheep	Direct and indirect, short-term and long-term adverse impacts on Nelson's bighorn sheep occurring in the Cady Mountains to the north of the project site; incremental contribution to the cumulative loss of foraging habitat in the Cady Mountains and significant adverse cumulative impacts on populations in the West Mojave Planning Area	Direct and indirect, short-term and long-term adverse impacts on Nelson's bighorn sheep occurring in the Cady Mountains to the north of the project site; incremental contribution to the cumulative loss of foraging habitat in the Cady Mountains and significant adverse cumulative impacts on populations in the West Mojave Planning Area	Direct and indirect, short-term and long-term adverse impacts on Nelson's bighorn sheep occurring in the Cady Mountains to the north of the project site; incremental contribution to the cumulative loss of foraging habitat in the Cady Mountains and significant adverse cumulative impacts on populations in the West Mojave Planning Area	Direct and indirect, short-term and long-term adverse impacts on Nelson's bighorn sheep occurring in the Cady Mountains to the north of the project site; incremental contribution to the cumulative loss of foraging habitat in the Cady Mountains and significant adverse cumulative impacts on populations in the West Mojave Planning Area	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Special-status mammals: special-status bats	Negligible short-term and long-term adverse impacts on special-status bats that forage over the project site; incremental contribution to cumulative adverse impacts	Negligible short-term and long-term adverse impacts on special-status bats that forage over the project site; incremental contribution to cumulative adverse impacts	Negligible short-term and long-term adverse impacts on special-status bats that forage over the project site; incremental contribution to cumulative adverse impacts	Negligible short-term and long-term adverse impacts on special-status bats that forage over the project site; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed

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<b>Climate Change</b>							
	Minor contributions to GHG emissions and reduction of soil carbon sequestration, but overall long-term, beneficial direct and indirect impacts due to a net reduction in GHG emissions across the electricity system; incremental contribution to cumulative beneficial impacts	Minor contributions to GHG emissions and reduction of soil carbon sequestration, but overall long-term, beneficial direct and indirect impacts due to a net reduction in GHG emissions across the electricity system; incremental contribution to cumulative beneficial impacts	Minor contributions to GHG emissions and reduction of soil carbon sequestration, but overall long-term, beneficial direct and indirect impacts due to a net reduction in GHG emissions across the electricity system; incremental contribution to cumulative beneficial impacts	Minor contributions to GHG emissions and reduction of soil carbon sequestration, but overall long-term, beneficial direct and indirect impacts due to a net reduction in GHG emissions across the electricity system; incremental contribution to cumulative beneficial impacts	Long-term, adverse direct and indirect impacts due to lack of net reduction in GHG emissions; no cumulative impacts	Potential for long-term, beneficial indirect impacts due to a net reduction in GHG emissions across the electricity system if other solar energy projects are constructed; no cumulative impacts	Long-term, adverse direct and indirect impacts due to lack of net reduction in GHG emissions; no cumulative impacts
<b>Cultural Resources and Paleontology</b>							
	Significant adverse effects to three cultural resources with the potential for listing on the National Register of Historic Places; permanent long-term adverse direct, indirect, and cumulative impacts on other cultural resources due to construction and decommissioning activities and increased human access	No adverse effects to any cultural resources with the potential for listing on the National Register of Historic Places; permanent long-term adverse direct, indirect, and cumulative impacts on other cultural resources due to construction activities and increased human access	Significant adverse effect to one cultural resource with potential for listing on the National Register of Historic Places; permanent long-term adverse direct, indirect, and cumulative impacts on other cultural resources due to construction activities and increased human access	Significant adverse effects to two cultural resources with potential for listing on the National Register of Historic Places; permanent long-term adverse direct, indirect, and cumulative impacts on other cultural resources due to construction activities and increased human access	No direct, indirect, or cumulative impacts since the site would not be developed	No adverse effects to historic properties; potential for permanent long-term adverse direct, indirect, and cumulative impacts on other cultural resources if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Fire and Fuels</b>							
	Adverse direct and indirect impacts due to increases in invasive weeds and human ignition sources; incremental contribution to cumulative adverse impacts	Adverse direct and indirect impacts due to increases in invasive weeds and human ignition sources; incremental contribution to cumulative adverse impacts	Adverse direct and indirect impacts due to increases in invasive weeds and human ignition sources; incremental contribution to cumulative adverse impacts	Adverse direct and indirect impacts due to increases in invasive weeds and human ignition sources; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for adverse direct and indirect impacts due to increases in invasive weeds and human ignition sources if other solar energy projects are constructed; potential for incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Geology, Soils, Topography, and Mineral Resources</b>							
Mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources	No direct, indirect, or cumulative impacts due to absence of mineral resources
Soils	Long-term and short-term adverse direct and indirect impacts on soils from clearing of vegetation, diminished soil productivity from topsoil loss, loss of cryptobiotic soil and desert pavement, erosion, and compaction; incremental contribution to cumulative adverse impacts on soil resources	Long-term and short-term adverse direct and indirect impacts on soils from clearing of vegetation, diminished soil productivity from topsoil loss, loss of cryptobiotic soil and desert pavement, erosion, and compaction; incremental contribution to cumulative adverse impacts on soil resources	Long-term and short-term adverse direct and indirect impacts on soils from clearing of vegetation, diminished soil productivity from topsoil loss, loss of cryptobiotic soil and desert pavement, erosion, and compaction; incremental contribution to cumulative adverse impacts on soil resources	Long-term and short-term adverse direct and indirect impacts on soils from clearing of vegetation, diminished soil productivity from topsoil loss, loss of cryptobiotic soil and desert pavement, erosion, and compaction; incremental contribution to cumulative adverse impacts on soil resources	No direct, indirect, or cumulative impacts since the site would not be developed	No direct, indirect, or cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed

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Geologic hazards	Geologic hazards include the potential for ground shaking and a low likelihood of volcanic eruptions	Geologic hazards include the potential for ground shaking and a low likelihood of volcanic eruptions	Geologic hazards include the potential for ground shaking and a low likelihood of volcanic eruptions	Geologic hazards include the potential for ground shaking and a low likelihood of volcanic eruptions	Avoidance of risks associated with geologic hazards since the site would not be developed	Avoidance of risks associated with geologic hazards	Avoidance of risks associated with geologic hazards since the site would not be developed
<b>Grazing and Wild Horses and Burros</b>							
Agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands	No direct, indirect, or cumulative impacts due to absence of agricultural lands
Grazing	Negligible direct, indirect, or cumulative impacts due to the low quality of grazing vegetation present and the fact that grazing is not currently occurring at the site	Negligible direct, indirect, or cumulative impacts due to the low quality of grazing vegetation present and the fact that grazing is not currently occurring at the site	Negligible direct, indirect, or cumulative impacts due to the low quality of grazing vegetation present and the fact that grazing is not currently occurring at the site	Negligible direct, indirect, or cumulative impacts due to the low quality of grazing vegetation present and the fact that grazing is not currently occurring at the site	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for negligible direct, indirect, or cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Wild horses and burros	Negligible direct, indirect, or cumulative impacts due to absence of designated HAs or HMAs, or any observations of wild horses and burros	Negligible direct, indirect, or cumulative impacts due to absence of designated HAs or HMAs, or any observations of wild horses and burros	Negligible direct, indirect, or cumulative impacts due to absence of designated HAs or HMAs, or any observations of wild horses and burros	Negligible direct, indirect, or cumulative impacts due to absence of designated HAs or HMAs, or any observations of wild horses and burros	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for negligible direct, indirect, or cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Land Use</b>							
	Direct and indirect long-term, adverse impacts due to the exclusion of other public land uses and the disturbance of 1,180 acres of donated and acquired lands; incremental contribution to cumulative adverse impacts	Direct and indirect long-term, adverse impacts due to the exclusion of other public land uses and the disturbance of 1,020 acres of donated and acquired lands; incremental contribution to cumulative adverse impacts	Direct and indirect long-term, adverse impacts due to the exclusion of other public land uses; no direct or indirect impacts on donated and acquired lands due to avoidance of those lands; incremental contribution to cumulative adverse impacts	Direct and indirect long-term, adverse impacts due to the exclusion of other public land uses; no direct or indirect impacts on donated and acquired lands due to avoidance of those lands; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct and indirect long-term, adverse impacts due to the exclusion of other public land uses and the disturbance of donated and acquired lands if other solar energy projects are constructed; potential for incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Noise and Vibration</b>							
	Direct and indirect adverse impacts created by short-term construction activities and by normal long-term operation of the solar power plant; no cumulative impacts due to location of other potential projects in the region immediately surrounding the sensitive receivers for the project	Direct and indirect adverse impacts created by short-term construction activities and by normal long-term operation of the solar power plant; no cumulative impacts due to location of other potential projects in the region immediately surrounding the sensitive receivers for the project	Direct and indirect adverse impacts created by short-term construction activities and by normal long-term operation of the solar power plant; no cumulative impacts due to location of other potential projects in the region immediately surrounding the sensitive receivers for the project	Direct and indirect adverse impacts created by short-term construction activities and by normal long-term operation of the solar power plant; no cumulative impacts due to location of other potential projects in the region immediately surrounding the sensitive receivers for the project	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct and indirect adverse impacts if other solar energy projects are constructed; no cumulative impacts due to location of other potential projects in the region immediately surrounding the sensitive receivers for the project	No direct, indirect, or cumulative impacts since the site would not be developed

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<b>Public Health and Safety and Hazardous Materials</b>							
Hazardous materials	Minimal potential for on-site and off-site direct and indirect impacts due to handling and storage of hazardous materials, including hydrogen; no cumulative impacts due to small amounts and low hazard of the hazardous chemicals to be stored at the facility	Minimal potential for on-site and off-site direct and indirect impacts due to handling and storage of hazardous materials, including hydrogen; no cumulative impacts due to small amounts and low hazard of the hazardous chemicals to be stored at the facility	Minimal potential for on-site and off-site direct and indirect impacts due to handling and storage of hazardous materials, including hydrogen; no cumulative impacts due to small amounts and low hazard of the hazardous chemicals to be stored at the facility	Minimal potential for on-site and off-site direct and indirect impacts due to handling and storage of hazardous materials, including hydrogen; no cumulative impacts due to small amounts and low hazard of the hazardous chemicals to be stored at the facility	No direct, indirect, or cumulative impacts since the site would not be developed	Minimal potential for on-site and off-site direct, indirect, and cumulative impacts if other solar energy projects are constructed that handle and store hazardous materials	No direct, indirect, or cumulative impacts since the site would not be developed
Waste management	Direct and indirect impacts due to increase in disposal of non-hazardous wastes; no cumulative impacts due to modest quantities of waste and employment of waste recycling	Direct and indirect impacts due to increase in disposal of non-hazardous wastes; no cumulative impacts due to modest quantities of waste and employment of waste recycling	Direct and indirect impacts due to increase in disposal of non-hazardous wastes; no cumulative impacts due to modest quantities of waste and employment of waste recycling	Direct and indirect impacts due to increase in disposal of non-hazardous wastes; no cumulative impacts due to modest quantities of waste and employment of waste recycling	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Emergency response	No adverse direct or indirect impacts on emergency medical services or law enforcement due to proposed safety procedures, employee training, proposed on-site security measures; incremental contribution to cumulative adverse impacts on emergency response	No adverse direct or indirect impacts on emergency medical services or law enforcement due to proposed safety procedures, employee training, proposed on-site security measures; incremental contribution to cumulative adverse impacts on emergency response	No adverse direct or indirect impacts on emergency medical services or law enforcement due to proposed safety procedures, employee training, proposed on-site security measures; incremental contribution to cumulative adverse impacts on emergency response	No adverse direct or indirect impacts on emergency medical services or law enforcement due to proposed safety procedures, employee training, proposed on-site security measures; incremental contribution to cumulative adverse impacts on emergency response	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative adverse impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Recreation</b>							
	Direct and indirect short-term and long-term adverse impacts due to loss of recreational access to the project site, reducing scenic values and altering the recreational experience; incremental contribution to cumulative adverse impacts	Direct and indirect short-term and long-term adverse impacts due to loss of recreational access to the project site, reducing scenic values and altering the recreational experience; incremental contribution to cumulative adverse impacts	Direct and indirect short-term and long-term adverse impacts due to loss of recreational access to the project site, reducing scenic values and altering the recreational experience; incremental contribution to cumulative adverse impacts	Direct and indirect short-term and long-term adverse impacts due to loss of recreational access to the project site, reducing scenic values and altering the recreational experience; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct and indirect short-term and long-term adverse impacts if other solar energy projects are constructed; potential for incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Socioeconomics and Environmental Justice</b>							
Population and employment	Negligible beneficial short-term and long-term direct and indirect impacts from increased employment and potential increase in local population; incremental contribution to cumulative beneficial impacts	Negligible beneficial short-term and long-term direct and indirect impacts from increased employment and potential increase in local population; incremental contribution to cumulative beneficial impacts	Negligible beneficial short-term and long-term direct and indirect impacts from increased employment and potential increase in local population; incremental contribution to cumulative beneficial impacts	Negligible beneficial short-term and long-term direct and indirect impacts from increased employment and potential increase in local population; incremental contribution to cumulative beneficial impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct and indirect short-term and long-term adverse impacts if other solar energy projects are constructed; potential for incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed

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Environmental justice	No direct, indirect, or cumulative socioeconomic impacts on low-income or minority populations	No direct, indirect, or cumulative socioeconomic impacts on low-income or minority populations	No direct, indirect, or cumulative socioeconomic impacts on low-income or minority populations	No direct, indirect, or cumulative socioeconomic impacts on low-income or minority populations	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, or cumulative socioeconomic impacts on low-income or minority populations if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Housing supply	No direct, indirect, or cumulative impacts on housing supply due to adequate existing housing in the area	No direct, indirect, or cumulative impacts on housing supply due to adequate existing housing in the area	No direct, indirect, or cumulative impacts on housing supply due to adequate existing housing in the area	No direct, indirect, or cumulative impacts on housing supply due to adequate existing housing in the area	No direct, indirect, or cumulative impacts since the site would not be developed	No direct, indirect, or cumulative impacts on housing supply due to adequate existing housing in the area	No direct, indirect, or cumulative impacts since the site would not be developed
Social and public services	Negligible direct, indirect, and cumulative impacts on school facilities since enrollment in local school districts is not anticipated to increase	Negligible direct, indirect, and cumulative impacts on school facilities since enrollment in local school districts is not anticipated to increase	Negligible direct, indirect, and cumulative impacts on school facilities since enrollment in local school districts is not anticipated to increase	Negligible direct, indirect, and cumulative impacts on school facilities since enrollment in local school districts is not anticipated to increase	No direct, indirect, or cumulative impacts since the site would not be developed	Negligible direct, indirect, and cumulative impacts on school facilities since enrollment in local school districts is not anticipated to increase	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Special Designations</b>							
WAs and WSAs	No direct impacts on WAs or WSAs since none are located within the project site; short-term and long-term indirect impacts on the wilderness values select WAs and WSAs by changing the natural and undisturbed landscape; incremental contribution to adverse cumulative impacts on special-designation areas	No direct impacts on WAs or WSAs since none are located within the project site; short-term and long-term indirect impacts on the wilderness values select WAs and WSAs by changing the natural and undisturbed landscape; incremental contribution to adverse cumulative impacts on special-designation areas	No direct impacts on WAs or WSAs since none are located within the project site; short-term and long-term indirect impacts on the wilderness values select WAs and WSAs by changing the natural and undisturbed landscape; incremental contribution to adverse cumulative impacts on special-designation areas	No direct impacts on WAs or WSAs since none are located within the project site; short-term and long-term indirect impacts on the wilderness values select WAs and WSAs by changing the natural and undisturbed landscape; incremental contribution to adverse cumulative impacts on special-designation areas	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct and indirect short-term and long-term adverse impacts if other solar energy projects are constructed; potential for incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed
ACECs	Short-term and long-term indirect impacts on the Pisgah Crater ACEC because of the closure of existing OHV routes on the project site, reduced access to open space and potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	Short-term and long-term indirect impacts on the Pisgah Crater ACEC because of the closure of existing OHV routes on the project site, reduced access to open space and potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	Negligible impacts on the Pisgah Crater ACEC due to fewer closures of OHV routes; direct and indirect impacts because of the potential for desert tortoise relocation	Short-term and long-term indirect impacts on the Pisgah Crater ACEC because of the closure of existing OHV routes on the project site, reduced access to open space and potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
DWMAs	Direct and indirect impacts on the Ord Rodman DWMA because of the potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	Direct and indirect impacts on the Ord Rodman DWMA because of the potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	Direct and indirect impacts on the Ord Rodman DWMA because of the potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	Direct and indirect impacts on the Ord Rodman DWMA because of the potential translocation of desert tortoise into this area; incremental contribution to adverse cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed that require relocation of desert tortoises to the DWMA	No direct, indirect, or cumulative impacts since the site would not be developed

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Donated and acquired lands	Short-term and long-term adverse direct and indirect impacts on resources for which the land was acquired or accepted by donation; incremental contribution to adverse cumulative impacts	Short-term and long-term adverse direct and indirect impacts on resources for which the land was acquired or accepted by donation; incremental contribution to adverse cumulative impacts	No direct, indirect, or cumulative impacts on donated and acquired lands due to avoidance of donated and acquired lands	No direct, indirect, or cumulative impacts on donated and acquired lands due to avoidance of donated and acquired lands	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed that develop on donated and acquired lands	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Traffic and Transportation</b>							
Construction impacts	Direct and indirect impacts due to increased construction workforce traffic and construction truck traffic; negligible cumulative impacts because the number of workers needed for operations of all of these projects is modest compared to road capacities	Direct and indirect impacts due to increased construction workforce traffic and construction truck traffic; negligible cumulative impacts because the number of workers needed for operations of all of these projects is modest compared to road capacities	Direct and indirect impacts due to increased construction workforce traffic and construction truck traffic; negligible cumulative impacts because the number of workers needed for operations of all of these projects is modest compared to road capacities	Direct and indirect impacts due to increased construction workforce traffic and construction truck traffic; negligible cumulative impacts because the number of workers needed for operations of all of these projects is modest compared to road capacities	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Operation impacts	Negligible direct and indirect impacts on traffic due to a low increase in operational traffic	Negligible direct and indirect impacts on traffic due to a low increase in operational traffic	Negligible direct and indirect impacts on traffic due to a low increase in operational traffic	Negligible direct and indirect impacts on traffic due to a low increase in operational traffic	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Effects on BLM routes	Long-term adverse direct and indirect impacts on travel in the project vicinity because of BLM route closures; incremental contribution to adverse cumulative impacts	Long-term adverse direct and indirect impacts on travel in the project vicinity because of BLM route closures; incremental contribution to adverse cumulative impacts	Long-term adverse direct and indirect impacts on travel in the project vicinity because of BLM route closures; incremental contribution to adverse cumulative impacts	Long-term adverse direct and indirect impacts on travel in the project vicinity because of BLM route closures; incremental contribution to adverse cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
<b>Visual Resources</b>							
	Direct adverse impacts due to the very high magnitude of change to the visual landscape; indirect adverse impact of encouraging additional subsequent development of similar industrial character in the area; incremental contribution to adverse cumulative impacts	Direct adverse impacts due to the very high magnitude of change to the visual landscape; indirect adverse impact of encouraging additional subsequent development of similar industrial character in the area; incremental contribution to adverse cumulative impacts	Direct adverse impacts due to the very high magnitude of change to the visual landscape; indirect adverse impact of encouraging additional subsequent development of similar industrial character in the area; incremental contribution to adverse cumulative impacts	Direct adverse impacts due to the very high magnitude of change to the visual landscape; indirect adverse impact of encouraging additional subsequent development of similar industrial character in the area; incremental contribution to adverse cumulative impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed

Resource Element	Alternative 1: Proposed Action	Alternative 1a: Agency Preferred Alternative (Environmentally Preferred Alternative)	Alternative 2: Reduced Acreage Alternative	Alternative 3: Avoidance of Donated and Acquired Lands Alternative	Alternative 4: No Action: Deny Calico Solar Project ROW Grant/ No CDCA Plan Amendment	Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site	Alternative 6: LUP Amendment Alternative: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit other Solar Energy Projects on the Project Site
<b>Hydrology and Water Resources</b>							
Hydrology	Adverse, long-term direct and indirect impacts on surface hydrology due to a loss of on-site ephemeral drainages; adverse, long-term direct and indirect impacts on desert wash communities downstream of the project; potential adverse, long-term indirect impacts due to an increase in standing water onsite; incremental contribution to adverse cumulative soil erosion and stormwater impacts within the Newberry Springs watershed	Adverse, long-term direct and indirect impacts on surface hydrology due to a loss of on-site ephemeral drainages; adverse, long-term direct and indirect impacts on desert wash communities downstream of the project; potential adverse, long-term indirect impacts due to an increase in standing water onsite; incremental contribution to adverse cumulative soil erosion and stormwater impacts within the Newberry Springs watershed	Adverse, long-term direct and indirect impacts on surface hydrology due to a loss of on-site ephemeral drainages; adverse, long-term direct and indirect impacts on desert wash communities downstream of the project; potential adverse, long-term indirect impacts due to an increase in standing water onsite; incremental contribution to adverse cumulative soil erosion and stormwater impacts within the Newberry Springs watershed	Adverse, long-term direct and indirect impacts on surface hydrology due to a loss of on-site ephemeral drainages; adverse, long-term direct and indirect impacts on desert wash communities downstream of the project; potential adverse, long-term indirect impacts due to an increase in standing water onsite; incremental contribution to adverse cumulative soil erosion and stormwater impacts within the Newberry Springs watershed	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Groundwater resources	Negligible, long-term direct and indirect impacts on groundwater due to localized drawdown of the water table; negligible cumulative impacts due the size and capacities of the affected groundwater basins; the existing and proposed future uses of groundwater in the basins; and the relatively low water use requirements of the proposed action	Negligible, long-term direct and indirect impacts on groundwater due to localized drawdown of the water table; negligible cumulative impacts due the size and capacities of the affected groundwater basins; the existing and proposed future uses of groundwater in the basins; and the relatively low water use requirements of this alternative	Negligible, long-term direct and indirect impacts on groundwater due to localized drawdown of the water table; negligible cumulative impacts due the size and capacities of the affected groundwater basins; the existing and proposed future uses of groundwater in the basins; and the relatively low water use requirements of this alternative	Negligible, long-term direct and indirect impacts on groundwater due to localized drawdown of the water table; negligible cumulative impacts due the size and capacities of the affected groundwater basins; the existing and proposed future uses of groundwater in the basins; and the relatively low water use requirements of this alternative	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Jurisdictional waters	Adverse, long-term direct and indirect impacts on California State jurisdictional waters; incremental contribution to cumulative adverse impacts	Adverse, long-term direct and indirect impacts on California State jurisdictional waters; incremental contribution to cumulative adverse impacts	Adverse, long-term direct and indirect impacts on California State jurisdictional waters; incremental contribution to cumulative adverse impacts	Adverse, long-term direct and indirect impacts on California State jurisdictional waters; incremental contribution to cumulative adverse impacts	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed
Floodplains	No direct, indirect, or cumulative adverse impacts on floodplains are expected due to the lack of FEMA designated floodplains onsite; detention/debris basins would completely retain flood flows resulting from a 100-year flood	No direct, indirect, or cumulative adverse impacts on floodplains are expected due to the lack of FEMA designated floodplains onsite; detention/debris basins would completely retain flood flows resulting from a 100-year flood	No direct, indirect, or cumulative adverse impacts on floodplains are expected due to the lack of FEMA designated floodplains onsite; detention/debris basins would completely retain flood flows resulting from a 100-year flood	No direct, indirect, or cumulative adverse impacts on floodplains are expected due to the lack of FEMA designated floodplains onsite; detention/debris basins would completely retain flood flows resulting from a 100-year flood	No direct, indirect, or cumulative impacts since the site would not be developed	Potential for direct, indirect, and cumulative impacts if other solar energy projects are constructed	No direct, indirect, or cumulative impacts since the site would not be developed

Table Key: ACEC = area of critical environmental concern; BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; DWMA = designated wildlife management area; FEMA= Federal Emergency Management Agency; GHG=greenhouse gas; HA=herd area; HMA = herd management area; LUP = land use plan; OHV = off-highway vehicle; PM<sub>10</sub> = inhalable particulate matter; WA = wilderness area; WSA = wilderness study area.

## **ES.9 Public and Agency Participation**

The BLM's NEPA process provides opportunities for the public and agencies to participate and consult in the scoping of the environmental analysis, and in the evaluation of the technical analyses and conclusions of that analysis.

Scoping activities for the project were conducted by the BLM in compliance with the requirements of NEPA. Many of these scoping activities were conducted jointly with the CEC. The BLM's scoping activities are described in detail in a final scoping report, which is available from the BLM. The scoping report documents the Notice of Intent, the scoping meetings, workshops, and the comments received during scoping. The issues raised during scoping are summarized in Chapter 5.

### **ES.9.1 Areas of Controversy**

Several areas of controversy related to the Calico Solar Project were identified from comments received from agencies, organizations, Native Americans and tribal governments, and members of the general public during the scoping process. These include:

- Opposition to the placement of a large solar project on essentially undisturbed desert land.
- Opposition to the overall number of renewable energy projects in the western United States.
- Concern regarding the impacts of this project on biological, cultural, and visual resources.
- Concern regarding the closure of BLM routes for renewable energy development.
- Concerns regarding the viability of the proposed solar technology.

### **ES.9.2 Summary of Comments and Responses on the Staff Assessment/Draft Environmental Impact Statement**

The NOA of the SA/DEIS was published in the Federal Register by the EPA on April 2, 2010. Publication of this NOA for the SA/DEIS initiated the 90-day public comment period, which extended until July 1, 2010. Appendix G includes an overview of the written comments received by the BLM and CEC on the SA/DEIS, and the BLM's responses to the individual comments.

## **ES.10 Agency Coordination**

Many federal, state, and local agencies were consulted and provided comments on the proposed project as part of this NEPA process.

### **U.S. Army Corps of Engineers**

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, the USACE reviews proposed projects to determine whether they may impact such resources, and/or be subject to the requirements of a Section 404 permit. Throughout the SA/DEIS process, the BLM, CEC, and the Applicant provided information to the USACE to assist them in making a determination regarding their federal jurisdiction and need for a Section 404 permit. Subsequent to the publication of the SA/DEIS, the USACE determined that no waters of the United States are present on the project site (Appendix F).

### **U.S. Fish and Wildlife Service**

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction to protect threatened and endangered species under the federal Endangered Species Act (ESA). Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally listed species. The site is known to be occupied by desert tortoise, which is currently listed as threatened under the federal ESA. The USFWS is also associated with the implementation of the Bald and Golden Eagle Protection Act as well as the Migratory Bird Treaty Act.

### **State Water Resources Control Board/Regional Water Quality Control Board**

The State Water Board works in coordination with nine Regional Water Quality Control Boards (RWQCB) to preserve, protect, enhance and restore water quality. The RWQCB have authority to protect surface water and groundwater. Throughout the SA/DEIS process, the BLM, CEC, and the Applicant have invited the RWQCB to participate in public scoping and workshops, and have provided information to assist the agency in evaluating the potential impacts and permitting requirements of the proposed project.

### **California Department of Fish and Game**

The California Department of Fish and Game (CDFG) have the authority to protect water resources through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The BLM, CEC, and the Applicant have provided information to the CDFG to

assist in their determination of the impacts to streambeds, and identification of permit and mitigation requirements. The CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act. The desert tortoise is listed under SESA. The CDFG has asserted its jurisdiction over 1,190 acres of streambeds with the proposed project site.

### **San Bernardino County**

The revised Calico Solar Project site contains no private land under the jurisdiction of San Bernardino County. The BLM and CEC provided opportunities during scoping for the County to provide input to the environmental technical studies for the project.

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# Chapter 1

## Introduction and Purpose and Need

### 1.1 Project Overview

This Final Environmental Impact Statement (FEIS) has been prepared to analyze and disclose the potential environmental impacts on the natural and human environment that could result from a right-of-way (ROW) grant to develop the proposed Calico Solar Project. The document concurrently analyzes the environmental impacts of a possible amendment to the California Desert Conservation Area (CDCA) land use plan (BLM 1999). This FEIS evaluates three action alternatives, a modified Proposed Action, a No Action alternative, and two land use plan (LUP) amendment alternatives. These alternatives would be located wholly on public land managed by the United States (U.S.) Department of the Interior (DOI) Bureau of Land Management (BLM). The modified Proposed Action is the Agency Preferred Alternative and the Environmentally Preferred Alternative.

The Proposed Action being evaluated within this FEIS is the construction and operation of the Calico Solar Project. This Proposed Action is an 8,230-acre solar electric-generating facility with a nominal capacity of 850 megawatts (MW). The Agency (BLM's) Preferred Alternative modifies this proposal to be a 6,215-acre solar project with the same generating capacity.

Calico Solar, Limited Liability Company (LLC) (Applicant) is seeking approval to construct, operate, and decommission the Calico Solar Project (formerly Stirling Energy Systems [SES] Solar One Project) and related facilities (Calico Solar Project). The Applicant is a private party that is a wholly owned subsidiary of Tessera Solar. The main objective of the Calico Solar Project is to provide clean, renewable, solar-powered electricity to the State of California. The electricity from the Calico Solar Project would assist the State in meeting its objectives as mandated by the California Renewable Portfolio Standard (RPS) Program and the California Global Warming Solutions Act. Additionally, the Calico Solar Project would address other state and local warming solutions acts and state and local mandates adopted by California's electric utilities for the provision of renewable energy.

Southern California Edison (SCE) selected the Calico Solar Project to help meet its objectives under the legislative requirements of the RPS Program through a least-cost, best-fit competitive solicitation. The Applicant and SCE have entered into a 20-year Power Purchase Agreement (PPA) for the provision of renewable electricity. This PPA would help SCE meet both its statutory mandate to purchase at least 20 percent of its electric power from renewable

resources by 2010 and its future electricity requirements. California Public Utilities Commission (CPUC) approved the PPA on October 27, 2005. The Applicant also has a signed large generator interconnection procedures (LGIP) with SCE, dated January 9, 2008, and a large generator interconnection agreement (LGIA), dated February 26, 2010.

On December 2, 2008, the Applicant filed an Application for Certification (AFC) to the California Energy Commission (CEC) for the proposed project. The application was originally submitted by SES Solar One, LLC; SES Solar Three, LLC; and SES Solar Six, LLC, for the SES Solar One Project. In January 2010, the above entities merged into Calico Solar, LLC, and the name of the SES Solar One Project was changed to the Calico Solar Project. On May 6, 2009, the CEC accepted the AFC as complete. Since filing its original ROW application the Applicant's development plans have been updated several times through submittals to the CEC project docket and in revisions to the project Plan of Development (POD) required by the BLM, The revisions to the AFC via the CEC project docket are summarized in Table 1-1. Readers should consult CEC's Calico Solar Project docket for a complete listing of all submittals pertaining to the AFC: <http://www.energy.ca.gov/sitingcases/calicosolar/index.html>.

**Table 1-1 Summary of Revisions to Project Description**

<b>Posted Date</b>	<b>Reference Document</b>	<b>Revisions to Proposed Project</b>
July 21, 2009	Data Response Numbers 49–70, 74–45, 80, 82–84, 86–91	Additional information regarding evaporation pond design
August 25, 2009	Data Response Numbers 113–127	Removes Satellite Services Complex from project scope
September 3, 2009	Data Response Numbers 1–48, 81, 109–112	Reduction I Project roads, vehicle type changes, fuel type changes, revisions to construction practices, sequencing and schedule, revision to placement of support facilities, vehicle travel pattern changes
December 1, 2009	Data Response Numbers 71–73, 76–79, 85, 128–141	Removal of access road Alternative Options 2 through 4 as discussed in the AFC; hydrogen gas to be produced on site and brought to SunCatchers via a distributed system.
December 16, 2009		Updated project map
January 11, 2010	Submittal	CAISO reports
January 12, 2010	Submittal	Geotechnical engineering report
January 28, 2010		Change of project name and applicant name
February 8, 2010	Supplemental Analysis for the AFC	Cadiz Water provided as primary water source for the project
February 17, 2010		Drainage layout figure and project layout figure
February 26, 2010	Submittal	Drainage layout figure; depicts project phases and other layout changes resulting from agency and public input

Posted Date	Reference Document	Revisions to Proposed Project
March 10, 2010	Revised submittal	Project layout figure ; depicts revisions to the areas of Phases 1 and 2 and identifies project features associated with each phase
March 10, 2010	Submittal	Identifies existing access routes in the project vicinity and proposed access post project development
March 26, 2010	Letter regarding submittal	Use of rail to deliver Cadiz water
April 29, 2010	Submittal	Suggested revised biological resources Conditions of Certification
May 4, 2010	Submittal	Additional information on sensitive species found during Burring Owl Surveys and information on Crow's Nest Well
May 6, 2010	Submittal	Determination regarding the requirement for the department of the USACE permit—project site does not contain waters of the United States
June 2, 2010	Submittal	Alternative site layout #2—engineering figure with SunCatcher Layout, and revised project boundary with 4,000 foot desert tortoise corridor figure.
June 16, 2010	Response to CEC e-mail	Responses to CEC e-mail dated June 4, 2010
June 21, 2010	Clarification to response to CEC e-mail	Clarification to Applicants responses to CEC e-mail dated June 4, 2010.
July 12, 2010	Supplement to AFC	Description and environmental assessment of updates to the project boundary, water supply and hydrogen system. Submitted May 14, 2010.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* AFC = Application for Certification; BLM = Bureau of Land management; CAISO = California Independent System Operator; CEC = California Energy Commission; USACE = U.S. Army Corps of Engineers.

The project proposes the use of land managed by the BLM; therefore, the Applicant has submitted a request for a ROW grant to the BLM. This land is governed primarily by the BLM's 1980 CDCA Plan as amended. The plan states that solar power facilities may be allowed within Limited Use areas after National Environmental Policy Act (NEPA) analysis is complete and requires that newly proposed power generation facilities that are not already identified in the CDCA Plan be considered through a plan-amendment process. However, the Agency Preferred Alternative, a modified version of the Proposed Action, is restricted to land classified as Multiple Use Class M (Moderate Use), which provides for a wide range of uses including energy and utility development (based on controlled balance between use and protection of public lands). Because the Calico Solar Project is not currently identified in the CDCA Plan, a plan amendment would be required in order to include the facility as an approved power generation site.

### **1.1.1 Location**

The project site consists of approximately 8,230 acres of BLM-administered public land in the Mojave Desert in San Bernardino County, California, north of Interstate 40 (I-40), approximately 37 miles east of Barstow; approximately 57 miles northeast of Victorville; and approximately 115 miles east of Los Angeles (Figure 1-1; Figure 1-2). A detailed legal description of the proposed project site is provided in Section B.1.2 of the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) (BLM and CEC 2010).

### **1.1.2 Project Background**

The Applicant proposes to use the Stirling solar dish system technology (referred to as SunCatcher). Calico Solar, LLC has executed PPAs and interconnection agreements with SCE to deliver renewable energy to the California market. The SunCatcher technology has been employed in a commercial capacity since January 2010 in Peoria, Arizona in partnership with the Salt River Project (SRP). The Maricopa Solar Project is comprised of 60 SunCatcher dishes and provides 1.5 megawatts of renewable energy to SRP customers in Phoenix, Arizona.

The Applicant has applied for a ROW grant from the BLM to construct the Calico Solar Project that would produce a nominal 850 MW of electricity, and would have the capability to operate for a term of 30 years. The initial terms of the PPA and ROW grant would be 20 years, The ROW grant could be renewed by the BLM. The Applicant has also filed an AFC with the CEC. Under California law, the CEC has regulatory authority for certifying applications for thermal power generating facilities in excess of 50 MW in size.

Additionally, the Applicant has applied to the U.S. Department of Energy (DOE) for a loan guarantee pursuant to Title XVII of the Energy Policy Act of 2005 (EPAAct). The application for a loan guarantee for the Calico Solar Project was filed with the DOE and is currently under review. The EPAAct established a federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of EPAAct authorizes the 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 DOE can comply with the requirements under EPAAct by selecting eligible projects that meet the goals of the Act. The DOE is using this NEPA process to assist in determining whether to issue a loan guarantee to the Applicant to support the proposed project.

The proposed project could help meet the explicit policy goals of the State of California and the federal goals of producing 10 percent of the nation's electricity from renewable sources by 2012 and 25 percent by 2025. Federal authorities include the following:

- Executive Order [EO] 13212, dated May 18, 2001, which mandates that agencies act expediently and in a manner consistent with applicable laws to increase the “production and transmission of energy in a safe and environmentally sound manner.”
- The EPAct, which encourages the DOI (BLM's parent agency) to approve at least 10,000 MW of renewable energy on public lands by 2015.
- Secretarial Order 3285, dated March 11, 2009, which "establishes the development of renewable energy as a priority for the Department of the Interior.”

For a detailed description of the proposed Calico Solar Project, refer to Chapter 2 of this document. The Calico Solar Project's POD may be reviewed at the BLM's Barstow Field Office or online at this location: <https://tesseractosolar.box.net/shared/j09n6g20f6>.

## **1.2 Purpose and Need for the Proposed Action**

### **1.2.1 BLM**

The BLM's purpose and need for the Calico Solar Project is to respond to the application for a ROW grant to construct, operate and decommission a solar thermal facility on public lands in compliance with Title V of the Federal Land Policy Management Act (FLPMA), BLM's ROW regulations, and other applicable federal laws. BLM's review of Tessera Solar's application is also consistent with the following laws and directives pertaining to renewable energy resources:

- Sec. 211 of Energy Policy Act of 2005, enacted in August, 2005, which mandated up to 10,000 MW of nonhydropower renewable energy projects on the public lands by 2015.
- Instruction Memorandum 2007-097, dated April 4, 2007, Solar Energy Development Policy establishes BLM policy to ensure the timely and efficient processing of energy ROWs for solar power on the public lands.
- Secretarial Order 3283 Enhancing Renewable Energy Development on the Public Lands, signed January 16, 2009. This order facilitates the Department of the

Interior's efforts to achieve the goals established in Sec. 211 of the Energy Policy Act of 2005.

- Secretarial Order 3285 Renewable Energy Development by the Department of the Interior, signed March 11, 2009. The order establishes the development of renewable energy as a priority for the Department of the Interior and establishes a Departmental Task Force on Energy and Climate Change.

Upon completion and consideration of the FEIS, the BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to the Applicant for the proposed Calico Solar Project. The BLM's actions would also include concurrent consideration of amending the CDCA Plan (BLM 1999).

### **1.2.2 Department of Energy**

The Applicant has applied to the DOE for a loan guarantee under Title XVII of the EPAct of 2005, as amended by Section 406 of the American Recovery and Reinvestment Act [ARRA] of 2009, Public Law 111-5. The DOE has entered into negotiation of a loan guarantee with the Applicant and has therefore become a cooperating agency in developing the FEIS. The purpose and need for action by the DOE was to comply with its mandate under the EPAct to select eligible projects that meet the goals of the act.

## **1.3 Agency Roles and Authorizations**

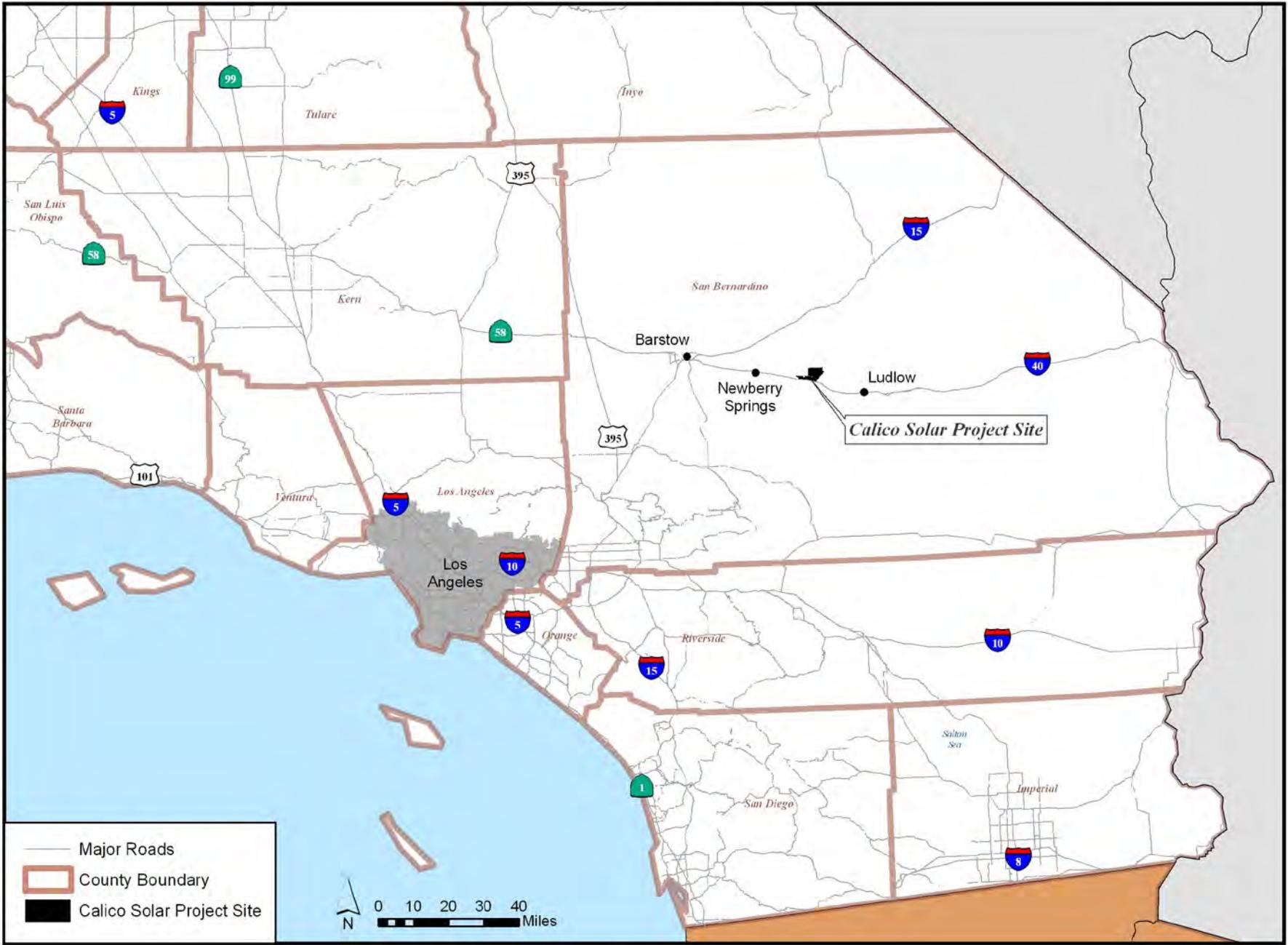
The BLM is the lead federal agency for evaluating environmental impacts of the proposed ROW grant and proposed CDCA Plan amendments pursuant to NEPA. The BLM is guided in these efforts through the agency's NEPA Planning Handbook H-1790-1 (BLM 2008) and Land Use Planning Handbook H-1601-1 (BLM 2005).

The CEC is the lead state agency responsible for evaluating the environmental effects of the project and for complying with the California Environmental Quality Act (CEQA) for project related discretionary actions by the CEC pursuant to the Applicant's AFC.

INTRODUCTION - FIGURE 1-1  
Calico Solar Project - Project Vicinity

AUGUST 2010

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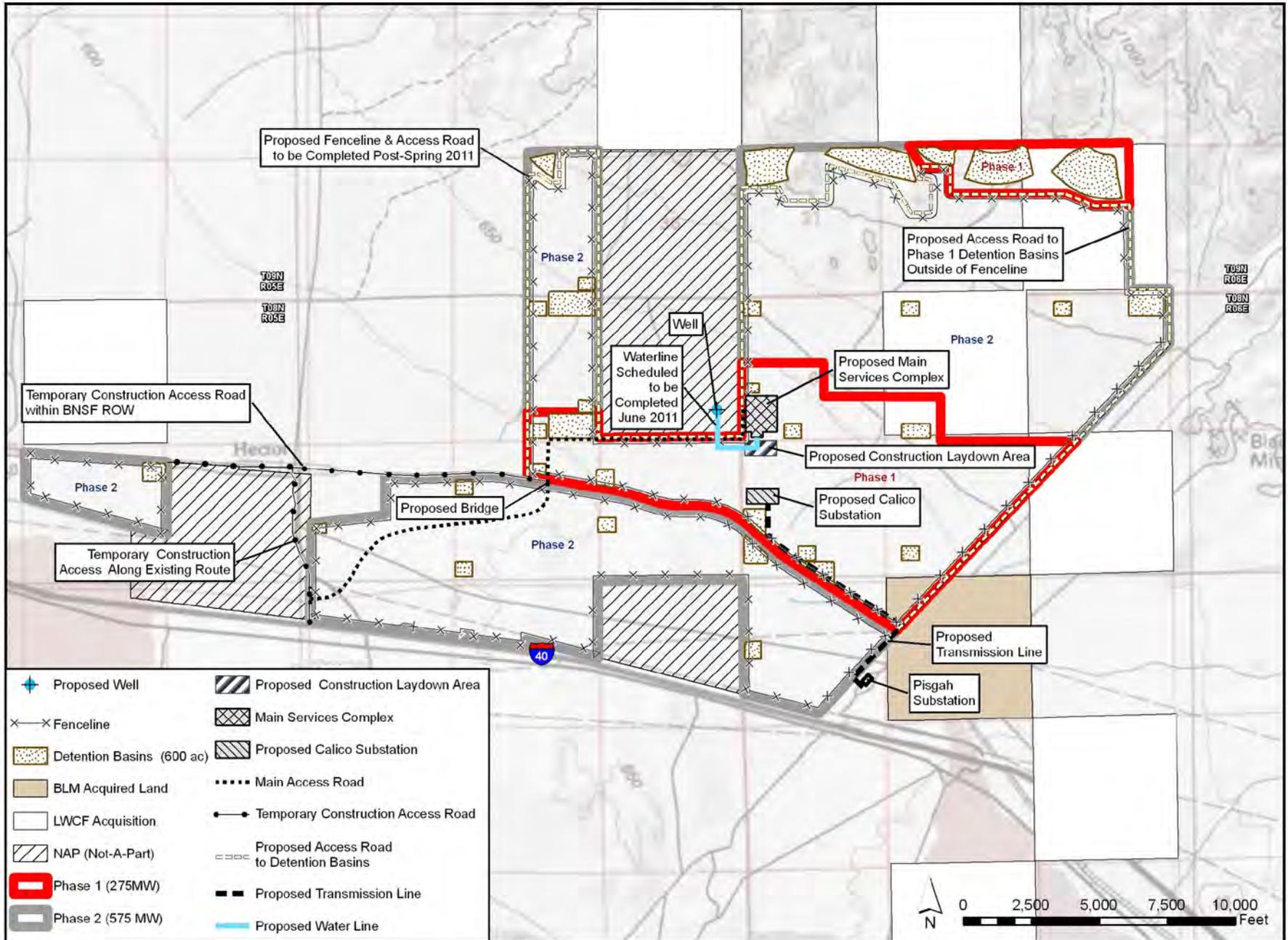


SOURCE: CEC, BLM, ESRI, URS

INTRODUCTION - FIGURE 1-2  
Calico Solar Project - Proposed Action

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SOURCE: ESRI, Huitz-Zollars, URS, USGS, BLM

## 1.4 SA/DEIS Background

In 2007, the BLM and the CEC signed a Memorandum of Understanding (MOU) that allowed the two agencies to jointly conduct environmental reviews of solar thermal power projects on BLM land in California in compliance with NEPA, CEQA, and with other federal and state laws and regulations pertaining to power generation sites (Appendix B). The Notice of Availability (NOA) for the SA/DEIS for the Calico Solar Project was published by the U.S. Environmental Protection Agency (EPA) in the Federal Register (FR) on April 2, 2010 (75 FR 16787). The BLM also issued its own NOA on April 19, 2010 (75 FR 20377).

On May 14, 2010, the Applicant submitted a supplement to its AFC proposing a modification to the Proposed Action northern boundary. On June 2, the Applicant submitted Alternative Site Layout Number 2 proposing additional modifications to the northern project boundary and additional water supply and hydrogen system information. The BLM has made a Determination of NEPA Adequacy (DNA) concerning the modifications to the Proposed Action pursuant to Section 5.1 of BLM's NEPA Handbook (BLM 2008) (Appendix C).

Subsequent to release of the SA/DEIS, the BLM and the CEC decided to prepare separate final environmental documents. The BLM has prepared this FEIS and the CEC is preparing a Supplemental Staff Assessment (SSA). Upon completing the FEIS, the BLM will issue a record of decision (ROD) determining whether to approve a CDCA land use plan amendment and approve the ROW grant for the project. The ROD for the Calico Solar Project is anticipated to be completed in the fall of 2010.

## 1.5 Guide to the FEIS

This FEIS contains the following sections:

- **DOI Letter:** This is the letter transmitting the FEIS to appropriate federal, state, and other agencies.
- **Abstract:** The abstract summarizes the Proposed Action and alternatives to the Proposed Action; the environmental impacts of the Proposed Action and the alternatives; and mitigation, project design features, best management practices, and other measures to address adverse impacts.
- **Executive Summary:** This section briefly describes the background of the FEIS, the lead agencies roles and responsibilities, the project purpose and need, the Proposed Action, the alternatives to the Proposed Action, connected and cumulative actions, the affected environment, the FEIS conclusions, the impacts of

the Proposed Action and the alternatives, and the public participation in the NEPA process.

- **Chapter 1—Introduction and Purpose and Need:** This chapter provides an overview of the proposed project; describes the BLM purpose and need for the project; describes agency roles and authorizations; describes the SA/DEIS process; provides a guide to the FEIS; describes the BLM Policies, Plans, and Programs relevant to the project and the FEIS; and describes other applicable plans and programs. It also establishes the framework for the proposed CDCA Plan amendment.
- **Chapter 2—Alternatives, Including the Proposed Action:** This chapter describes the construction, operation, and decommissioning of the Proposed Action and other reasonable alternatives evaluated in detail in the FEIS. The alternatives include: two other action alternatives, a modified Proposed Action, a No Action alternative, and two CDCA LUP amendment alternatives. Other alternatives were considered but eliminated from detailed analysis.
- **Chapter 3—Affected Environment:** This chapter describes the existing project setting as related to air quality and climate; biological resources; climate change; cultural resources and paleontology; fire/fuels; geology, soils, and mineral resources; grazing and wild horses and burros; land use; noise and vibration; public health and safety and hazardous materials; recreation; socioeconomics and environmental justice; special designations; traffic and transportation; visual resources; and water resources. Each section defines the resource elements and identifies applicable laws, regulations, plans, and policies including the applicable CDCA Plan guidelines and elements.
- **Chapter 4—Environmental Consequences:** This chapter describes the methodology for evaluating the environmental consequences to each of the affected resource elements for the impacts analyses for the Proposed Action and the alternatives. In addition this chapter identifies mitigation, project design features, and best management practices, and summarizes the unavoidable adverse impacts for the affected resource elements identified in Chapter 3. Chapter 4 also discusses cumulative effects, irreversible and irretrievable commitment of resources, growth-inducing impacts, and short-term versus long-term productivity of the environment and summarizes all the unavoidable adverse impacts of the Proposed Action. The potential impacts of the proposed CDCA Plan amendment are evaluated in this chapter.
- **Chapter 5—Consultation, Coordination, and Public Participation:** This chapter describes the BLM scoping process for the Proposed Action and the organizations

and persons consulted, provides a summary of the comments received on the SA/DEIS, and describes administrative remedies.

- **Chapter 6—Monitoring and Compliance:** This chapter describes the purpose and scope of BLM monitoring compliance with the project measures during project construction, operations, and decommissioning and how that compliance would be documented by the BLM.
- **Chapter 7—Native American Consultation, Concerns, and Values:** This chapter discusses the Native American consultation conducted by the BLM and summarizes the specific concerns about the project and values related to the project site and area raised to the BLM by the Native American representatives during that consultation process.
- **Chapter 8—List of Preparers:** This chapter lists the BLM, Applicant, and consultant staff who participated in the preparation of the FEIS.
- **Chapter 9—References:** This chapter lists the primary references used in the preparation of the FEIS.
- **Chapter 10—Index:** This chapter lists keywords and terms used in the FEIS and indicates the pages where those words and terms are used.
- **Chapter 11—Glossary:** This chapter provides a glossary of technical terms used in the FEIS.
- **Appendices:** The following appendices provide additional information in support of the analysis and documentation provided in this FEIS:
  - Appendix A: Figures (not included in the FEIS text)
  - Appendix B: CEC and BLM Memorandum of Understanding
  - Appendix C: Determination of NEPA Adequacy
  - Appendix D: Summary of Proposed Mitigation Measures
  - Appendix E: Cultural Resources Documentation
  - Appendix F: Determination Regarding U.S. Army Corps of Engineers Permit
  - Appendix G: Public and Agency Comments on the Draft Environmental Impact Statement

- Appendix H: Biological Assessments
- Appendix I: Draft Desert Tortoise Translocation Plan

## 1.6 Legal and Policy Consistency and Plan Conformance

Projects requiring federal action or other federal involvement require compliance with the NEPA and the Council on Environmental Quality (CEQ) Guidelines for Implementing NEPA (40 CFR 1500 to 1508). NEPA specifically requires each federal agency to review the effects of a proposed project on the natural and human environments before taking any action on that project. The SA/DEIS and this FEIS document BLM's compliance with the requirements of NEPA for the Calico Solar Project.

### 1.6.1 CDCA Plan

The project site is located in the CDCA planning area. The CDCA Plan governs BLM's land management practices and site-specific implementation decisions in the project vicinity in accordance with the intent of Congress as stated in FLPMA under the principles of multiple use and sustained yield. The CDCA Plan is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA. Land uses that are not in conformance with the CDCA Plan would require a plan amendment.

The process for considering amendments to BLM LUPs is described in the agency's *Land Use Planning Handbook* (BLM 2005). The general process for amending a BLM LUP is as follows:

- The plan amendment process would be completed in compliance with the FLPMA, NEPA, and all other relevant federal law, executive orders, and management policies of the BLM.
- The plan amendment process would include an EIS to comply with NEPA standards.
- Where existing planning decisions are still valid, those decisions may remain unchanged and would be incorporated into the new plan amendment.
- The plan amendment would recognize valid existing rights.
- Native American tribal consultations would be conducted in accordance with policy, and tribal concerns would be given due consideration

- Consultation with other agencies with jurisdiction would be conducted throughout the plan amendment process.

Chapter 7 of the CDCA Plan details the plan amendment process. The proposed amendment would be a Category 3 amendment because it requests a specific use or activity, which is not currently authorized by an existing plan element—specifically, the Energy Production and Utility Corridors Element. In analyzing the Applicant’s request to amend the CDCA Plan, the analysis of the proposed amendment will:

- (1) Determine whether the request has been properly submitted and whether any law or regulation prohibits granting the requested amendment.
- (2) Determine whether alternative locations within the CDCA are available that would meet the applicant’s needs without requiring a change in the Plan’s classification, or an amendment to any Plan element.
- (3) Determine the environmental effects of granting and/or implementing the Applicant’s request.
- (4) Consider the economic and social impacts of granting and/or implementing the Applicant’s request.
- (5) Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from federal, state, and local government agencies.
- (6) Evaluate the effect of the proposed amendment on BLM management’s desertwide obligation to achieve and maintain a balance between resource use and resource protection.

Details concerning the proposed amendment in reference to the FEIS alternatives are discussed in Chapter 2.

This FEIS acts as the mechanism for meeting the NEPA requirements of the plan amendment process, and provides the analysis required to support a CDCA Plan amendment identifying the site location as suitable or unsuitable for solar development within the Plan.

### **1.6.2 Solar Programmatic EIS**

The Office of Energy Efficiency and Renewable Energy and BLM are preparing a Solar Energy Development Programmatic EIS (PEIS) to develop utility-scale solar energy development; develop and implement agency-specific programs that would establish environmental policies

and mitigation strategies for solar energy projects; and amend relevant BLM land use plans with the consideration of establishing a new BLM solar energy development program. The PEIS included lands within the CDCA planning area which are open to solar energy development in accordance with the provisions of the CDCA Plan. The Calico Solar Project site is located within the boundaries of the Pisgah solar energy zone. The BLM is processing the Calico Solar Project ROW grant application and other active solar applications while the PEIS is being prepared.

### 1.6.3 Federal Laws and Regulations

In addition to compliance with NEPA, the Calico Solar Project is subject to requirements for consistency and conformance with a number of other applicable federal laws and regulations and BLM policies and programs. Table 1-2 summarizes the primary federal laws, regulations, policies, and plans relevant to the Calico Solar Project.

Besides what is listed in Table 1-2, there are also a number of other federal laws, regulations, policies, and plans that will apply to the Calico Solar Project. Those other documents are listed in detail throughout Section C in the SA/DEIS, in tables titled “Laws, Ordinances, Regulations, and Standards.” Chapter 3, Affected Environment, also includes discussions of federal laws, regulations, policies, and plans relevant to the analysis of the potential environmental impacts of the Calico Solar Project.

**Table 1-2 Summary of Federal Laws, Regulations, Policies, and Plans**

<b>Relevant Authority</b>	<b>Description</b>
American Indian Religious Freedom Act of 1978 (42 USC 1996)	This act is intended to protect Native American religious practices, ethnic heritage sites, and land uses.
American Recovery and Reinvestment Act of 2009	The goals of the act are to create new jobs and save existing jobs, spur economic activity and invest in long-term growth, and foster unprecedented levels of accountability and transparency in government spending.
Antiquities Act of 1906 (16 USC 431-433)	Provides for the protection of historic or prehistoric remains and sites of scientific value on federal lands, establishes criminal sanctions for unauthorized destruction or removal of antiquities, authorizes the President to establish national monuments by proclamation, and authorizes the scientific investigation of antiquities on federal lands, subject to permit and regulations.
Bald and Golden Eagle Protection Act (16 USC 668)	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.

Relevant Authority	Description
California Desert Protection Act of 1994	This act established 69 wilderness areas, established the Mojave National Preserve, and 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 significant portions of grazing allotments, wild horse and burro herd management areas, and herd areas.
Clean Air Act (42 USC 7401 et seq., as amended)	The CAA regulates air emissions and pollutants from area, stationary, and mobile sources to improve air quality. The CAA authorized the EPA to establish national ambient air quality standards to protect public health and the environment.
California Desert Conservation Area Plan (BLM 1999)	<p>The development of this plan was mandated as part of FLPMA. The CDCA Plan is a comprehensive, long-range plan for the management, use, development, and protection of the public lands in the CDCA. The plan covers approximately 25 million acres of land in California, of which about 10 million are directly administered by the BLM. The site proposed for the Calico project is in an area administered by the BLM.</p> <p>The CDCA Plan is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan's goals and actions for each resource are established in its 12 elements. Each plan elements provide both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.</p>
Comprehensive Environmental Response, Compensation and Liability Act of 1980 (42 USC 9615, as amended)	CERCLA provides for the cleanup of sites contaminated by hazardous substances. It authorizes the federal government to clean up sites using the Hazardous Substance Superfund. It imposes liability for cleanup on responsible parties and requires them to perform the cleanup, to reimburse others for their cleanup expenses, or to reimburse the fund when the fund is used to pay for cleanup. CERCLA requires that responsible parties pay damages to the federal, state, or tribal government for the destruction or loss of, or injury to, natural resources.

Relevant Authority	Description
Clean Water Act (33 USC 1251 et seq.)	<p>The CWA requires states to set standards to protect water quality, including regulation of storm water and wastewater discharges during construction and operation of a facility. California's regulations to comply with the CWA are in the Porter-Cologne Water Quality Control Act of 1967. Sections 401 and 404 of the CWA establish protection of waters of the United States such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands.</p> <p>Section 401 requires that any activity which may result in a discharge into waters of the United States must be certified by the California State Water Resources Control Board as administered by the Regional Water Quality Control Boards. This certification ensures that the proposed activity does not violate state and/or federal water quality standards. The site for the Calico Solar Project is within the jurisdiction of the Colorado River Regional Water Quality Control Board.</p> <p>Section 404 authorizes the USACE to regulate the discharge of dredged or fill material to waters of the United States and adjacent wetlands. The USACE issues individual site-specific or general (Nationwide) permits for such discharges. Section 404 Permits are not granted without prior 401 certification.</p> <p>Section 303(d) of the CWA requires states to develop a list of impaired waters that do not meet water quality standards, establish priority rankings, and develop action plans, called "total maximum daily loads" to improve water quality. Section 311 prohibits the discharge of oil or hazardous materials to waters of the United States.</p>
Emergency Economic Stabilization Act of 2008 (Public Law 110-343) Business Solar Investment Tax Credit (Internal Revenue Code Section 48)	<p>This act extended the 30 percent investment tax credit for solar energy property for 8 years through December 31, 2016. The act allows the tax credit to be used to offset both regular and alternative minimum tax and waives the public utility exception of current law (that is, permits utilities to directly invest in solar facilities and claim the tax credit). The 5-year accelerated depreciation allowance for solar property is permanent and unaffected by passage of the 8-year extension of the tax credit.</p>
Endangered Species Act of 1973 (16 USC 1531 et seq. and 50 CFR 17.1 et seq., as amended)	<p>The ESA provides for the federal protection of threatened plants, invertebrates, fish, and wildlife. The U.S. Fish and Wildlife Service administers the ESA. The ESA provides for the listing of T&amp;E species, requires consultation with the U.S. Fish and Wildlife Service on federal projects, prohibits the taking of listed T&amp;E species, and provides for permits to allow the incidental taking of T&amp;E species.</p>
Energy Policy Act of 2005 (42 USC 13201)	<p>This act established a comprehensive, long-range national energy policy including both traditional energy production and newer energy technologies and conservation</p>

Relevant Authority	Description
EO 11593 Protection and Enhancement the Cultural Environment May 6, 1971	This EO identified several actions required of federal agencies to contribute to the protection and enhancement of the cultural environment.
EO 11988, Floodplain Management, as amended May 24, 1977	This EO requires each federal agency to avoid, to the extent possible, impacts associated with the occupancy and modification of floodplains and to avoid supporting floodplain development when there is a practicable alternative.
EO 11990 Protection of Wetlands (42 FR 26961) May 24, 1977	This EO directs each federal agency to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out its responsibilities.
EO 12088, Federal Compliance with Pollution Control Standards (amended by EO 12580, Superfund Implementation) October 13, 1978 February 23, 1987	This EO requires each federal agency to ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to federal facilities and activities under the control of the agency.
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994	This EO directs each federal agency to achieve environmental justice as part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.
EO 13112, Invasive Species, February 3, 1999	This EO requires federal agencies to take actions to prevent the introduction and spread of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts of invasive species.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001	The EO makes it unlawful to take or possess any migratory nongame bird or any part of such bird as designated in the Migratory Bird Treaty Act.
EO 13211 Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001	The act directs federal agencies to identify impacts their actions may have on the supply, distribution, or use of energy in the United States.
EO 13212 Actions To Expedite Energy-Related Projects, May 18, 2010	This act directs federal agencies to expedite their reviews of permits or other actions for energy-related projects, to accelerate the completion of those projects.
EPA Section 404(b)(1) guidelines (40 CFR 230 et seq.)	Section 404(b)(1) requires the EPA to analyze alternatives to consider the avoidance and minimization of impacts to the extent practicable to determine whether a proposed discharge to Waters of the United States can be authorized.
Federal Aviation Regulations (77 CFR)	These regulations implement standards for determining obstructions in navigable airspace, sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alteration activities, and provides for aeronautical studies of obstructions to air navigation to determine their effects on the safe and efficient use of airspace.

Relevant Authority	Description
Federal Noxious Weed Act of 1974, as amended	This act established a federal program to control the spread of noxious weeds. The Secretary of Agriculture is authorized to designate plants as noxious weeds. The movement of all such weeds in interstate or foreign commerce is prohibited except under permit.
FLPMA of 1976 (43 USC 1701 et seq., as amended)	FLPMA provides the mandate to the BLM for the management of public lands and resources under its stewardship under the principles of multiple use, sustained yield, and maintenance of environmental quality.  FLPMA requires the Secretary of the Interior to retain and maintain public lands and authorizes the BLM to manage public lands to protect the quality, scientific, scenic, historical, archeological, and other values of those lands. It further authorizes the BLM to develop regulations and plans for the protection of public land areas of critical environmental concern, including important historic, cultural or scenic values.
Farmland Protection Policy Act (Agriculture and Food Act of 1981, Title XV, Subtitle I, 1539–1549)	The FPPA is intended to minimize the impact of federal programs on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that, to the extent possible, federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and farmland of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.
Hazardous Materials Transportation Guides (49 CFR 171–177 and 350–399)	The regulation governs the transportation of hazardous materials and related guidelines.
Migratory Bird Treaty Act (16 USC 703–711)	This act makes it unlawful to take or possess any migratory bird (or any part of such migratory bird including active nests) as designated unless permitted by regulation (for example, duck hunting).
National Historic Preservation Act of 1966 (16 USC 470, as amended)	The NHPA provided for the establishment of the National Register of Historic Places to include historic properties that are significant in American history, architecture, archeology, and culture. Section 106 of the NHPA requires federal agencies to take into account the effect of a proposed undertaking on resources listed or eligible for listing on the National Register of Historic Places.
Occupational Safety and Health Administration (29 USC 651 et seq.)	This regulation protects workers from the effects of occupational noise exposure.
Omnibus Public Land Management Act of 2009 (House of Representatives 146/Public Law 111-011)	This act designates certain land as components of the National Wilderness Preservation System, and authorizes certain programs and activities in the Departments of the Interior and Agriculture.

Relevant Authority	Description
Paleontological Resources Preservation Act (Public Law 111–011)	The act authorizes the Secretaries of the Departments of Interior and Agriculture to manage the protection of paleontological resources on federal lands.
Public Rangelands Improvement Act of 1978	This act established and reaffirmed the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; and continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros which pose a threat to themselves, their habitat, and to other rangeland values.
Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.)	The RCRA gives the EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.
Safe Drinking Water Act Amendments of 1996	This act and its amendments emphasize preventing contamination through source water protection and enhanced water system management to better provide for the sustainable use of water by our nation's public water systems.
Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601 et seq.)	This act includes the Emergency Planning and Community Right to Know Act (also known as SARA Title III).
Secretarial Order 3285, Renewable Energy Development by the Department of the Interior, March 11, 2009	This order established the development of renewable energy as a priority for the Department of the Interior and established a Departmental Task Force on Energy and Climate Change.
West Mojave Plan (BLM et al. 2005)	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan. The West Mojave Plan is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mojave ground squirrel and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirement of the California and federal ESAs.
Wild Free-Roaming Horses and Burros Act of 1971	This act authorizes the BLM to protect, manage, and control wild horses and burros to ensure that healthy herds thrive on healthy rangelands. The BLM manages these animals as part of its multiple-use mission under the 1976 FLPMA. A key BLM responsibility under this act is to determine the appropriate management level of wild horses and burros on public rangelands.

Relevant Authority	Description
Wilderness Act of 1964 (16 USC 1131–1136, Statute 890)	The Wilderness Act directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System. The Secretary of Agriculture was directed to study and recommend suitable areas in the National Forest System. The act provides criteria for determining suitability and establishes restrictions on activities that can be undertaken on a designated area.

*Table Key:* BLM = Bureau of Land Management; CAA = Clean Air Act; CDCA = California Desert Conservation Area; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; CWA = Clean Water Act; EO = executive order; EPA = Environmental Protection Agency; ESA = Endangered Species Act; FLPMA = Federal Land Policy and Management Act; FPPA = Farmland Protection Policy Act; FR = Federal Register; NHPA = National Historic Preservation Act; RCRA = Resource Conservation and Recovery Act; SARA = Superfund Amendments and Reauthorization Act; T&E = threatened and endangered; U.S. = United States; USACE = U.S. Army Corps of Engineers; USC = United States Code.

#### 1.6.4 Other State and Local Plans and Programs

In addition to the federal laws, regulations, policies, and plans described above and in Table 1-2, a number of state and local laws, plans, and programs may also be relevant to the Calico Solar Project. Those other documents are listed in detail throughout Section C in the SA/DEIS, in tables titled “Laws, Regulations, Plans and Policies.”

# Chapter 2

## Alternatives, Including the Proposed Action

### 2.1 Overview

Regulations promulgated by the CEQ require that an EIS rigorously explore and objectively evaluate all reasonable alternatives to a proposed action. Reasonable alternatives are those for which effects can be reasonably ascertained, whose implementation is not remote or speculative, that are feasible, effective, are not remote from reality, and those that are consistent with the basic policy objectives for management of the area (40 CFR 1502.14; CEQ Forty Questions, No. 1a; *Headwaters, Inc., v. BLM*, 914 F.2d. 1174 [9th Cir. 1990]). Reasonable alternatives are dictated by the nature and scope of the proposed action. To determine reasonable alternatives, an agency must define the purpose and need of the proposal. The purpose and need of the proposed action is to be evaluated under a reasonableness standard. The CEQ regulations state that an agency should include reasonable alternatives not within the jurisdiction of the lead agency (40 CFR 1502.14[c]). The BLM interprets this to apply to exceptional circumstances and limits its application to broad, programmatic EISs that would involve multiple agencies. Because this is a site specific analysis and not a programmatic EIS, and for other reasons, these types of alternatives are identified but are not carried forward for full evaluation for BLM purposes in this FEIS.

For most actions, the purpose and need statement should be constructed to reflect BLM's discretion consistent with its decision space under its statutory and regulatory requirements. Thus, alternatives that are not within BLM jurisdiction would not necessarily be considered reasonable. Further, “[i]n determining the scope of alternatives to be considered, the emphasis is on what is ‘reasonable’ rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative” (CEQ Forty Questions, No. 2a).

Twenty-four alternatives were identified and considered by the BLM and CEC in the SA/DEIS, including alternative sites; a range of solar and renewable and nonrenewable energy generation technologies; and conservation/demand-side management. Of these 24 alternatives, 3 action alternatives were determined by BLM to meet its purpose and need for the proposed Calico Solar Project. These include the Proposed Action (Alternative 1), Reduced Acreage Alternative (Alternative 2) and the Avoidance of Donated and Acquired Lands Alternative (Alternative 3).

This chapter also identifies alternatives that were considered but eliminated from detailed analysis, and provides the rationale for eliminating those alternatives according to criteria described in the SA/DEIS and in BLM's NEPA Handbook.

In this FEIS, the BLM has included an Agency Preferred Alternative (Alternative 1a), which is modified from the Proposed Action. The Agency Preferred Alternative is considered by BLM to be the Environmentally Preferred Alternative. Additionally, Chapter 2 describes a No Action alternative (Alternative 4) and two CDCA LUP amendment alternatives (Alternatives 5 and 6). These were also described in the SA/DEIS.

### **2.1.1 Screening Methodology**

The SA/DEIS identified 24 alternatives using the following methodology (Section B.2.4 of the SA/DEIS):

- (1) Develop an understanding of the project, identify the basic objectives of the project, and describe its potentially significant adverse impacts.
- (2) Identify and evaluate technology alternatives to the project such as increased energy efficiency (or demand-side management) and the use of alternative generation technologies (for example, solar or other renewable or nonrenewable technologies).
- (3) Identify and evaluate alternative locations.
- (4) Evaluate potential alternatives to select those qualified for detailed evaluation. Under NEPA, explore and evaluate all reasonable alternatives, and of those reasonable alternatives, identify those that would avoid or minimize adverse impacts or enhance the quality of the human environment.
- (5) Evaluate the impacts of not constructing the project, known as the No Project Alternative under CEQA and the No Action Alternative under NEPA.

The 24 alternatives were evaluated to identify a range of reasonable alternatives for detailed analysis. That analysis is documented in this chapter in Section 2.10, Alternatives Considered but Eliminated from Detailed Analysis. The set of reasonable alternatives identified for detailed analysis is as follows:

- Alternative 1: Proposed Action
- Alternative 1a: Agency Preferred Alternative (modified from the Proposed Action)
- Alternative 2: Reduced Acreage Alternative

- Alternative 3: Avoidance of Donated and Acquired Lands Alternative
- Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment
- Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site
- Alternative 6: LUP Amendment: Deny Calico Solar ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site

## 2.2 Alternative 1: Proposed Action

The Proposed Action is an 8,230-acre solar energy power plant (see Figure 1-2) designed to produce 850 MW, as described in the AFC to the CEC (SES 2008). The Proposed Action project site contains 1,180 acres of lands that were either donated to BLM or acquired by the BLM through the federal Land and Water Conservation Fund (LWCF) program. The Proposed Action is described in detail in Chapter B.1 of the SA/DEIS and has been updated in the FEIS. The components of this alternative are presented below.

### 2.2.1 Structures and Facilities

Since publication of the SA/DEIS, the Applicant has proposed some refinements to the project features as their engineering designs have progressed and in response to agency consultations. These modifications are listed in Table 2-1 and described in detail in the Applicant's POD for the Calico Solar Project (Tessera Solar 2010a), which can be found at the following Web site: <https://tesseractosolar.box.net/shared/i09n6g20f6>.

**Table 2-1 Proposed Action Project Structures and Equipment**

Description	Quantity	Dimensions (feet)
SunCatcher power generating system	34,000	38 long x 38 wide x 40 high
Main Services Complex administration building	1	130 long x 70 wide x 14 high
Main Services Complex maintenance building	1	70 long x 70 wide x 14 high
Main SunCatcher assembly building	2	1,000 long x 100 wide x 78 high
Well-water and fire-water storage tank, 220,000 gallons	1	36 diameter x 20 high
Demineralized water tank, 11,000 gallons	2	10 diameter x 10 high
Potable water tank, 5,000 gallons	1	40 diameter x 20 high
230-kV transmission line towers, single-circuit wood H-framed structure	28	40 wide x 60 high

Description	Quantity	Dimensions (feet)
Generator collection subpanel; distribution panel, 42 circuits, 400 A, 600 V, with circuit breakers in a weatherproof enclosure	2,834	1 long x 5 wide x 5 high [Table Note 1]
Generator collection power center, 2,000-A distribution panels with six 400-A circuit breakers	567	2 long x 3 wide x 6 high [Table Note 1]
Collector group GSU transformer, 1,750 kVA, 575 V to 34.5 kV, with taps	567	6.67 long x 7.5 wide x 6.67 high [Table Note 1]
Open bus switch rack, 35 kV, seven bays with five 35-kV, 1,200-A, 40-kVA international circuit breakers, insulators, switches, and bus work	6	105 long x 20 wide x 30 high [Table Note 1]
Shunt capacitor bank, 34.5 kV, 90 MVAR switched in six each 15 MVAR steps	6	15 long x 8 wide x 20 high [Table Note 1]
DVAR compensation system in coordination with shunt capacitor banks—size to be determined by studies	1	60 long x 12 wide x 16 height [Table Note 1]
Disconnect switch, 35-kV, 3,000-A, 200-kV BIL, group-operated	6	3 long x 11 wide x 16 high [Table Note 1]
Power transformer, three phase, 100/133/167 MVA, 230/132.8-34.5/19.9kV, 750-kV BIL, oil filled	6	15 long x 35 wide x 23 high [Table Note 1]
Power circuit breaker, 242-kV, 2000-A, 40-kA interrupting capacity	7	12 long x 20 wide x 16 high [Table Note 1]
Coupling capacitor voltage transformer for metering, 242-kV, 900-kV BIL, 60 hertz, potential transformer ratio 1,200/2,000:1	6	1 long x 1 width x 25 height [Table Note 1]
Disconnect switch, 242 kV, 2000 A	9	10 long x 25 width x 25 height [Table Note 1]

*Table Source:* Tessera Solar 2010a.

*Table Note 1:* Includes structure height to provide electrical safety clearances to ground.

*Table Key:* A = amperes; BIL = basic impulse level; DVAR= dynamic volt-amperes reactive; GSU = generator step-up; kA = kilo amperes; kV = kilovolts; kVA = kilovolt amperes; kVAR = kilovolt-amperes reactive; MVA = megavolt amperes; MVAR = megavolt-amperes reactive; V = volts.

### 2.2.1.1 Project Site Arrangement

The Calico Solar Project site would be organized into 1.5-MW solar groups consisting of 60 SunCatchers per group. The 1.5-MW groups would be connected in series to create 3-, 6-, and 9-MW solar groups. The 3-, 6-, and 9-MW groups would be connected to overhead collection lines rated at 48 MW or 51 MW. The typical solar groups would be arranged as necessary to fit the contours of the site. The entire project would be fenced for security. The fence design is being determined in consultation with regulatory and resource agencies to protect sensitive ecological areas and address storm flows in washes.

### **2.2.1.2 SunCatchers**

The primary equipment for the generating facility of the Proposed Action would include approximately 34,000 SunCatchers, their associated equipment and systems, and their support infrastructure. A SunCatcher is a 25-kilowatt (kW) solar dish Stirling system designed to automatically track the sun and collect and focus solar energy onto a power conversion unit (PCU), which generates electricity (Figure 2-1). The system consists of a 40-foot-high by 38-foot-wide solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU. The SunCatcher includes three major components: the foundation/pedestal, the dish assembly, and the PCU. A more detailed descriptions of the SunCatcher components is included in Chapter B.1 of the SA/DEIS.

### **2.2.1.3 Substation and Transmission System Interconnection**

The Proposed Action would include a new 230-kilovolt (kV) Calico Solar Substation approximately in the center of the project site (see Figure 1-2). A control building would be located near this new substation and would be connected to the existing SCE Pisgah Substation via an approximately 2-mile single-circuit, 230-kV transmission line, of which 0.09 mile would be outside the Calico ROW and within the SCE ROW. The new substation would contain relay and control systems for the substation in one room and the project operations control room in another room or rooms. The control building would also contain the necessary communications equipment to meet owner, California Independent System Operator (CAISO), and SCE requirements.

The on-site portion of the interconnection transmission line would be installed in a 100-foot-wide ROW from the Calico Solar Project Substation southeast to point of intersection with the SCE transmission ROW, then southwest to parallel the transmission ROW to the Pisgah Substation. The transmission line towers would consist of 28 wood H-frame towers. Two overhead fiber optic cables would be provided for communication with SCE and the CAISO.

### **2.2.1.4 Buildings**

The Proposed Action would include construction of three buildings located within the project boundary (see Figure 1-2). The operation and administration building, maintenance building, and main services complex would be painted with a matching “Carlsbad Canyon” color per the BLM Standard Environmental Colors chart and would be manufactured buildings. The water treatment building and the water holding tanks, including the potable water, raw water, and demineralized/fire protection water tanks located at the main services complex would also be painted with a “Carlsbad Canyon” color. All buildings would be constructed in accordance with

the appropriate edition of the California Building Code (CBC) and other applicable laws and regulations.

### **Main Services Complex**

The 52-acre main services complex (including parking and services) would be located within the project site in a central location that provides for efficient access routes for maintenance vehicles servicing the SunCatcher solar field. The main control room would be located at the main services complex. Warehouse and shop spaces would provide work areas and storage for spare parts for project maintenance. The main services complex would contain meeting and training rooms, maintenance and engineering offices, and administrative offices.

### **Administration Building**

The project administration offices and personnel facilities would be located in a one-story operation and administration building. The administration building would measure approximately 130 feet long by 70 feet wide by 14 feet high. This building would also contain meeting and training rooms, engineering offices, a visitor's room, and support services.

The project maintenance facilities, shop, and warehouse storage would be located adjacent to the administration building. The maintenance building would measure 70 feet wide by 70 feet long by 14 feet high. This building would contain maintenance shops and offices, PCU rebuild areas, maintenance vehicle servicing bays, chemical storage rooms, the main electrical room, and warehouse storage for maintenance parts to service the SunCatchers. A diesel-powered fire water pump and a diesel operated standby power generator would be located adjacent to the operation and administration building on the north side.

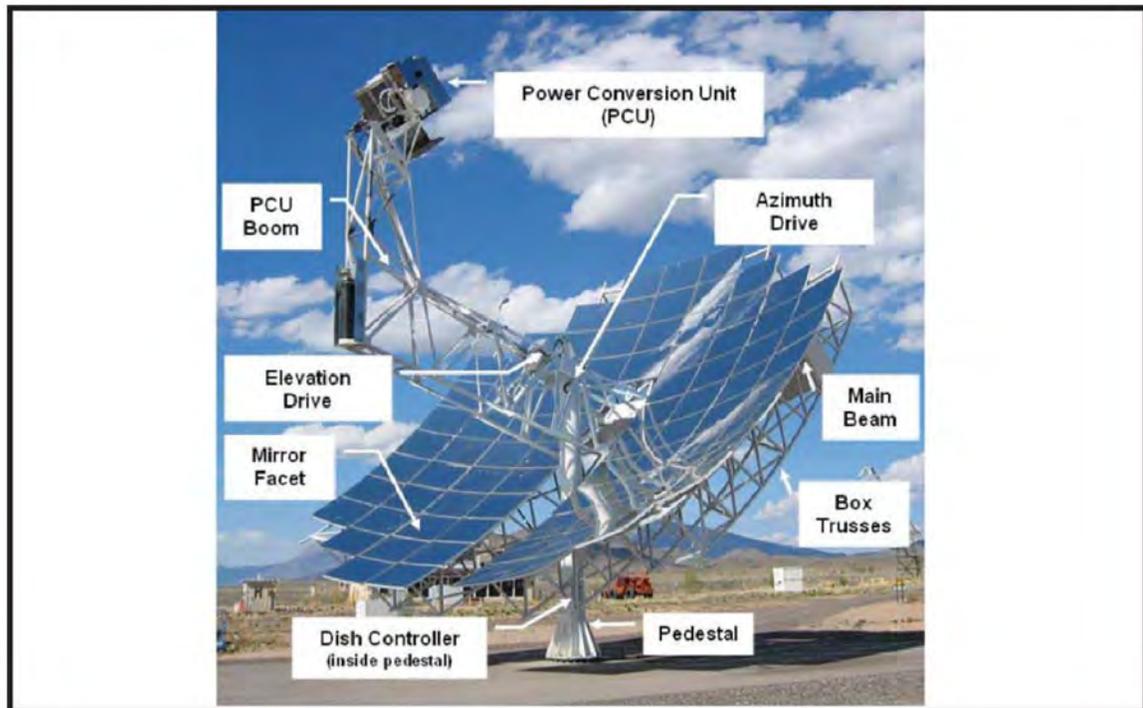
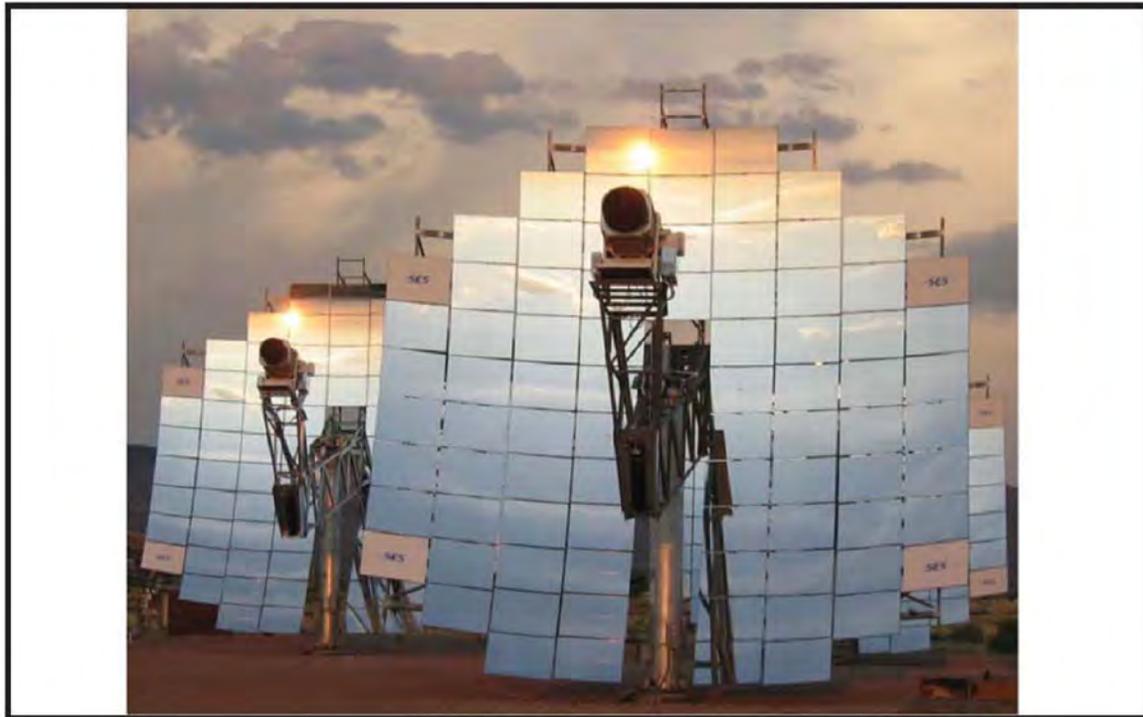
### **Assembly Buildings**

SunCatcher assembly would be performed on-site in two temporary structures. These assembly buildings would be 1,000 feet long by 100 feet wide by 78 feet high, and would be decommissioned after all project SunCatchers are assembled and installed. The assembly buildings would be located beside the main services complex.

The primary purpose of the SunCatcher assembly buildings would be the assembly of the SunCatcher superstructure, the main beam assembly and trusses, the pedestal trunnion, mirrors, wire harnesses, control systems, drive position motors, and the calibration of the mirrors and control systems before field installation. Each assembly bay would be equipped with an automated platform on locating rails to move the SunCatcher through the assembly process.

**ALTERNATIVES - FIGURE 2-1**  
Calico Solar Project - SunCatcher Details

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ALTERNATIVES

SOURCE: SES Solar Two Project - AFC Photograph 1-1 and 1-2

The exterior material for the assembly buildings would be a fire retardant vinyl fluoride film with ultraviolet blocking characteristics and would be chemical and weather resistant. The exteriors would be painted desert sand to match the other structures.

A transport trailer storage would be located adjacent to the assembly buildings. This storage area would allow the project to maintain a supply of three to five days of inventory of SunCatcher parts during the assembly phase of construction.

## **Water Treatment Structure and Evaporative Ponds**

A water treatment shade structure would be located next to the main services complex and to the northeast side of the main services complex (Figure 1-2). The water treatment structure would house water treatment equipment and safe storage areas for water treatment chemicals. A motor control center for the water treatment equipment and pumps would be located within this structure. Two wastewater evaporative ponds would be located just north of the water treatment structure. Each pond would be 0.5-acre in size and designed to contain 1 year of discharge flow (approximately 2 million gallons).

### **2.2.2 Construction Activities**

Project construction would be performed in accordance with plans and mitigation measures that would assure the project conforms to applicable laws and regulations and would minimize impacts. The construction plans for the Calico Solar Project are contained in the Applicant's POD (Tessera Solar 2010a). The Applicant intends to use local workers to the maximum extent possible.

Heavy construction for the project would include, but would not be limited to, SunCatcher assembly, refueling of equipment, staging of materials for the next day's construction activities, quality assurance/control, and commissioning.

One 15-acre construction laydown area is proposed in the southern portion of the main services complex (Figure 1-2) (Tessera Solar 2010a).

#### **2.2.2.1 Schedule**

Construction of the Proposed Action is anticipated to be completed in two phases. Phase I is expected to begin in late 2010 and to take approximately 23 months. Construction of Phase II is estimated to begin in July 2013 and to require approximately 29 months, with all construction completed by October 2015 (Tessera Solar 2010a). Although construction would take an estimated total of 52 months to complete, power would be available to the grid as each 60 unit group of SunCatcher is completed.

### **2.2.2.2 Access**

During project construction and operation, the main access to the project site would be from the south, off of I-40 from the Hector Road exit (Figure 2-2). Traffic would continue northward after County-designated Hector Road ends along an existing road, alternating between BLM Route AF0410 and an unnamed existing road on private land, and use an at-grade crossing at the Burlington Northern Santa Fe (BNSF) railroad. This at-grade crossing would be used until a bridge is constructed by the Applicant to span the railroad. All access to the project site would be through controlled gates.

### **2.2.2.3 Site Development**

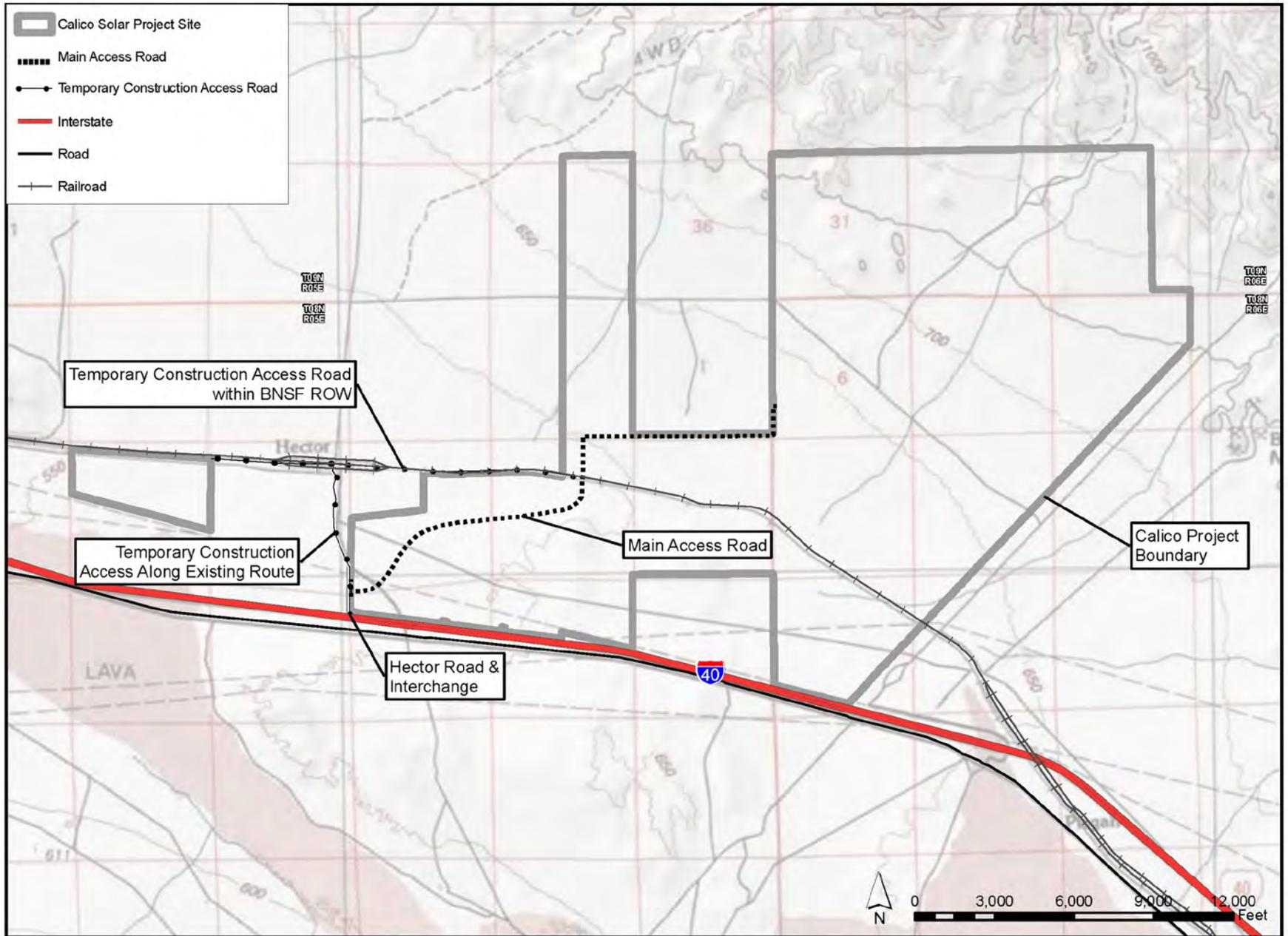
The layout of the proposed Calico Solar Project would maintain the local predevelopment drainage patterns where feasible, and water discharge from the site would remain at the southern and western boundaries. Following the completion of the 30 percent engineering drawings in April 2009, the Applicant determined that it would be necessary to place SunCatcher units throughout the site, including in washes, to attain the proposed 850-MW yield.

There would be three types of roads constructed as part of the Proposed Action. The 1.3-mile main access road would have two 12-foot lanes and would extend from Hector Road to the main services complex. Approximately 13 miles of access roads within the project site would connect on-site facilities and have two 8-foot lanes. The 390 miles of north-south and east-west maintenance roads between the SunCatchers would have one 8-foot lane. Additionally, there would be 39 miles of 22-foot-wide perimeter roads. All of these roads would be bladed and treated with Soiltec or an equivalent soil stabilizer. The roadways would have a low-flow swale or roadway dip as needed to convey nuisance runoff to existing drainage channels. It is expected that storm water runoff would flow over the crown of the roadways, which are typically less than 6 inches from swale flow line to crown at centerline of roadway, thus maintaining existing local drainage patterns during storms.

Brush trimming would be conducted between alternating rows and would consist of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion. To minimize shading on SunCatchers and prevent potential brush fire hazards, natural vegetation trimmings would be cleared in the area of each SunCatcher as well as on either side of the roadways.

**ALTERNATIVES- FIGURE 2-2**  
**Calico Solar Project - Local Transportation Network**

AUGUST 2010



ALTERNATIVES

SOURCE: ESRI, BLM, URS

After brush has been trimmed, blading for roadways and foundations would occur between alternating rows to provide access to individual SunCatchers. Blading would consist of limited removal of terrain undulations. Although ground disturbance would be minimized wherever possible, the Applicant proposes that localized rises or depressions within the individual 1.5-MW solar groups would be removed to provide for proper alignment and operation of the individual SunCatchers.

The Applicant proposes localized channel grading on a limited basis to improve channel hydraulics within the dry washes and to control flow direction where buildings and roadways are proposed. The main services complex would be protected from a 100-year flood by berms or channels that would direct the flow around the perimeter of the building site, if required.

Arizona Crossings (roadway dips) would be placed along the roadways or low-flow culverts consisting of a small-diameter storm drain with a perforated stem pipe, as needed to cross the minor or major channels/swales. These designs would be based on Best Management Practices (BMPs) for erosion and sediment control. The Arizona Crossings would be used for major washes where the channel cross section exceeds 8 feet wide and 3 feet deep or exceeds 20 feet wide and 2 feet deep. The roadway section at the channel flow line would be without a crown.

It is anticipated that roadway maintenance would be required after rainfall events. For minor storm events, unpaved roadway sections may need to be bladed to remove soil deposition, along with sediment removal from stem pipe risers at the culvert locations. For major storm events, in addition to the aforementioned maintenance, roadway repairs may be required due to possible damage to pavement where the roadways cross the channels and where the flows exceed the culvert capacity. Additional maintenance may be required after major storm events to replace soil eroded from around SunCatcher pedestals located in washes.

Building sites would be developed per San Bernardino County drainage criteria, with provision for soft bottom storm water retention basins. Rainfall from paved areas and building roofs would be collected and directed to the storm water retention basins. Volume on retention or detention basins would have a total volume capacity for a 3-inch minimum precipitation covering the entire site. Volume would be considered by a combination of basin size and additional volume provided within paving and/or landscaping areas.

The retention basins would be designed so that the retained flows would empty within 72 hours after the storm to provide mosquito abatement. This design would be accomplished by draining, evaporation, infiltration, or a combination thereof.

The postdevelopment flow rates released from the project site are expected to be less than the pre-development flow rates, thus complying with BMPs. The expected flow reduction is based on the following factors:

- Except for the building sites, roads, and two evaporation ponds, the majority of the project site would remain pervious; only a negligible portion of the site would be affected by pavement and SunCatchers foundations.
- The increased runoff expected from the building sites would be over-mitigated by capturing 100 percent of the runoff in a retention basin, where the storm runoff would be infiltrated and/or evaporated to the atmosphere.
- The proposed perforated risers to be constructed upstream of the roadway culverts would provide for additional detention.

#### **2.2.2.4 Dust Control**

For dust control purposes, all roads would be sealed using a polymeric sealant, Soiltac. There would be no untreated roads on the site, and there would be no off-road vehicle travel during operations (Tessera Solar 2010a). During construction and operation, water for dust control would be conveyed to the main services complex via a 6- to 8-inch-diameter water line. The water would be stored in a 5,000-gallon dust control tank. Reject water from the reverse osmosis (RO) system and water from the raw water storage tank would be used for dust control. The estimated water use for construction of the Proposed Action is shown in Table 2-2 (Tessera Solar, unpublished data).

#### **2.2.3 Operations and Maintenance**

The Calico Solar Project would be an “as-available” resource. This means that the project would operate anywhere from a minimum of approximately 18-MW net when the first units are interconnected to the grid during the initial phase of construction to 850 MW at completion of the project. The capability for independent operation of all 34,000 SunCatchers would give maximum flexibility in operations. The Calico Solar Project would operate approximately 3,500 hours per annum and is expected by the Applicant to have an overall availability of 99 percent or higher. The number of available operating hours is determined by the availability of the sun’s energy at greater than 250 watts per square meter.

It is expected that the Calico Solar Project would be operated with a staff of approximately 136 full time employees (Tessera Solar 2010a). The project would operate 7 days per week, generating electricity during normal daylight hours when the solar energy is available. Maintenance activities would occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available.

### 2.2.3.1 Electric Service and Communications

Electric service for the Main Services Complex would be obtained from SCE. Electric power would be provided via overhead service from an SCE overhead distribution line located on the north side of I-40. Communications service for the main services complex would be obtained from the local phone company. Communications service would be provided via an overhead service from existing underground communications lines located on the north of I-40.

**Table 2-2 Proposed Action Water Use for Construction**

<b>Water Use</b>	<b>Daily Average (gallons per minute)</b>	<b>Daily Maximum (gallons per minute)</b>	<b>Annual Usage (acre-feet)</b>
<b>Equipment Water Requirements</b>			
SunCatcher mirror washing	9.3 [Table Note 1]	25.0 [Table Note 2]	10.3 [Table Note 3]
<b>Water Treatment System Discharge</b>			
Brine to evaporation ponds	4.7	14.1 [Table Note 4]	5.2
<b>Potable Water Use</b>			
For drinking and sanitary water requirements	20.7 [Table Note 5]	24.9 [Table Note 6]	12 [Table Note 7]
<b>Soil Stabilizer and Dust Control</b>			
Water mixed with Soiltac for dust control, water truck and additional dust suppression.	187	224 [Table Note 8]	108 [Table Note 9]
<b>Hydrogen Generation</b>			
Electrolysis water requirements	0.1	0.2 [Table Note 6]	0.2 [Table Note 10]
<b>Total</b>	222	288	136

*Table Source:* Tessera Solar, unpublished data.

*Table Note 1:* Based on washing 80 percent (27,177) of the SunCatchers each month with an average of 10.3 gallons of demineralized water per wash and 21 work days per month.

*Table Note 2:* Assumes one 500-gallon water tanker is filled every 20 minutes.

*Table Note 3:* Based on all 34,000 SunCatchers experiencing 9.6 washes per year.

*Table Note 4:* Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20 percent of system discharge.

*Table Note 5:* Assumes 17 gallons per person per day for 731 people.

*Table Note 6:* Maximum amount assumes a 20 percent contingency over the data listed in the Daily Average column for this water-use type.

*Table Note 7:* Assumes a 6-day work week and average daily usage.

*Table Note 8:* Based on filling a 2,000-gallon tanker truck 6/7 full of water over 1 hour.

*Table Note 9:* Assumes 6:1 ratio mix of water to Soiltac applied to 1,245 acres of road every 2 years.

*Table Note 10:* Assumes 195 standard cubic feet of hydrogen generated per year per dish and 1.5 liters of water consumed per cubic meter of hydrogen generated.

### **2.2.3.2 Operations Water Supply, Use, and Treatment**

When completed, the Calico Solar Project operations would require a total of approximately 20 acre-feet of raw water per year water for mirror and equipment washing, drinking, dust control and fire protection (Tessera Solar 2010a). Table 2-3 provides both the expected maximum water usage rates and the annual average usage rates. SunCatcher mirror washing and operations dust control under regular maintenance routines would require an average of approximately 24 gallons of raw water per minute, with a daily maximum requirement of approximately 40 gallons of raw water per minute during the summer peak months each year.

The Applicant investigated multiple water supply sources for this project, including wells in the project vicinity (Lavic Basin) with mixed results. When the SA/DEIS was released, water from a BNSF-owned and operated water well within the Cadiz Valley Groundwater Basin was identified as a primary source of water for the project. The BNSF water would require rail transport to be delivered to the project site and construction of a two-mile pipeline.

Since completion of the SA/DEIS, the Applicant gathered additional information from the water wells in the Lavic Groundwater Basin (Tessera Solar 2010b). The three water wells are located on nearby properties in the not-a-part (NAP) area adjacent to the project site. One of these wells on property owned by the Applicant has shown sufficient water supply to support the project's construction and operation water needs. On May 14, 2010, the Applicant submitted additional information concerning the Lavic Basin water wells to the BLM and CEC and requested that water from Lavic Basin Well 3 be designated as the proposed primary water supply. Water from Well 3 would be transported via a new 0.4-mile underground pipeline from the Applicant's property to the project site and then to the main services complex. This water is not suitable for drinking and would require RO treatment on site prior to use.

Pursuant to the Applicant's request, the BNSF Cadiz Valley well is now considered to be a back-up water source. Both water supply options are discussed and analyzed in this FEIS.

#### **Potable Water**

Potable water to meet plant requirements would be delivered by truck and stored in a 5,000-gallon tank in the water treatment area. This tank would provide all required potable water for the operating facility for 2 to 3 days at which time it would need to be replenished.

#### **Mirror-Washing and Fire-Protection Water**

The main services complex would include a location for an approximately 220,000-gallon tank to be used to store water for SunCatcher mirror washing and fire protection applications. This volume of water would meet all applicable laws and regulations, including fire protection water for the Newberry Springs Fire Department and the San Bernardino County Fire Department

(Harvard Station 46). Emergency water may be trucked in from local municipalities. The Applicant would seek agreements at the time of the emergency.

**Table 2-3 Proposed Action Water Use for Operations**

<b>Water Use</b>	<b>Daily Average (gallons per minute)</b>	<b>Daily Maximum (gallons per minute)</b>	<b>Annual Usage (acre-feet)</b>
<b>Equipment Water Requirements</b>			
SunCatcher mirror washing	9.3 [Table Note 1]	25.0 [Table Note 2]	10.3 [Table Note 3]
<b>Water Treatment System Discharge</b>			
Brine to evaporation ponds	4.7	14.1 [Table Note 4]	5.2
<b>Potable Water Use</b>			
For drinking and sanitary water requirements	1.6 [Table Note 5]	1.9 [Table Note 6]	2.2 [Table Note 7]
<b>Dust Control</b>			
Well water for dust control during operations	1.5	28.6 [Table Note 8]	2.5 [Table Note 9]
<b>Hydrogen Generation</b>			
Electrolysis water requirements	0.1	0.2 [Table Note 6]	0.2 [Table Note 10]
<b>Total</b>	<b>17.3</b>	<b>69.8</b>	<b>20.4</b>

*Table Source:* BLM and CEC 2010.

*Table Note 1:* Based on washing 80 percent (27,177) of the SunCatchers each month with an average of 10.3 gallons of demineralized water per wash and 21 work days per month.

*Table Note 2:* Assumes one 500-gallon water tanker is filled every 20 minutes.

*Table Note 3:* Based on all 34,000 SunCatchers experiencing 9.6 washes per year.

*Table Note 4:* Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20 percent of system discharge.

*Table Note 5:* Assumes 17 gallons per person per day for 136 people.

*Table Note 6:* Maximum amount assumes a 20 percent contingency over the data listed in the Daily Average column for this water-use type.

*Table Note 7:* Assumes a 6-day work week and average daily usage.

*Table Note 8:* Based on filling a 2,000-gallon tanker truck 6/7 full of water over 1 hour.

*Table Note 9:* Assumes 6:1 ratio mix of water to Soiltac applied to 1,245 acres of road every 2 years.

*Table Note 10:* Assumes 195 standard cubic feet of hydrogen generated per year per dish and 1.5 liters of water consumed per cubic meter of hydrogen generated.

### **2.2.3.3 Wastewater and Waste Management**

The water treatment wastewater generated by the RO unit would contain relatively high concentrations of total dissolved solids (TDS). Wastewater or brine generated by the RO unit would be discharged to a polyvinyl chloride (PVC)-lined concrete evaporation pond that meets the requirements of the San Bernardino County Regional Water Quality Control Board (RWQCB). There would be two 0.5-acre evaporation ponds and each would be sized to contain 1 year of discharge flow, approximately 2 million gallons. A minimum of 1 year is required for the water treatment waste to undergo the evaporation process. The second pond would be in operation while the first is undergoing evaporation. The two ponds would alternate their functions on an annual basis.

After the brine has gone through the evaporation process, the solids that settle at the bottom of the evaporation pond would be tested by the Applicant and disposed of in an appropriate non hazardous waste disposal facility. The solids would be scheduled for removal during the summer months, when the concentration of solids is at its greatest due to an increase in evaporation rates, in order to achieve maximum solids removal.

Sanitary wastewater generated at the facility cannot be conveyed to an existing sewage facility or pipeline as there are no public or private entities that manage sanitary wastewater flows for locations in the vicinity of the project site. The wastewater generated at the main services complex would be discharged into a sub-surface wastewater disposal system with septic tanks and leach fields, and will be designed in accordance with the applicable laws and regulations, including the San Bernardino County RWQCB, and the California Department of Public Health Services.

The general threshold limit for a standard approval process for septic tanks and leach fields through the local RWQCB is 500 gallons per acre per day. The expected daily sanitary wastewater flow from the Calico Solar Project ranges from an average of 5,500 gallons to a peak of 6,600 gallons; the required set aside area given this flow is approximately 14 acres. Given the project site area is much greater than 14 acres, the threshold limit for septic tank and leach field applications would be met. The required leach field area is estimated to be approximately 1,180 square feet (0.025 acre).

### **2.2.3.4 Hazardous Waste Management**

Hazardous materials used during facility construction and operations would include paints, epoxies, grease, transformer oil, caustic electrolytes (battery fluid), and products that would be generated by the construction equipment, such as waste fuel and waste oil. To properly manage and dispose of hazardous materials and wastes several procedures would be utilized. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Chemicals

would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in large storage tanks, while most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed to contain leaks and spills in concrete containment areas. To ensure these procedures are carried out the applicant develop a Hazardous Materials Management Plan (HMMP) prior to the beginning of project construction as part of the project's POD (Tessera Solar 2010a).

### 2.2.3.5 Hydrogen System

In the AFC filed December 2, 2008, the Applicant proposed a distributed hydrogen system in which hydrogen is stored at the SunCatchers in hydrogen gas cylinders (k-bottles) (SES 2008). The hydrogen use, supply and storage system was described to include a k-bottle of hydrogen on each PCU. One hydrogen gas cylinder would contain approximately 195 cubic feet of hydrogen, used to replenish lost hydrogen gas within the gas circuit. Each k-bottle was to be supported from the base of the PCU boom. Each PCU's k-bottle would either need to be removed and replaced or refilled at each dish site as required (approximately two times per year).

In the SA/DEIS, in response to a CEC data request, the Applicant reconsidered the plan for providing hydrogen to the PCUs and proposed an on-site hydrogen gas supply, storage and distribution system that would eliminate the need for the delivery of hydrogen k-bottles. The Applicant is still in the process of evaluating the relative economic and efficiency advantages of the two hydrogen systems. Table 2-4 presents a summary of differences between the centralized and distributed hydrogen supply system (Tessera Solar, unpublished data).

**Table 2-4 Proposed Action Potential Hydrogen Supply Systems**

Feature	Centralized Hydrogen System	Distributed Hydrogen System
Storing hydrogen in main service complex	36,400 scf per tank (total: 1 tank)	36,400 scf per tank (total: 1 tank)
High-pressure supply tank	29,333 scf per compressor group (total: 95 compressor groups)	82 scf per SunCatcher (total: 34,000 SunCatchers)
Low-pressure supply tank	9,900 scf per compressor group (total: 95 compressor groups)	28 scf per SunCatcher (total: 34,000 SunCatchers)
Local storage tank	Not applicable	489 scf per SunCatcher (total: 34,000 SunCatchers)
Single SunCatcher	1.6 scf	1.6 scf
Total amount on-site	3,817,935 scf (21,422 pounds)	20,456,800 scf (114,783 pounds)

*Table Source:* Tessera Solar, unpublished data.

*Table Key:* scf = standard cubic feet.

## Centralized Hydrogen System

Two centralized hydrogen systems would produce hydrogen gas through electrolysis with two redundant hydrogen generators. One system would be located south of the BNSF railroad tracks and the other would be located north of the tracks. Each proposed hydrogen generator would be capable of producing 1,820 standard cubic feet of hydrogen per hour. The hydrogen generators could run full time, if needed, to supply a sufficient amount of hydrogen to the SunCatchers. However, the generators would be operated at off-peak electric hours using grid power and generated hydrogen would be stored onsite. Hydrogen gas produced by the onsite generators would be stored in a steel storage tank. The hydrogen tank, approximately 9 feet in diameter by 30 feet long, would be capable of storing an approximately 2-day supply of hydrogen (that is, approximately 36,400 standard cubic feet).

The hydrogen storage tank would distribute hydrogen to 95 individual compressor groups. Each compressor group would be electrically operated and would consist of a compressor and a high-pressure supply tank with a 29,333-standard-cubic-foot capacity, delivering gas at approximately 2,760 pounds per square inch. Each compressor group would also be equipped with a low-pressure dump tank with the same 9,900-standard-cubic-foot capacity and used to recover hydrogen from nonoperational PCUs through a 0.25-inch and 0.5-inch stainless steel return line. When utilizing this hydrogen system no other holding tanks or storage tanks in the compressor groups would be required. Hydrogen would be delivered to each SunCatcher through 1-inch diameter pipelines and returned to central compression through 0.75-inch diameter pipelines.

## Distributed Hydrogen System

The distributed hydrogen supply system utilizes k-bottles at each SunCatcher. This system would also use two redundant hydrogen generators and one steel storage tank located at the main services complex (as described in the centralized system) to produce hydrogen. However, the system would not deliver hydrogen through pipelines. Instead, hydrogen would be filled from the hydrogen storage tank to each individual SunCatcher through trucks. Each SunCatcher would include an 82-standard-cubic-foot high-pressure supply tank, 28-standard-cubic-foot low-pressure dump tank, and a 489-standard-cubic-foot local storage tank. In addition, each SunCatcher unit would contain a minimum of 1.6 standard cubic feet of hydrogen at 580 pounds per square inch at all times, resulting in a total of around 610 standard cubic feet of hydrogen in each SunCatcher. The k-bottles would be delivered back to each SunCatcher during the mirror-washing truck process. Hydrogen refilling and replacement trips are expected occur approximately three times per year.

### 2.2.4 Decommissioning Activities

The removal of the project from service, or decommissioning, may range from “mothballing” to the removal of equipment and appurtenant facilities, depending on conditions at the time.

Permanent closure is defined as a cessation in operations with no intent to restart operations owing to project age, damage to the project that is beyond repair, adverse economic conditions, or other substantial reasons. The decommissioning process is detailed in the project POD. The planned life of the Calico Solar Project is 30 years. However, if the project is still economically viable, it could be operated longer. It is also possible that the project could become economically noncompetitive before 30 years have passed, forcing early decommissioning.

Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the CEC, the BLM, and other applicable agencies for review and approval as part of the decommissioning plan. The decommissioning plan would discuss the following:

- Proposed decommissioning activities for the project and appurtenant facilities constructed as part of the project
- Conformance of the proposed decommissioning activities with applicable laws and regulations
- Activities necessary to restore the project site if the plan requires removal of equipment and appurtenant facilities
- Decommissioning alternatives other than complete restoration to the original condition
- Associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning

In general, the decommissioning plan for the project would maximize the recycling of project components. The project owner anticipates selling unused chemicals back to the suppliers or other purchasers or users. Equipment containing chemicals would be drained and shut down to ensure public health and safety and to protect the environment. Nonhazardous wastes would be collected and disposed of in appropriate landfills or waste collection facilities. Hazardous wastes would be disposed of according to applicable laws and regulations. The site would be secured 24 hours per day during the decommissioning activities, and periodic updated reports would be provided to the CEC, the BLM, and other appropriate parties.

Similar to project construction and facility operations, decommissioning would be performed in accordance with plans and mitigation measures that would assure the project conforms to applicable laws and regulations and would minimize impacts. The BLM would require mitigation

and restoration as stipulated in the project POD and the approved reclamation plan, as well as other federal agency requirements. The authorized project would require a “Performance and Reclamation” bond consistent with BLM policy (43 CFR 2805.12[g]).

## **2.2.5 CDCA Land Use Plan Amendment**

Approval of the Proposed Action would require the BLM to also amend the CDCA Plan. The CDCA Plan amendment process is described in Section 1.6.1 and Section 4.18 of the FEIS. This chapter addresses how the proposed amendment would vary by alternative.

### **2.2.5.1 Multiple-Use Classes**

Four multiple-use classes are used in the CDCA Plan with each class describing a different type and level of use permitted within a specific geographic area. Multiple-use guidelines for specific resource activities vary by the designated multiple-use class.

The Proposed Action project site includes two CDCA Plan Multiple-Use Class designations (Figure 2-3). For the Proposed Action, 97 percent (8,022 acres) of the project site is currently designated as Multiple-Use Class M (Moderate Use) which is described as follows in the CDCA Plan:

- “Multiple-Use Class M (Moderate Use) is based on a controlled balance between high intensity use and protection of public lands. This class provides for a wide variety o[f] present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.” (BLM 1999)

The remaining 3 percent (208 acres) of the Proposed Action project site is currently designated as Multiple-Use Class L (Limited Use) which is as follows:

- “Multiple-Use Class L (Limited Use) protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.” (BLM 1999)

### **2.2.5.2 Multiple-Use Class Guidelines**

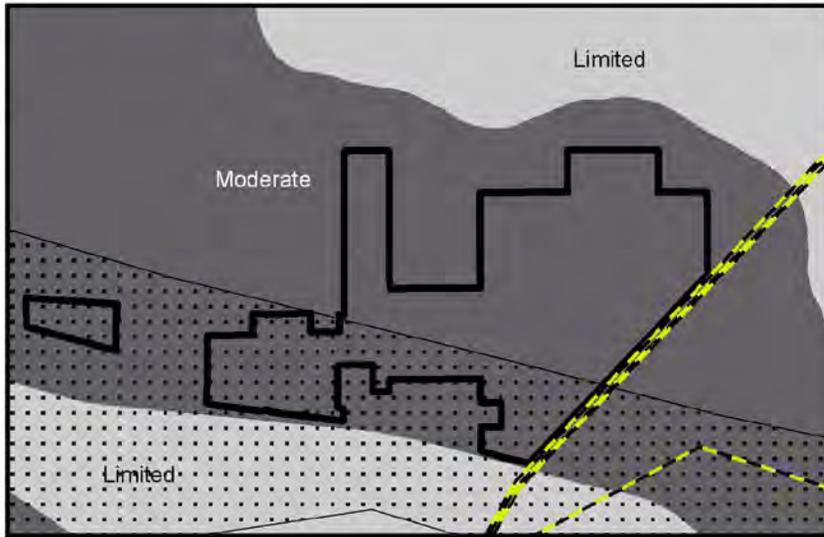
All CDCA land-use actions and resource management activities must meet the multiple-use guidelines with the Plan given for the specific multiple-use class. All land use actions and

resource management activities on public lands within a multiple-use class delineation must meet the guidelines given for that class. There are nineteen multiple-use class guidelines identified in the CDCA Plan:

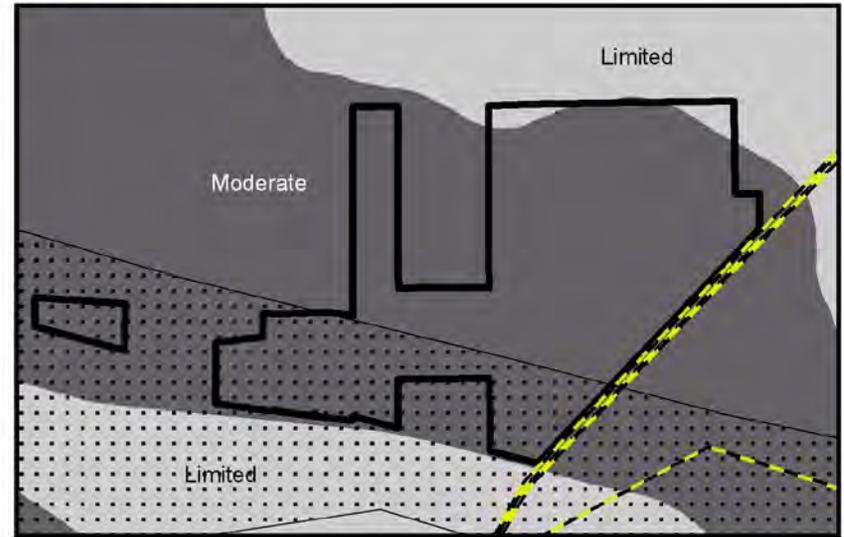
- Agriculture
- Air Quality
- Water Quality
- Cultural and Paleontological Resources
- Native American Values
- Electrical Generation Facilities
- Transmission Facilities
- Communication Sites
- Fire Management
- Vegetation
- Land-Tenure Adjustment
- Livestock Grazing
- Mineral Exploration and Development
- Motorized-Vehicle Access/Transportation
- Recreation
- Waste Disposal
- Wildlife Species and Habitat
- Wetland-Riparian Areas
- Wild Horses and Burros

ALTERNATIVES - FIGURE 2-3  
Calico Solar Project - Multiple-Use Classes

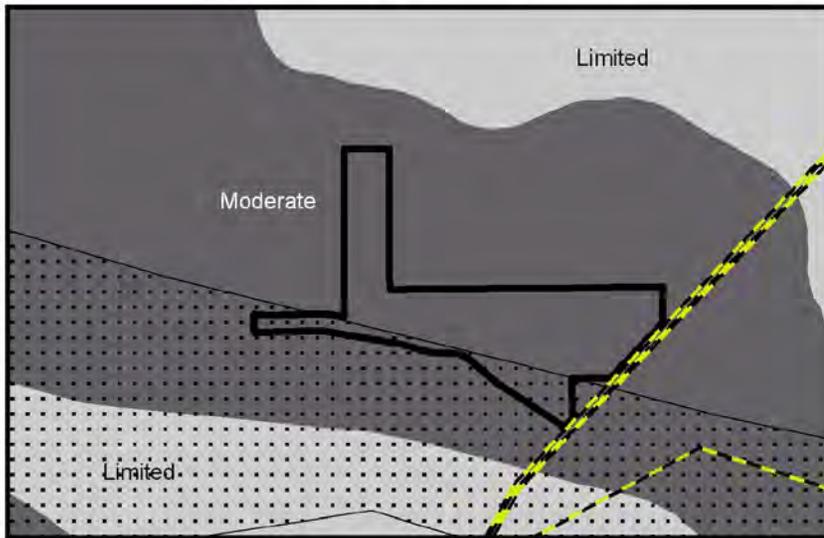
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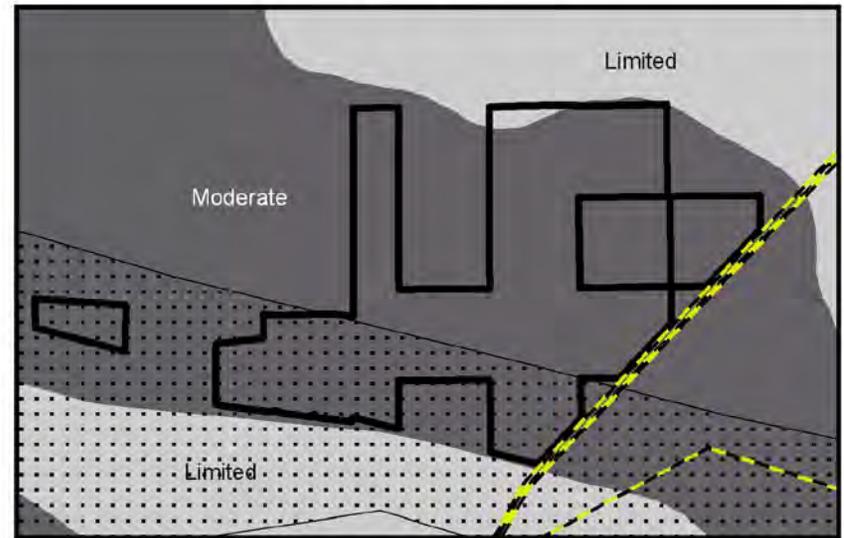
AGENCY PREFERRED ALTERNATIVE



PROPOSED ALTERNATIVE

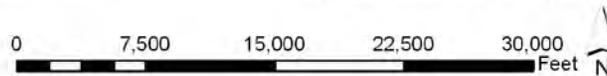
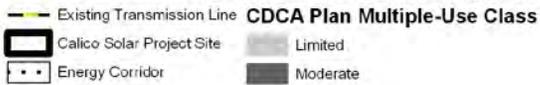


REDUCED ACREAGE ALTERNATIVE



AVOIDANCE OF DONATED AND ACQUIRED LANDS ALTERNATIVE

ALTERNATIVES



SOURCE: BLM, CEC, URS

The applicability of the Multiple-Use Class Guidelines is discussed for each resource described in Chapter 3. The Land Use Plan Amendment Analysis is contained within Section 4.18. The relationship of the CDCA Plan guidelines and elements are discussed for each resource element in Chapter 4.

### **2.2.5.3 CDCA Plan Elements**

The CDCA Plan contains twelve plan elements. Plan elements provide more specific application of the Multiple Use class guidelines for a specific resource or activity. The CDCA Plan includes:

- Cultural Resources
- Native American Values
- Wildlife
- Vegetation
- Wilderness
- Wild Horses and Burros
- Livestock Grazing
- Recreation
- Motorized Vehicle Access
- Geology-Energy Minerals
- Energy Production and Utility Corridors
- Land Tenure Adjustment

The applicability of the CDCA Plan elements is discussed for each resource described in Chapter 3. The primary CDCA Plan element affected by the Proposed Action is the Energy Production and Utility Corridors Element.

### **Energy Production and Utility Corridors Element**

The Energy Production and Utility Corridors Element of the CDCA Plan has three element components that relate to the Proposed Action. The Planning Corridors component identifies 16 planning corridors for utility facilities including new electrical transmission towers and cables of

161 kV or more. The utility corridor adjacent to the project site is shown in Figure 2-4. Utility needs which do not conform to the CDCA adopted corridor system are processed by a plan amendment. The Powerplant Sites component discusses coordination of the siting and evaluation of powerplants over 50 MW with the CEC. The Alternative Energy Sources component states plan amendment procedures “will adequately provide for the coordination needed for assuring rapid implementation of these important fuel-replacement alternative energy programs in an environmentally sound manner.”

In the Proposed Action, the Energy Production and Utility Corridors Element of the CDCA Plan would be modified to include this Category 3 amendment:

- Allow for the siting of the 8,230-acre Calico Solar Project, including a 2.0-mile interconnecting transmission line from the new Calico Solar Substation to the existing Pisgah Substation.

## **2.2.6 Motorized Vehicle Access**

Under the Proposed Action segments of eight BLM routes currently designated as open would be closed to public access within the project boundaries. The process for closure would follow BLM Instruction Memorandum (IM) 2008-014.

The Motorized Vehicle Element of the CDCA Plan describes the area designations for “open,” “closed” and “limited” vehicle use based on multiple-use classes with certain exceptions described in the Plan. In the project vicinity, vehicle use is “Limited,” meaning that motorized-vehicle access is allowed only on certain “routes of travel,” which includes roads, ways, trails washes. In Multiple-Use Class M areas access is on existing routes, unless it is determined that use on specific routes must be limited further. In Multiple-Use Class L areas, access is directed toward use of approved routes of travel.

### **2.2.6.1 Route Designations**

Specific BLM routes in the CDCA planning area are also designated “open,” “closed” or “limited” for motor vehicle use. The route designations are generally a consequence of the area designations previously described. An “Open Route” designation allows for motorized vehicle access. Special uses with potential for resource damage or significant conflict with other uses may require specific BLM authorization. A “Closed Route” designation prohibits motorized vehicle access except for (1) fire, military, emergency or law enforcement vehicles when used for emergency purposes; (2) combat or combat support vehicles when used for national defense purposes; (3) vehicles whose use is expressly authorized by an agency head under a permit, lease or contract; and (4) vehicles used for official purposes by employees, agents or

designated representatives of the Federal Government or one of its contractors. The use must be consistent with the multiple use guidelines for the area.

There are eight BLM designated routes in the Proposed Action project site (Table 2-5; Figure 2-5). All of these routes are currently designated as open. If the Proposed Action were approved, a segment of each route that falls within the 8,230-acre project boundary would be closed pursuant to BLM IM 2008-014. Additionally, the Applicant would construct a new route to provide access around the project site.

**Table 2-5 Proposed Action: BLM Route Changes**

<b>BLM Route ID</b>	<b>Length inside project boundary (miles)</b>	<b>Existing CDCA Plan Route Designation</b>	<b>Proposed Authorized Officer Decision</b>
AF045	3.23	Open	Closed
AF0450	2.65	Open	Closed
AF052	2.48	Open	Closed
AF053	2.64	Open	Closed
AF058	3.69	Open	Closed
AF132	0.58	Open	Closed
AF133	0.49	Open	Closed
AF298	5.92	Open	Closed

*Table Source:* BLM GIS data.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

## 2.3 Alternative 1a: Agency Preferred Alternative

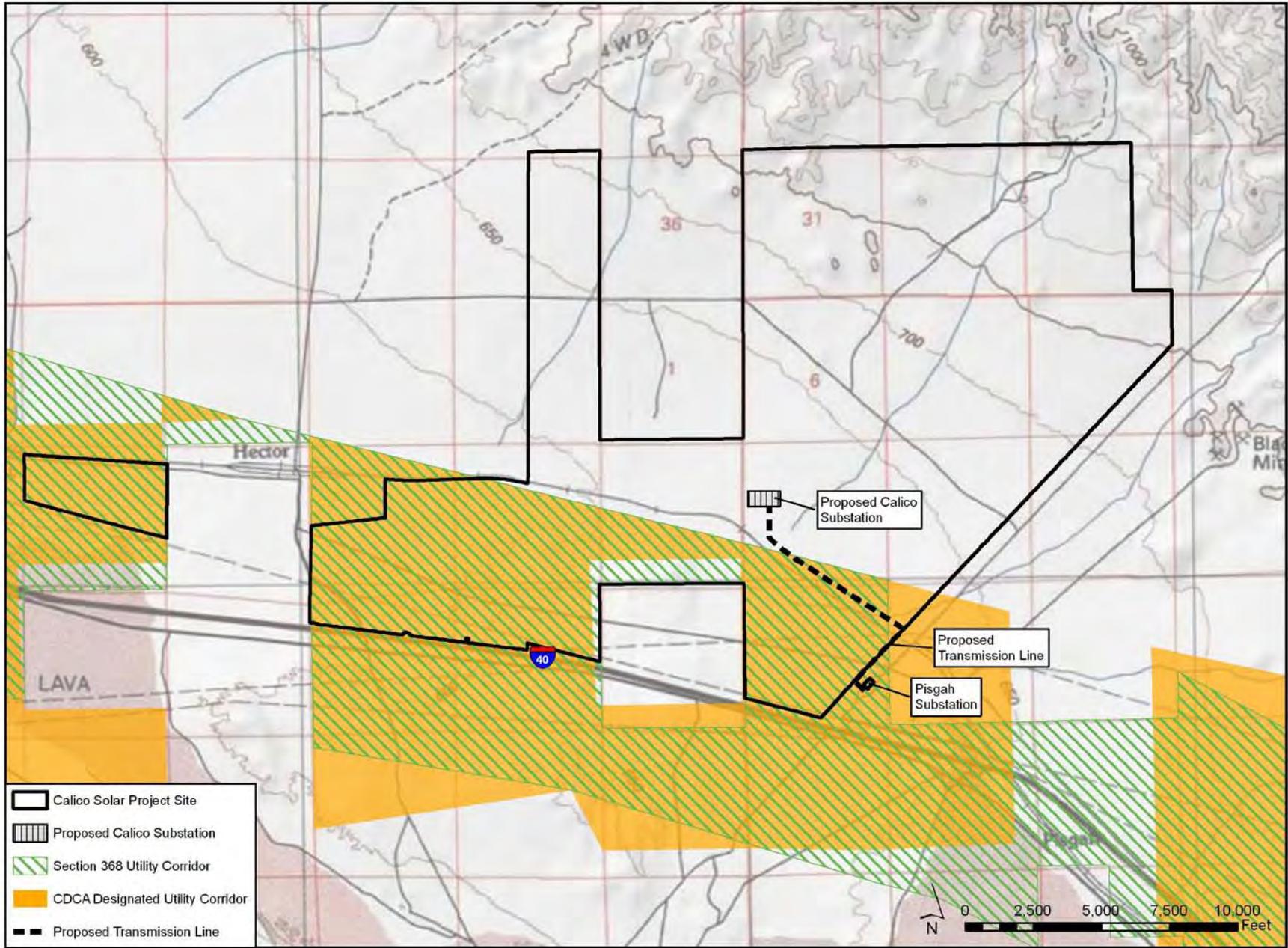
The CEQ regulations require an EIS “. . . to identify the agency’s preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference” (40 CFR 1502.14[e]). In the SA/DEIS the BLM did not have a preferred alternative, but the BLM has identified an Agency Preferred Alternative in the FEIS. The Agency Preferred Alternative is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors (46 FR 18026).

The Agency Preferred Alternative is a 6,215-acre solar energy power plant project (Figure 2-6) that was developed in the FEIS as a modification of the Proposed Action. A Determination of NEPA Adequacy is provided in Appendix C, which documents BLM’s determination that a supplemental DEIS was not required upon development of the Agency Preferred Alternative for the FEIS. This alternative is also the Environmentally Preferred Alternative. This alternative would accommodate 34,000 SunCatchers and generate 850 MW. The estimated temporary and permanent land disturbances for the Agency Preferred Alternative are presented in Table 2-12.

**ALTERNATIVES - FIGURE 2-4**  
**Calico Solar Project - CDCA Designated Utility Corridor**

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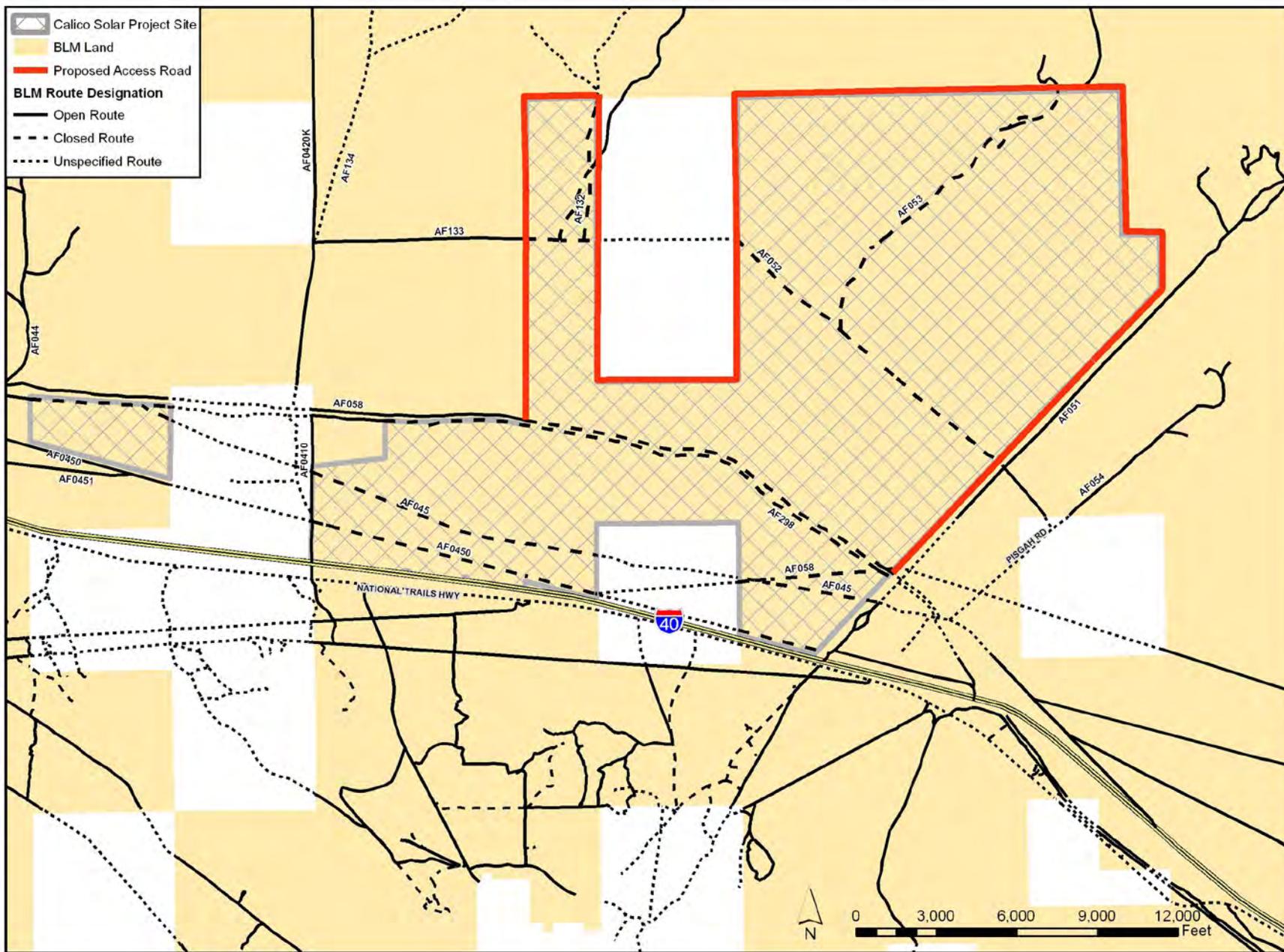
ALTERNATIVES



SOURCE: ESRI, Huitt-Zollars, URS, USGS, BLM

ALTERNATIVES - FIGURE 2-5  
 Calico Solar Project - BLM Closed Routes in Proposed Alternative

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ALTERNATIVES

SOURCE: BLM, URS

The boundaries of the Agency Preferred Alternative were developed after extensive consultation with federal and state regulatory agencies with responsibilities for management of biological and cultural resources. Accordingly, the north boundary of the project footprint has been redesigned to avoid 1,770 acres of habitat for desert tortoises, bighorn sheep and rare plants. The south boundary was also modified so that no cultural resources would be adversely affected. And, within the project boundary there are 6.65 acres of environmentally sensitive areas on which development would be excluded to protect rare plants.

### **2.3.1 Structures and Facilities**

Structures and facilities associated with the Agency Preferred Alternative would be the same as what is described above for the Proposed Action and shown in Table 2-1.

### **2.3.2 Construction Activities**

Project construction of the Agency Preferred Alternative would be similar to what is described for the Proposed Action.

#### **2.3.2.1 Site Development**

Site development associated with the Agency Preferred Alternative would be similar to the Proposed Action with the exceptions described below to accommodate a 6,215-acre project footprint.

The location of the detention/debris basins would be located immediately south of the north boundary of the Agency Preferred Alternative project site (Figure 2-6). The total acreage of the basins would be the same as for the Proposed Action.

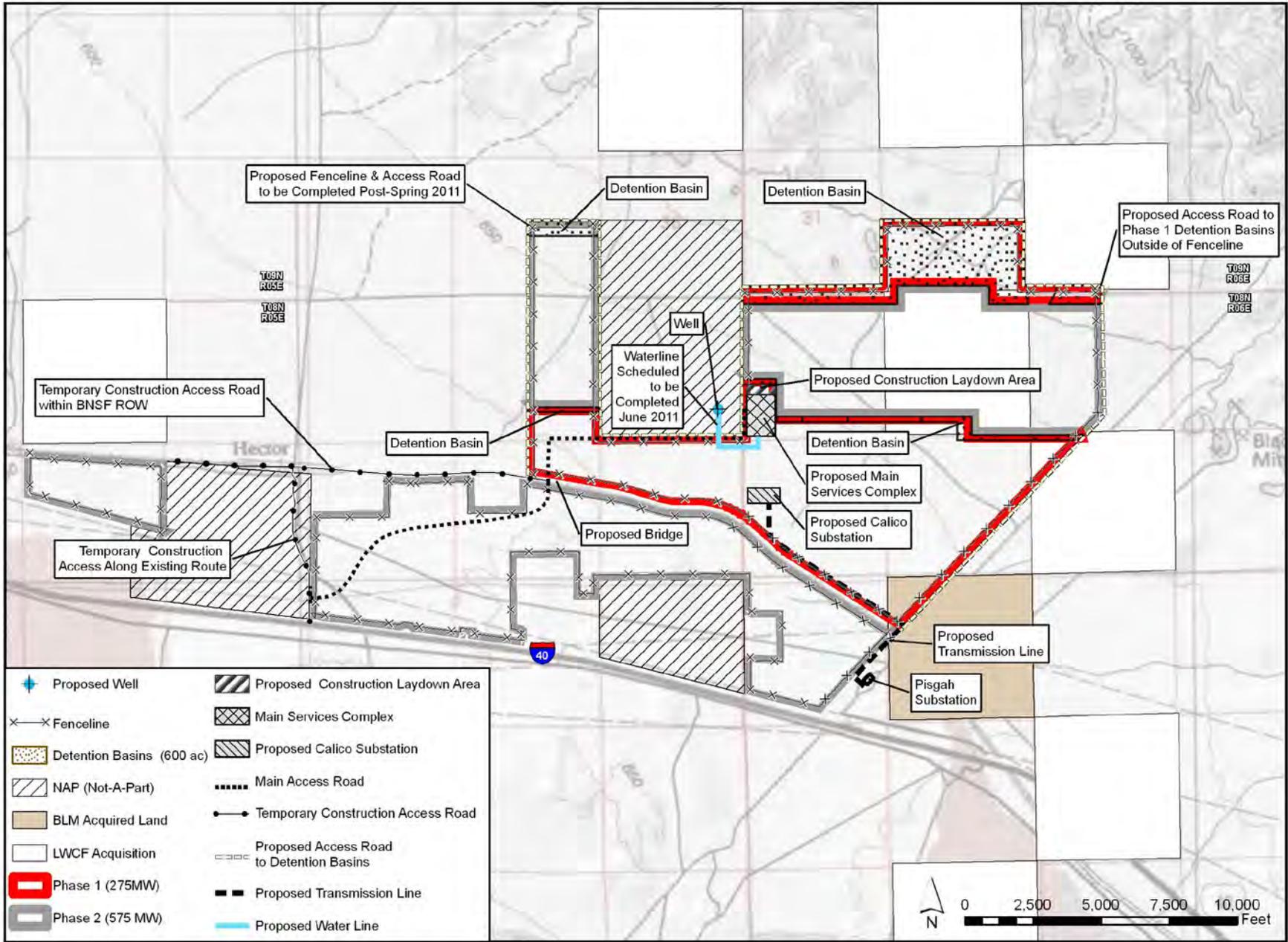
Total length of roadways and fence lines would be decreased compared to the Proposed Action; see Table 2-12 later in this chapter for a comparison of these items.

### **2.3.3 Operations and Maintenance**

Operations and maintenance of the Agency Preferred Alternative would be similar to what is described for the Proposed Action.

**ALTERNATIVES - FIGURE 2-6**  
**Calico Solar Project - Agency Preferred Alternative**

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ALTERNATIVES

SOURCE: ESRI, Huitt-Zollars, URS, USGS, BLM

### 2.3.4 Decommissioning Activities

Decommissioning Activities would be the same as those identified in the Proposed Action Alternative.

### 2.3.5 CDCA Land Use Plan Amendment

The Agency Preferred Alternative would require the BLM to amend the CDCA Plan. The land use plan amendment would be the same as what is described for the Proposed Action adjusted for project footprint.

### 2.3.6 Motorized Vehicle Access

Under the Agency Preferred Alternative segments of eight BLM routes currently designated as open, totaling approximately 19 miles, would be closed to public access within the project boundaries (Table 2-6; Figure 2-7). The process for closure would follow BLM IM 2008-014. Additionally, the Applicant would construct a project perimeter road that would allow for access around the project site.

**Table 2-6 Agency Preferred Alternative: BLM Route Changes**

<b>BLM Route ID</b>	<b>Length inside project boundary (miles)</b>	<b>Existing CDCA Plan Route Designation</b>	<b>Proposed Authorized Officer Decision</b>
AF045	2.53	Open	Closed
AF0450	2.21	Open	Closed
AF052	2.48	Open	Closed
AF053	1.57	Open	Closed
AF058	3.69	Open	Closed
AF132	0.52	Open	Closed
AF133	0.49	Open	Closed
AF298	5.92	Open	Closed

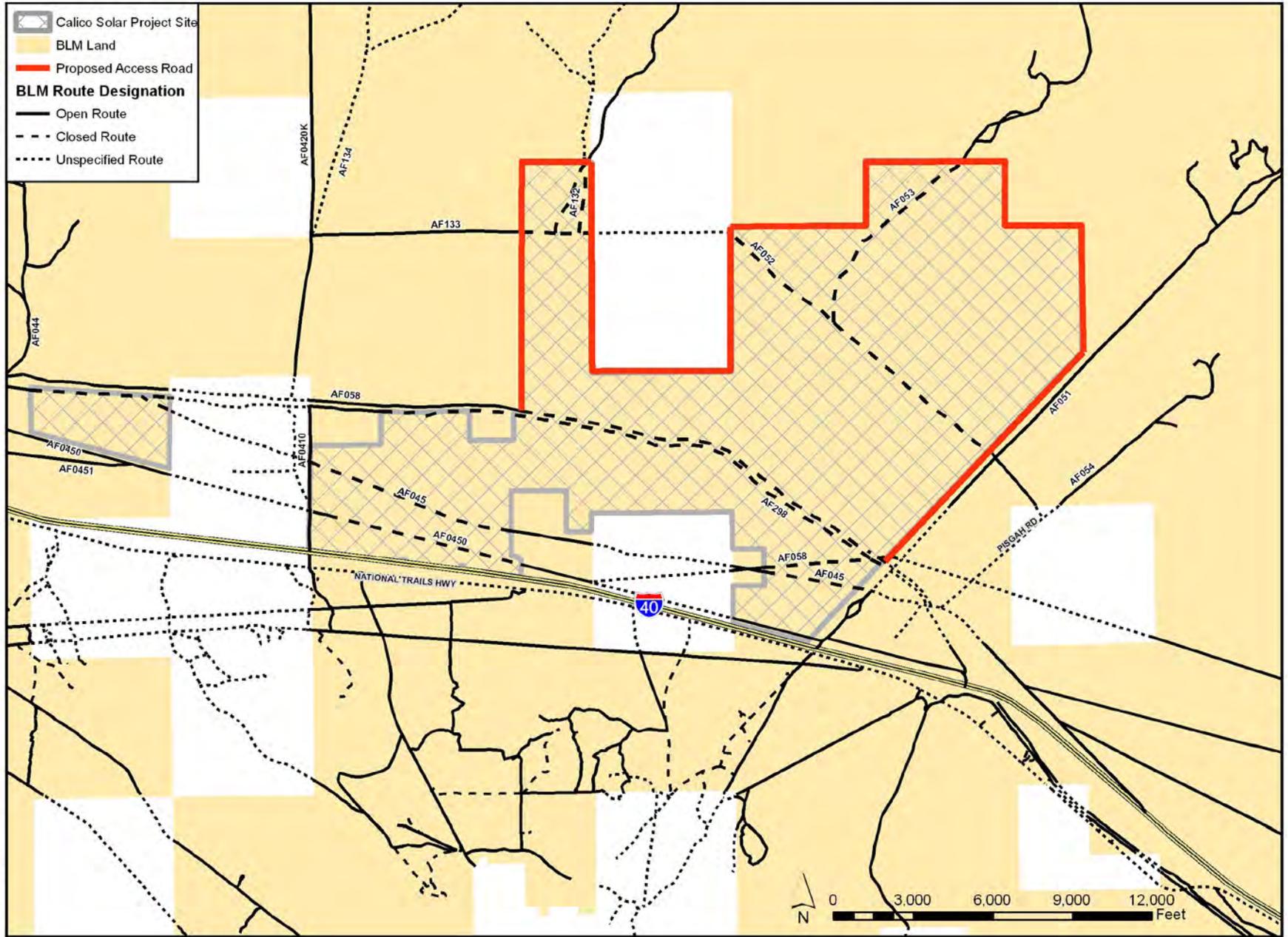
*Table Source:* BLM GIS data.

*Table Key:* Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

ALTERNATIVES - FIGURE 2-7  
 Calico Solar Project - BLM Closed Routes in Agency Preferred Alternative

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SOURCE: BLM, URS

## 2.4 Alternative 2: Reduced Acreage Alternative

The Reduced Acreage Alternative is a 2,600-acre solar energy power plant project (Figure 2-8) and is described in detail in Chapter B.1 of the SA/DEIS. This alternative would accommodate approximately 11,000 SunCatchers. As discussed in the SA/DEIS, the Reduced Acreage Alternative was developed to avoid sensitive cultural resources; desert washes; areas that were mapped as occupied desert tortoise habitat (live tortoise and/or active burrows and sign); and avoid donated and acquired lands. The Reduced Acreage Alternative also responds to public scoping comments requesting a scaled-down project footprint. The estimated temporary and permanent land disturbances for the Reduced Acreage Alternative are presented in Table 2-12.

### 2.4.1 Structures and Facilities

Structures and facilities associated with the Reduced Acreage Alternative are noted below in Table 2-7.

**Table 2-7 Reduced Acreage Alternative: Project Structures and Facilities**

Description	Quantity	Dimensions (feet)
SunCatcher power generating system	11,000	38 long x 38 wide x 40 high
Main Services Complex administration building	1	130 long x 70 wide x 14 high
Main Services Complex maintenance building	1	70 long x 70 wide x 14 high
Main SunCatcher assembly building	2	1,000 long x 100 wide x 78 high
Well-water and fire-water storage tank, 220,000 gallons	1	36 diameter x 20 high
Demineralized water tank, 11,000 gallons	2	10 diameter x 10 high
Potable water tank, 5,000 gallons	1	40 diameter x 20 high
230-kV transmission line towers, single-circuit, wood H-frame structure	28	40 wide x 60 high
Generator collection sub-panel; distribution panel, 42 circuit, 400 A, 600 V, with circuit breakers in a weatherproof enclosure	917	1 long x 5 wide x 5 high [Table Note 1]
Generator collection power center, 2,000-A distribution panels with six 400-A circuit breakers	184	2 long x 3 wide x 6 high [Table Note 1]
Collector group generator step-up unit transformer, 1,750 kVA, 575 V to 34.5 kV, with taps	184	6.67 long x 7.5 wide x 6.67 high [Table Note 1]
Open bus switch rack, 35kV, 7 bay with five 35kV, 1,200-A, 40kVA international circuit breakers, insulators, switches, and bus work	2	105 long x 20 wide x 30 high [Table Note 1]
Shunt capacitor bank, 34.5kV, 90 MVAR switched in six each 15 MVAR steps	2	15 long x 8 wide x 20 high [Table Note 1]
DVAR compensation system in coordination with shunt capacitor banks—size to be determined by studies	1	60 long x 12 wide x 16 high [Table Note 1]

<b>Description</b>	<b>Quantity</b>	<b>Dimensions (feet)</b>
Disconnect switch, 35-kV, 3,000-A, 200-kV BIL, group-operated	2	3 long x 11 wide x 16 high [Table Note 1]
Power transformer, three phase, 100/133/167-MVA, 230/ 132.8-34.5/19.9-kV, 750-kV BIL, oil filled	2	15 long x 35 wide x 23 high [Table Note 1]
Power circuit breaker, 242-kV, 2000-A, 40-kA interrupting capacity	3	12 long x 20 wide x 16 high [Table Note 1]
Coupling capacitor voltage transformer for metering, 242-kV, 900-kV BIL, 60 hertz, potential transformer ratio 1,200/2,000:1	2	1 long x 1 wide x 25 high [Table Note 1]
Disconnect switch, 242 kV, 2000 A	3	10 long x 25 v x 25 high [Table Note 1]

*Table Source:* Tessera Solar 2010a.

*Table Note 1:* Includes structure height to provide electrical safety clearances to ground.

*Table Key:* A = amperes; BIL = basic impulse level; DVAR= dynamic volt-amperes reactive; kA = kilo amperes; kV = kilovolts; kVA = kilovolt amperes; MVA = megavolt amperes; MVAR = megavolt-amperes reactive; V = volts.

## 2.4.2 Construction Activities

Project construction of the Reduced Acreage Alternative would be similar to what is identified for the Proposed Action.

One 15-acre construction laydown area is proposed in the southern portion of the Main Services Complex (Figure 2-8) (Tessera Solar 2010a).

### 2.4.2.1 Schedule

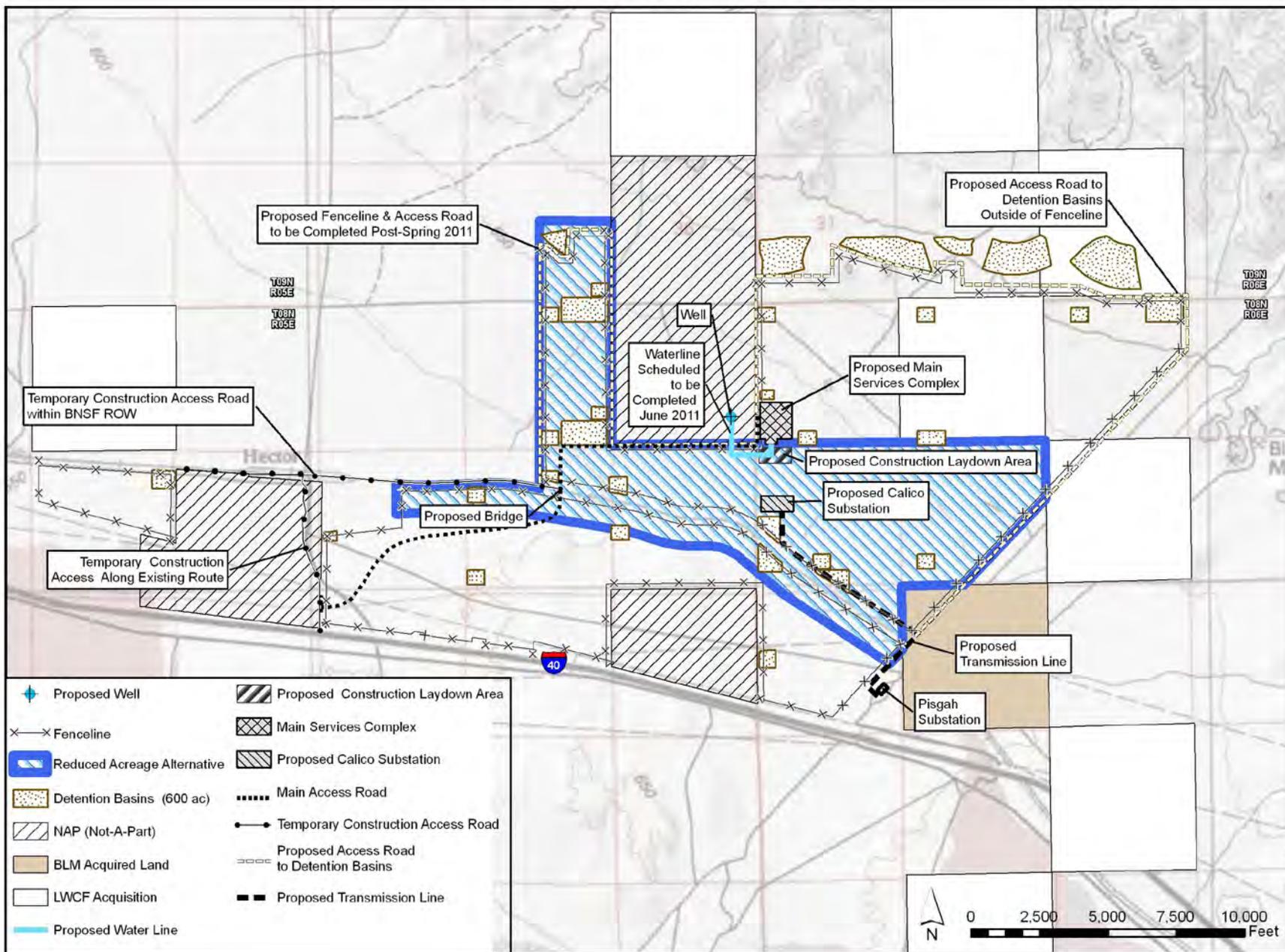
The construction period for the Reduced Acreage Alternative would be approximately 23 months, similar to what is proposed for Phase I of the Proposed Action.

## 2.4.3 Operations and Maintenance

Operations and maintenance activities associated with the Reduced Acreage Alternative would be similar to the Proposed Action, but proportionally reduced to reflect the fewer number (11,000) of SunCatchers. For example, water use for operations and maintenance would be reduced to reflect the smaller facility (Table 2-8).

ALTERNATIVES - FIGURE 2-8  
Calico Solar Project - Reduced Acreage Alternative

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**Table 2-8 Reduced Acreage Alternative: Water Use for Operations**

<b>Water Use</b>	<b>Daily Average (gallons per minute)</b>	<b>Daily Maximum (gallons per minute)</b>	<b>Annual Usage (acre-feet)</b>
<b>Equipment Water Requirements</b>			
SunCatcher Mirror Washing	4.0 [Table Note 1]	10.5 [Table Note 2]	4.3 [Table Note 3]
<b>Water Treatment System Discharge</b>			
Brine to Evaporation Ponds	2.0	6.0 [Table Note 4]	2.2
<b>Potable Water Use</b>			
For drinking and sanitary water requirements	0.7 [Table Note 5]	0.8 [Table Note 6]	0.9 [Table Note 7]
<b>Dust Control</b>			
Well water for dust control during operations	0.9	17.2 [Table Note 8]	1.5 [Table Note 9]
<b>Hydrogen Generation</b>			
Electrolysis water requirements	0.04	0.01 [Table Note 6]	0.08 [Table Note 10]
<b>Totals</b>	<b>7.64</b>	<b>34.5</b>	<b>9.0</b>

*Table Source:* modified from Tessera Solar 2010a and unpublished data.

*Table Note 1:* Based on washing 100 percent (11,000) of the SunCatchers each month with an average of 10.3 gallons of demineralized water per wash and 21 work days per month.

*Table Note 2:* Assumes one 500-gallon water tanker is filled every 20 minutes.

*Table Note 3:* Based on 11,000 SunCatchers experiencing 9.6 washes per year.

*Table Note 4:* Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20 percent of system discharge.

*Table Note 5:* Assumes 17 gallons per person per day for 50 people.

*Table Note 6:* Maximum amount assumes a 20 percent contingency over the data listed in the Daily Average column for this water-use type.

*Table Note 7:* Assumes a 6-day work week and average daily usage.

*Table Note 8:* Based on filling a 2,000-gallon tanker truck 6/7 full of water over 1 hour.

*Table Note 9:* Assumes 6:1 ratio mix of water to Soiltac applied to 398 acres of road every 2 years.

*Table Note 10:* Assumes 195 standard cubic feet of hydrogen generated per year per dish and 1.5 liters of water consumed per cubic meter of hydrogen generated.

Table 2-9 identifies the details of the two alternative hydrogen generation and distribution system for the Reduced Acreage Alternative.

**Table 2-9 Reduced Acreage Alternative: Potential Hydrogen Supply Systems**

<b>Feature</b>	<b>Centralized Hydrogen System</b>	<b>Distributed Hydrogen System</b>
Storing hydrogen in main service complex	36,400 scf per tank (total: 1 tank)	36,400 scf per tank (total: 1 tank)
High-pressure supply tank	29,333 scf per compressor group (total: 31 compressor groups)	82 scf per SunCatcher (total: 11,000 SunCatchers)
Low-pressure supply tank	9,900 scf per compressor group (total: 31 compressor groups)	28 scf per SunCatcher (total: 11,000 SunCatchers)
Local storage tank	Not applicable	489 scf per SunCatcher (total: 11,000 SunCatchers)
Single SunCatcher	1.6 scf	1.6 scf
Total amount on-site	1,237,463 scf (6,943 pounds)	6,643,000 scf (37,274 pounds)

*Table Source:* Tessera Solar 2010a and unpublished data.

*Table Key:* scf = standard cubic feet.

#### **2.4.4 Decommissioning Activities**

Decommissioning Activities would be the same as those identified in the Proposed Action Alternative.

#### **2.4.5 CDCA Land Use Plan Amendment**

The Reduced Acreage Alternative would require the BLM to amend its CDCA Plan. The land use plan amendment would be the same as what is described for the Proposed Action adjusted for project footprint.

#### **2.4.6 Motorized Vehicle Access**

Under the Reduced Acreage Alternative segments of five BLM routes currently designated as open, totaling approximately 10 miles, would be closed to public access within the project boundaries (Table 2-10; Figure 2-9). The process for closure would follow BLM IM 2008-014. Additionally, the Applicant would construct a project perimeter road that would allow for access around the project site.



**Table 2-10 Reduced Acreage Alternative: BLM Route Changes**

<b>BLM Route ID</b>	<b>Length inside project boundary (miles)</b>	<b>Existing CDCA Plan Route Designation</b>	<b>Proposed Authorized Officer Decision</b>
AF052	0.90	Open	Closed
AF058	3.11	Open	Closed
AF132	0.57	Open	Closed
AF133	0.49	Open	Closed
AF298	4.74	Open	Closed

*Table Source:* BLM GIS data.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

## **2.5 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative was developed by the BLM and CEC to avoid all donated and LWCF-acquired lands and would occupy approximately 7,050 acres (Figure 2-10). In the SA/DEIS, this alternative was estimated to accommodate approximately 28,800 SunCatchers to generate 720 MW. Subsequent to publication of the SA/DEIS, the Applicant conducted additional analysis of site design and determined that 34,000 SunCatchers could be accommodated to generate 850 MW while still avoiding the donated and acquired lands. The estimated temporary and permanent land disturbances for the Avoidance of Donated and Acquired Lands Alternative are presented in Table 2-12.

### **2.5.1 Structures and Facilities**

Structures and facilities associated with the Avoidance of Donated and Acquired Lands Alternative would be the same as what is described above for the Proposed Action and shown in Table 2-1.

### **2.5.2 Construction Activities**

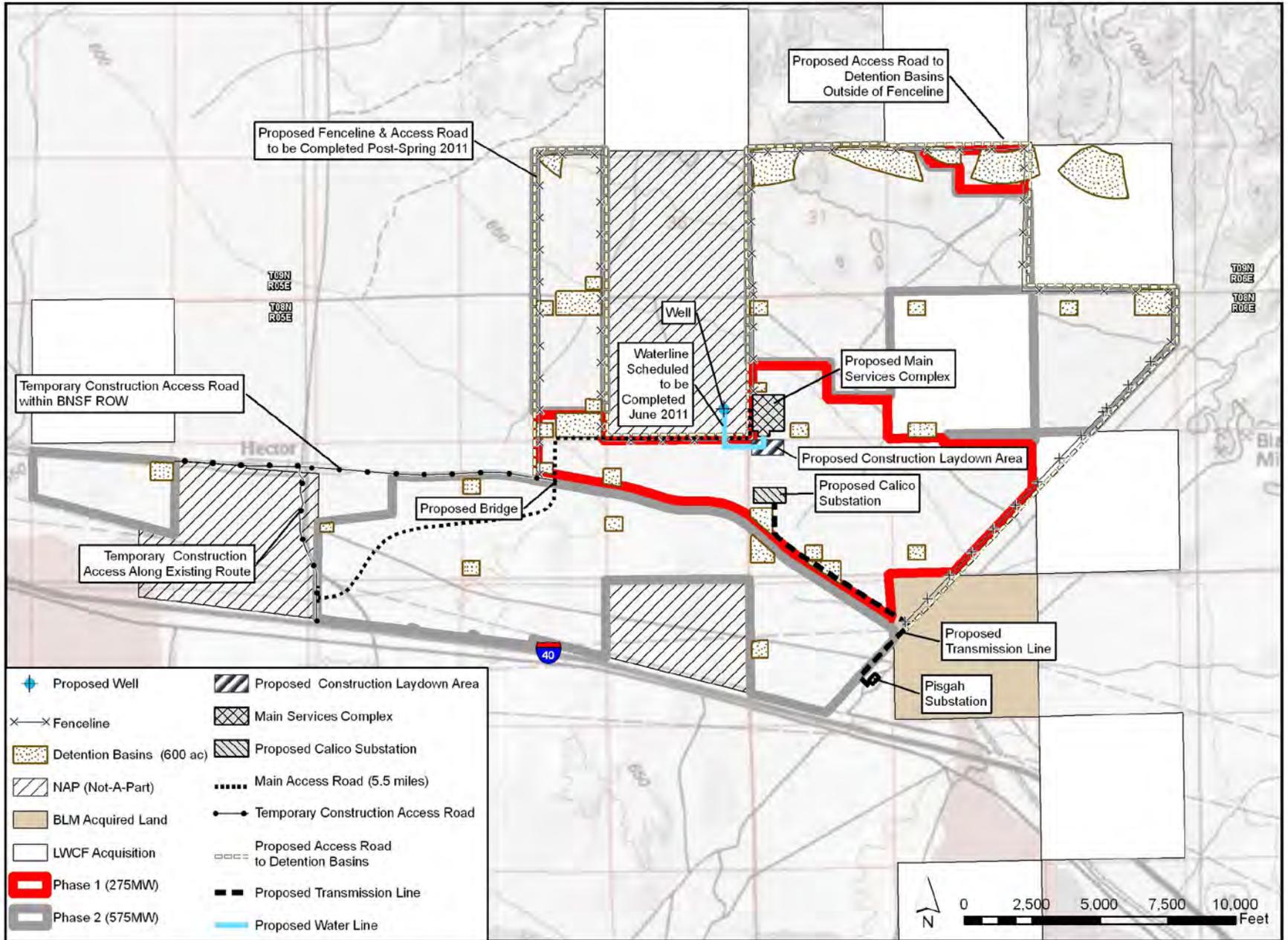
Project construction of the Avoidance of Donated and Acquired Lands Alternative would be similar to what is identified for the Proposed Action.

### **2.5.3 Operations and Maintenance**

Operations and maintenance activities associated with the Avoidance of Donated and Acquired Lands Alternative would be similar to the Proposed Action.

**ALTERNATIVES - FIGURE 2-10**  
 Calico Solar Project - Avoidance of Acquired and Donated Lands Alternative

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SOURCE: ESRI, Huitt-Zollars, URS, USGS, BLM

## 2.5.4 Decommissioning Activities

Decommissioning Activities would be the same as those identified in the Proposed Action Alternative.

## 2.5.5 CDCA Land Use Plan Amendment

The Avoidance of Donated and Acquired Lands Alternative would require the BLM to amend its CDCA Plan. The land use plan amendment would be the same as what is described for the Proposed Action adjusted for project footprint.

## 2.5.6 Motorized Vehicle Access

Under the Avoidance of Donated and Acquired Lands Alternative segments of eight BLM routes currently designated as open, totaling approximately 21 miles, would be closed to public access within the project boundaries (Table 2-11; Figure 2-11). The process for closure would follow BLM IM 2008-014. Additionally, the Applicant would construct a project perimeter road that would allow for access around the project site.

**Table 2-11 Avoidance of Donated and Acquired Lands Alternative: BLM Route Closures**

<b>BLM Route ID</b>	<b>Length inside project boundary (miles)</b>	<b>Existing CDCA Plan Route Designation</b>	<b>Proposed Authorized Officer Decision</b>
AF045	3.23	Open	Closed
AF0450	2.65	Open	Closed
AF052	2.23	Open	Closed
AF053	2.00	Open	Closed
AF058	3.69	Open	Closed
AF132	0.58	Open	Closed
AF133	0.49	Open	Closed
AF298	5.92	Open	Closed

*Table Source:* BLM GIS data.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.



## **2.6 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under NEPA, the No Action alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives. Under this No Action alternative, the BLM would deny the Calico Solar Project ROW grant and would not amend the CDCA Plan. As a result, the proposed Calico Solar Project would not be constructed on the project site and BLM would continue to manage the site consistent with the agency's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality (43 United States Code [USC] 1781[b]) in conformance with applicable statutes, regulations, policy, and the existing CDCA Plan. Other renewable energy projects may be constructed in the CDCA Plan area, including the location evaluated for the Calico Solar Project, to meet California renewable energy portfolio mandates. This is the only alternative in this FEIS that does not include a proposed amendment to the CDCA Plan. Future ROW grant applications for solar power development would require a NEPA analysis of both the proposed project and the CDCA Plan amendment for its siting.

## **2.7 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the BLM would deny the Calico Solar Project ROW grant and would amend the CDCA Plan to allow other solar projects on the project site described under the Proposed Action. The BLM would continue to manage the site consistent with the CDCA Plan with a new plan amendment to the Energy Production and Utility Corridors Element on the project. Future ROW grant applications for solar power development would require the BLM to conduct a NEPA analysis for the project proposal, but the agency would not be required to also conduct a NEPA analysis for a CDCA land use plan amendment.

### **2.7.1 CDCA Land Use Plan Amendment**

Under Alternative 5, the Energy Production and Utility Corridors Element of the CDCA Plan would be modified as a Category 3 Amendment to allow for the siting of a future solar energy project on the project site.

## **2.8 Alternative 6: LUP Amendment: Deny Calico Solar ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the BLM would deny the Calico Solar Project ROW grant and would amend the CDCA Plan to prohibit other solar projects on the project site. The BLM would continue to manage the site consistent with the amended CDCA Plan. In the absence of the Proposed Action for solar energy development, other renewable energy projects may be constructed in other locations in the CDCA Plan area to meet renewable energy portfolio mandates.

### **2.8.1 CDCA Land Use Plan Amendment**

Under Alternative 6, the Energy Production and Utility Corridors Element of the CDCA Plan would be modified as a Category 3 Amendment to prohibit the siting of a future solar energy project on the project site.

## **2.9 Comparison of the Proposed Action and the Alternatives**

Table 2-12 compares the project footprint and project features associated with the Proposed Action and with the other action, the No Action, and the LUP amendment alternatives discussed in this FEIS.

The range of alternatives identified includes alternatives that are not within the lead agency's (BLM's ) jurisdiction, as well as the No Action Alternative. The range of alternatives evaluated in the FEIS encompasses those to be considered by the ultimate agency decision maker (40 CFR 1502.2[e]). The evaluation in this section includes whether the alternative is reasonable, whether it will accomplish the purpose and need for the proposed action, as well as whether it would result in the avoidance or minimization of impacts caused by the proposed action. This screening-level analysis is intended to identify the range of reasonable alternatives; the analysis also includes a resource-by-resource evaluation of environmental impacts of most of the potential alternatives.

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**Table 2-12 Comparison of the Proposed Action and Alternatives**

	<b>Alternative 1: Proposed Action</b>	<b>Alternative 1a: Agency Preferred Alternative</b>	<b>Alternative 2: Reduced Acreage Alternative</b>	<b>Alternative 3: Avoidance of Donated and Acquired Lands Alternative</b>	<b>Alternative 4: No Action: Deny Calico Solar/No CDCA Plan Amendment</b>	<b>Alternative 5: LUP Amendment: Deny Calico Solar/CDCA Plan Amendment to Allow Other Solar Energy Projects</b>	<b>Alternative 6: LUP Amendment: Deny Calico Solar/CDCA Plan Amendment to Prohibit Other Solar Energy Projects</b>
Project size	8,230 acres Phase I: 2,320 acres Phase II: 5,910 acres	6,215 acres Phase I: 2,320 acres Phase II: 3,895 acres	2,600 acres, one phase	7,050 acres Phase I: 2,320 acres Phase II: 4,730 acres	Not applicable	Unknown	Not applicable
Generation Capacity	850 MW	850 MW	275 MW	850 MW	0	Unknown	None
SunCatchers	Total: 34,000 Phase I: 11,000 Phase II: 23,000	Total: 34,000 Phase I: 11,000 Phase II: 23,000	Total: 11,000	Total: 34,000 Phase I: 11,000 Phase II: 23,000	0	0 (assumes alternate technology)	0
Phased Generation Capacity	Phase I: 275 MW Phase II: 575 MW	Phase I: 275 MW Phase II: 575 MW	275 MW	Phase I: 275 MW Phase II: 575 MW	0	Unknown	0
Boundary Fencing length	39 miles	29.5 miles	9.4 miles	33 miles	0	Unknown	0
On-site access roads	13 miles, 48.5 acres	10 miles, 36.4 acres	3.2 miles, 12 acres	11 miles, 41 acres	0	Unknown	0
SunCatcher maintenance roads	390 miles, 864 acres	293 miles, 649 acres	94 miles, 208 acres	293 miles, 649 acres	0	Unknown	0
Perimeter roads	39 miles, 105 acres	29.5 miles, 78.7 acres	9.4 miles, 25 acres	33 miles, 88 acres	0	Unknown	0
600-V underground electrical system	576 miles, 50 acres	Same as Proposed Action	184 miles, 16 acres	Same as Proposed Action	0	Unknown	0
34.5-kV underground electrical system	45 miles, 35 acres	Same as Proposed Action	14 miles, 11 acres	Same as Proposed Action	0	Unknown	0
Underground hydrogen lines (centralized option)	576 miles, 50 acres	Same as Proposed Action	184 miles, 16 acres	Same as Proposed Action	0	Unknown	0
Total disturbed land area (Includes Main Services Complex, construction laydown area, Calico Substation, transmission lines, and all other common facilities)	Construction disturbance: 4,602 acres Permanent disturbance: 4,411 acres	Construction disturbance: 4,337 acres Permanent disturbance: 4,151 acres	Construction disturbance: 1,454 acres Permanent disturbance: 1,371 acres	Construction disturbance: 4,354 acres Permanent disturbance: 4,167 acres	0	Unknown	0
Total annual water use	Construction: 136 acre-feet Operations: 20 acre-feet	Same as Proposed Action	Construction: 136 acre-feet Operations: 9 acre-feet	Same as Proposed Action	0	Unknown	0

	<b>Alternative 1: Proposed Action</b>	<b>Alternative 1a: Agency Preferred Alternative</b>	<b>Alternative 2: Reduced Acreage Alternative</b>	<b>Alternative 3: Avoidance of Donated and Acquired Lands Alternative</b>	<b>Alternative 4: No Action: Deny Calico Solar/No CDCA Plan Amendment</b>	<b>Alternative 5: LUP Amendment: Deny Calico Solar/CDCA Plan Amendment to Allow Other Solar Energy Projects</b>	<b>Alternative 6: LUP Amendment: Deny Calico Solar/CDCA Plan Amendment to Prohibit Other Solar Energy Projects</b>
Peak daily operation water use	69.8 gallons/minute	Same as Proposed Action	34.5 gallons/minute	Same as Proposed Action	0	Unknown	0
CDCA Plan Amendment required	Yes	Yes	Yes	Yes	No	Yes	Yes
Amendment to CDCA Plan Energy Production and Utility Corridors Element	Element would be amended to allow an 8,230-acre, 850-MW Calico Solar Project on the project site, including a 2.0-mile interconnecting transmission line	Element would be amended to allow a 6,215-acre, 850-MW Calico Solar Project on the project site, including a 2.0-mile interconnecting transmission line	Element would be amended to allow a 2,600-acre, 275-MW Calico Solar Project on the project site, including a 2.0-mile interconnecting transmission line	Element would be amended to allow a 7,050-acre, 850-MW Calico Solar Project on the project site, including a 2.0-mile interconnecting transmission line	No change to Element	Element would be amended to allow other solar energy projects on the project site	Element would be amended to prohibit other solar energy projects on the project site

Source: Modified from Tessera Solar 2010a; 2010b, unpublished data; BLM and CEC 2010.

Table Key: CDCA = California Desert Conservation Area; kV = kilovolts; LUP = land use plan; MW = megawatts; V = volts. Alternatives Considered but Eliminated from Detailed Analysis

In addition to the action, no action, and land use plan alternatives previously discussed in this chapter and evaluated as reasonable alternatives as part of this FEIS, a number of other alternative sites and renewable and conventional energy generation technologies were considered in SA/DEIS, as well as conservation and demand-side management. These alternatives are described briefly in this chapter but were eliminated from detailed analysis if any of the following criteria from the BLM NEPA Handbook H-1790-1 (BLM 2008) apply:

- (1) It is ineffective (it would not respond to BLM's purpose and need).
- (2) It is technically or economically infeasible.
- (3) It is inconsistent with the basic policy objectives for the management of the area (not conforming to BLM's CDCA Plan).
- (4) Its implementation is remote or speculative.
- (5) It is substantially similar in design to an alternative that is analyzed.
- (6) It would have substantially similar effects to an alternative that is analyzed.

This process for eliminating these alternatives from detailed analysis complies with 40 Code of Federal Regulations (CFR) 1502.14(a) of CEQ regulations. The rationale for elimination is summarized in Table 2-13.

### **2.9.1 The Private Lands Alternative**

One site alternative, the Private Lands Alternative (Figure 2-12), was evaluated in the SA/DEIS but not carried forward for detailed analysis by the BLM under NEPA. The BLM considers the Private Lands Alternative as essentially equivalent to the No Action Alternative for the purposes of this NEPA analysis.

A private land alternative is not a reasonable alternative to the BLM since analysis in this EIS of such an alternative, over which BLM has no discretionary approval authority, would not present an analysis of impacts in a form that would define issues or provide a basis for choice in a manner any different than the No Action Alternative, which is fully considered in this document. Impacts on public land resources would not occur if the project was located on private land just as impacts on public land resources would not occur if the No Action Alternative was approved (and the project was denied). In addition, since the BLM's responsibility related to the proposed action in this EIS is whether to approve, or deny, or approve with modification an application for a Solar Project to be sited on public land, analysis of a private land alternative would be outside the scope of the analysis. Finally, approval of any specific private land alternative would be remote and speculative. The northern section of the Private Lands Alternative that was analyzed by the

State is made up of approximately 64 parcels with 27 separate landowners. The southern portion of the Private Lands Alternative is made up of 45 parcels with 22 separate landowners. Due to the highly fragmented land ownership pattern, development of these sections would be impractical and uneconomical. Because the BLM has no approval jurisdiction over such an alternative and since no application is before the CEC, and/or the County of San Bernardino, the BLM determined the private land alternative to be speculative and remote.

Scoping comments suggested consideration of alternative sites and technologies for the Calico Solar Project as a means to reduce the project impacts on undisturbed land and desert environments. In a written scoping letter received from the Defenders of Wildlife, the organization requested consideration of an alternative that would involve the use of existing degraded lands. An area west of the project site in the vicinity of Daggett/Yermo/Newberry Springs was suggested because of the presence of many agricultural fields and brownfields. The Private Lands Alternative was developed in response to these comments.

The SA/DEIS analysis concluded that the Private Lands Alternative would have impacts similar to the Proposed Action for air quality, hazardous materials management, recreation, public health, socioeconomics, transmission line safety and nuisance, waste management, worker safety and fire protection, facility design, power plant efficiency, geology and paleontology, and power plant reliability.

The SA/DEIS concluded that impacts from the Private Lands Alternative would be less than for the Proposed Action for biological resources, cultural resources, visual resources and, potentially, for transmission system engineering. The Private Lands Alternative would be less preferred than the proposed Calico Solar Project site for land use, in that it would displace more valuable agricultural uses, and for noise impacts due to the proximity of residential uses.

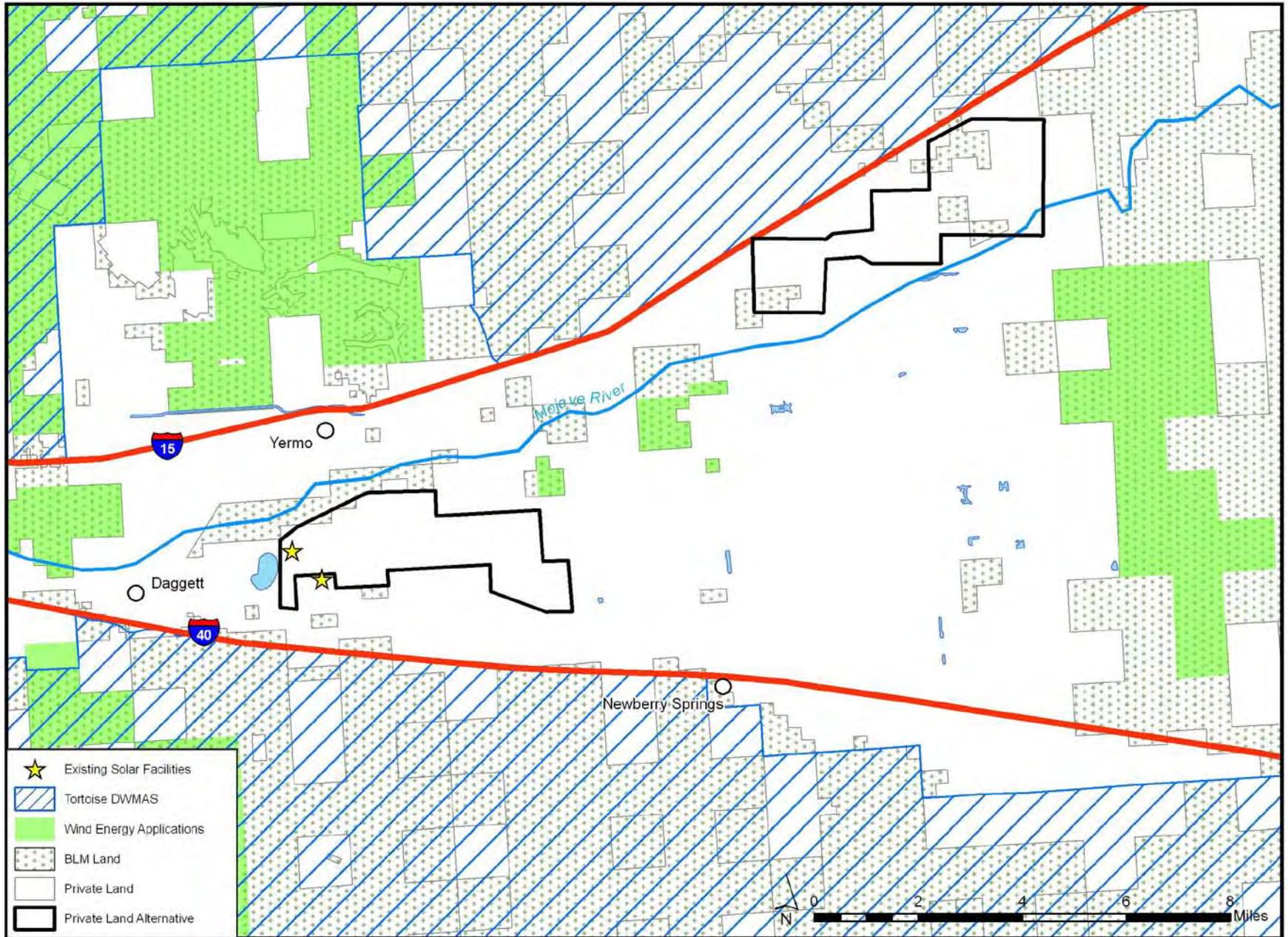
The SA/DEIS analysis also concluded that impacts on soils and water for the Private Lands Alternative would be similar to those for the Proposed Action. The SA/DEIS analysis assumed that groundwater would be available at the Private Lands Alternative site, and that water for existing irrigated agricultural uses on the site would be converted to industrial use for the solar power project.

For additional information about the Private Lands Alternative, consult Section B.2.7 of the SA/DEIS.

**ALTERNATIVES - FIGURE 2-12**  
**Calico Solar Project - Private Land Alternative**

AUGUST 2010

ALTERNATIVES



SOURCE: CEC, Tele Atlas Data, San Bernardino County

## 2.9.2 Other Alternatives Considered but Eliminated from Detailed Analysis

In addition to the Private Lands Alternative, several other sites and a number of renewable and nonrenewable technologies were also not carried forward for detailed analysis based on criteria in Section 6.6.3 of the BLM NEPA Handbook H-1790-1 (BLM 2008). Those alternatives are briefly described in Table 2-13 including the rationale for why they were eliminated from detailed analysis.

**Table 2-13 Alternatives Eliminated from Detailed Analysis**

<b>Alternative</b>	<b>Description of Alternative</b>	<b>Rationale for Elimination from Detailed Analysis</b>
Private Land Alternative	The Private Land Alternative is made up of two separate and unconnected sections of disturbed land appropriate for solar development. The sections are located between I-15 on the north and I-40 on the south. The northern section has a total of approximately 64 parcels (27 separate landowners) making up approximately 4,000 acres. The southern section has a total of approximately 45 parcels (22 separate landowners), also comprising approximately 4,000 acres.	This alternative is ineffective in responding to the BLM's purpose and need to construct, operate and decommission a solar thermal facility on public lands; is economically infeasible, the alternative is remote and speculative as noted above.
<b>Public Land Alternatives</b>		
Camp Rock Road (AS1)	The Camp Rock Road site was identified by the Applicant in the AFC as a potential alternative site. The site is located on nine sections, southwest of T6NR2E north of Camp Rock Road and bisected by an existing transmission line corridor. Two of the sections in the alternative site were acquired by federal LWCF. The site is located adjacent to and partially on the 154,700-acre Johnson Valley OHV Area. All forms of motorized vehicle use are allowed within the boundaries of the area which include staging and camping areas. Competitive events are often held in Johnson Valley. Slopes at the site range from 3 to 6 percent. Existing access to the site is from a county-maintained road although access would require an additional 3-mile access road to Harrod Road. Additionally, there is no railroad within 10 miles. The entire site is classified as Category I Desert Tortoise habitat and is within the Ord-Rodman DWMA.	The Camp Rock Road Alternative was eliminated from detailed analysis because it is located in Category I desert tortoise habitat; is within the Ord-Rodman DWMA; is partially located in the Johnson Valley OHV area; and would require use of LWCF acquisition lands. It is therefore inconsistent with the basic policy objectives for management of the Ord-Rodman DWMA and Johnson Valley OHV area.

<b>Alternative</b>	<b>Description of Alternative</b>	<b>Rationale for Elimination from Detailed Analysis</b>
Upper Johnson Valley (AS2)	The Upper Johnson Valley was identified by the Applicant in the AFC as a potential alternative site. The site is located east of Lucerne Valley and north of Bessemer Mine Road on nine sections, three of which are owned by SCE. The site is located on Category III desert tortoise habitat. Slopes range from 3 to 5 percent. Access to the site would be from a county-maintained road and require an additional 9.5-mile access road to State Highway 247. There is no railroad within 10 miles of the site. Six sections of land within the site are part of the Upper Johnson Valley OHV Area and would be entirely surrounded by the OHV area. It would be located 8 miles east of Marine Corps Air Ground Combat Center Twentynine Palms (Twentynine Palms).	The Upper Johnson Valley Alternative was eliminated from detailed analysis because it is partially located within, and is surrounded by, the Upper Johnson Valley OHV Area; and lacks railroad and major highway access. It is therefore inconsistent with the basic policy objectives for management of the Johnson Valley OHV area. The lack of adequate access also makes it economically infeasible.
West of Twentynine Palms Military Base (AS3)	The West of Twentynine Palms Military Base site was identified by the Applicant in the AFC as a potential alternative site. It is located on eight sections of land that are part of the Upper Johnson Valley OHV Area and would be entirely surrounded by the OHV area. The site is immediately west of Twentynine Palms and two of the sections were acquired by federal LWCF. Twentynine Palms is currently considering and preparing an EIS for a Training Land/Airspace Acquisition Study. The West of Twentynine Palms Military Base Alternative site would be located within the West Study Area. Access to the site would require an 11.5-mile access road to I-40. Additionally, there is no railroad within 10 miles of the site. The alternative site was not located in any identified critical habitat land.	The West of Twentynine Palms Alternative was eliminated from detailed analysis because it is partially located within, and is surrounded by, the Upper Johnson Valley OHV Area; lacks railroad and major highway access; would require the use of LWCF lands; and is within the study area for Twentynine Palms expansion. It is therefore inconsistent with the basic policy objectives for management of the Johnson Valley OHV area. The lack of adequate access also makes it economically infeasible.
I-40 South (AS4)	The I-40 South site is located on 12 sections of land both federal and private. The site is traversed by the Lugo-Pisgah No. 2 transmission line and is located approximately 2 miles south of I-40. Access to the site would require a 0.5-mile access road to I-40. Slopes at the site range from 3 to 5 percent. Three sections of the alternative site are located within the Ord-Rodman DWMA of desert tortoise critical habitat which would limit their use for energy development. Three existing mining claims are located within one mile of the alternative site, and access roads to the existing mines cross the site. The project would be located on approximately 3 miles of the Pisgah Crater Lava Flow.	The I-40 South Alternative was eliminated from detailed analysis because it is located in the Ord Rodman unit of desert tortoise critical habitat; would impact approximately 3 miles of the Pisgah Crater Lava Flow, and would potentially impact access to three existing mines. It is therefore inconsistent with the basic policy objectives for management of the Ord-Rodman DWMA.

<b>Alternative</b>	<b>Description of Alternative</b>	<b>Rationale for Elimination from Detailed Analysis</b>
Broadwell Lake (AS5)	The Broadwell Lake Alternative site was considered because it is near the SCE Lugo-Pisgah No. 2 transmission line. The site is located on 12 sections of BLM land approximately 9 miles north of I-40, and approximately 5 miles east of the proposed Calico Solar Project site. The Broadwell Lake site would be within the proposed Mojave Trails National Monument. In 2007, DPT Broadwell Lake LLC submitted an application to the BLM for a ROW on most of the land in the site for a power tower solar thermal generating facility.	The Broadwell Lake Alternative has a pending solar thermal power plant ROW application ahead of Calico Solar LLC in the queue. It was eliminated from further analysis because it would have substantially similar environmental effects to the Proposed Action.
SES Solar Three Alternative	The SES Solar Three site was considered in conjunction with the Reduced Acreage Alternative because it would allow for additional development of solar power while avoiding resources of greatest concern. In November 2006, SES Inc. Solar Three, LLC filed an application with the BLM for use of 6,779 acres of land immediately west of Calico Solar Project.	The SES Solar Three alternative has a pending solar thermal power plant ROW application ahead of Calico Solar LLC in the queue. It was eliminated from further analysis because it would have substantially similar environmental effects to the Proposed Action.
<b>Solar Generation Technology Alternatives</b>		
Parabolic Trough	A parabolic trough system converts solar radiation to electricity by using sunlight to heat a fluid, such as oil, which is then used to generate steam. The plant consists of a large field of trough-shaped solar collectors arranged in parallel rows, normally aligned on a north-south horizontal axis. A parabolic trough power plant would include parabolic trough collectors, solar boilers, heat transfer fluid oil heater. It would require approximately 5 to 8 acres of land per MW of power generated, approximately 4,250 to 6,800 acres for an 850 MW facility.	The parabolic trough technology on the project site was eliminated from detailed analysis because it would require the entire site to be graded. Additionally a solar trough project would require approximately 600 acre-feet/year of water per 100 MW of capacity if wet cooling is used and 18 acre-feet/year of water per 100 MW if dry cooling is used. Solar trough technology also poses a risk of spills of hazardous material into soil or water from the transfer fluid conveyed in pipelines from the parabolic collectors to the solar boiler. The parabolic trough technology was therefore eliminated because it would result in a greater environmental effects than the proposed SunCatcher technology.

<b>Alternative</b>	<b>Description of Alternative</b>	<b>Rationale for Elimination from Detailed Analysis</b>
Solar Power Tower	<p>Solar power tower technology converts thermal energy to electricity by using heliostat (mirror) fields to focus energy on a boiler located on power tower receivers near the center of each heliostat array. The solar power towers can be up to 459 feet tall with additional 10-foot-tall lightning rods. In general, a solar power tower plant requires 5 to 10 acres of land per MW of power generated. An 850-MW solar power tower field would require from 4,250 acres to 8,500 acres of land.</p>	<p>Solar power tower technology on the project site was eliminated from detailed analysis because it would have substantially similar environmental effects to the Proposed Action. In addition, the towers are substantially taller than the SunCatchers and project features and could conflict with aviation and military activities. It would be in the Department of Defense Airspace Consultation Area for the nearby Twentynine Palms installation, and could be inconsistent with basic policy objectives for the management of this area.</p>
Linear Fresnel	<p>A solar linear Fresnel power plant converts solar radiation to electricity by using flat moving mirrors to follow the path of the sun and reflect its heat on the fixed pipe receivers located about the mirrors. During daylight hours, the solar concentrators focus heat on the receivers to produce steam, which is collected in a piping system and delivered to steam drums located in a solar field and then transferred to steam drums in a power block. The steam drums transferred to the power block will be used to turn steam turbine generators and produce electricity. The steam is then cooled, condensed into water, and re-circulated back into the process. An 850-MW solar linear Fresnel field would require nearly 4,000 acres of land.</p>	<p>The solar linear Fresnel power plant technology was eliminated from detailed analysis because it would have substantially similar environmental effects to the Proposed Action. The technology also has not been demonstrated to be feasible for utility scale power production, and implementation is therefore remote or speculative.</p>
Solar Photovoltaic (Utility-Scale)	<p>A utility-scale solar PV power generation facility would consist of PV panels that would absorb solar radiation and convert it directly to electricity. For this analysis, a utility-scale project would consist of any solar PV facilities that would require transmission to reach the load center, or center of use.</p> <p>The land requirement for PV facilities varies from approximately 3 acres per MW of capacity for crystalline silicon to more than 10 acres per MW produced for thin film and tracking technologies. An 850-MW solar PV power plant would require between 2,550 and 8,500 acres.</p> <p>Utility-scale solar PV installations require land with less than a 3 percent slope. Solar PVs only require water for only for washing the solar PV arrays.</p>	<p>The utility-scale solar PV technology was eliminated from detailed analysis because it would require the entire site to be graded. This would result in a greater effect on biological and cultural resources than the Calico Solar Project, which would not require grading the entire site. It would therefore have greater environmental effects than the Proposed Action.</p>

<b>Alternative</b>	<b>Description of Alternative</b>	<b>Rationale for Elimination from Detailed Analysis</b>
Distributed Solar	A distributed solar alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on building rooftops or in other disturbed areas such as parking lots or adjacent to existing substations. Installations of 850-MW distributed solar PV panels would require up to approximately 5,700 acres.	This alternative was eliminated because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement.
Wind	Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which would then feed alternating current into the existing utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. A single 1.5-MW turbine operating at a 40 capacity factor generates 2,100 MW annually. Approximately 4,250 to 14,450 acres of land would be required for an 850-MW wind electricity power plant. Wind turbines are often over 400 feet high for 2-MW turbines.	This alternative was eliminated because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, a wind project would have substantially similar environmental effects to the Proposed Action.
Geothermal	Geothermal technologies use steam or high-temperature water from naturally occurring geothermal reservoirs to drive steam turbines or generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are used to extract energy from the high-temperature water. It is expected that 10 to 15 small projects would be required to achieve 850 MW of geothermal energy.	This alternative was eliminated because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement due to the need for multiple siting and environmental review processes to achieve the same output of energy.
Biomass	Biomass energy generation creates electricity by burning organic fuels in a boiler to produce steam, which then turns a turbine. Biomass can also be converted into a fuel gas such as methane and burned to generate power. Wood is the most commonly used biomass for power generation. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Techniques to convert these fuels to electricity include direct combustion, gasification, and anaerobic fermentation. Biomass facilities do not require the extensive amount of land required by other renewable energy sources, but they generate only small amounts of electricity, in the range of 3 to 10 MW.	This alternative was eliminated because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement due to the need for multiple siting and environmental review processes to achieve the same output of energy.

<b>Alternative</b>	<b>Description of Alternative</b>	<b>Rationale for Elimination from Detailed Analysis</b>
Tidal	The oldest technology to harness tidal power for the generation of electricity involves building a dam, known as a barrage, across a bay or estuary that has large differences in elevation between high and low tides. Water retained behind a dam at high tide generates a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines. To produce practical amounts of power for tidal barrages, a difference between high and low tides of at least 5 meters is required.	Tidal technology was eliminated from detailed analysis because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition it would likely be economically infeasible, and remote and speculative, for the Applicant to implement.
Wave	Wave power technologies have been used for nearly 30 years. Setbacks and a general lack of confidence have contributed to slow progress towards proven devices that would have a good probability of becoming commercial sources of electrical power using wave energy. The highest energy waves are concentrated off the western coasts of the United States in the 40 to 60 degree latitudes range north and south. The power in the wave fronts varies in these areas between 30 and 70 kilowatts per meter with peaks to 100 kilowatts per meter. Many wave energy devices are still in the research and development stage, and would require large amounts of capital to get started.	Wave power technology was eliminated from detailed analysis because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition it would likely be economically infeasible, and remote and speculative, for the Applicant to implement.
<b>Nonrenewable Technology Alternatives</b>		
Natural gas	Natural gas power plants typically consist of combustion turbine generators, heat recovery steam generators, a steam turbine generator, wet or dry cooling towers, and associated support equipment. An interconnection with a natural gas pipeline, a water supply, and electric transmission are also required. A gas-fired power plant generating 850 MW would generally require less than 90 acres of land.	This fossil fuel technology was eliminated from detailed analysis because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. Additionally, it is inconsistent with BLM's and the State of California's guidance concerning renewable energy.
Coal	Traditional coal-fired plants generate large amounts of greenhouse gases. New clean coal technology includes a variety of energy processes that reduce air emissions and other pollutants from coal-burning power plants. The Clean Coal Power Initiative is providing government co-financing for new coal technologies that help utilities meet the Clear Skies Initiative to cut sulfur, nitrogen, and mercury pollutants by nearly 70 percent by 2018. However, these technologies are not yet in use.	This fossil fuel technology was eliminated from detailed analysis because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. Additionally, it is inconsistent with BLM's and the State of California's guidance concerning renewable energy.

Alternative	Description of Alternative	Rationale for Elimination from Detailed Analysis
Nuclear Energy	Due to environmental and safety concerns, California law currently prohibits the construction of new nuclear power plants in the state until the CEC finds that the federal government has approved and there exists demonstrated technology for the permanent disposal of spent fuel from these facilities.	Nuclear technology was eliminated from detailed analysis because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand. Additionally, because it is currently prohibited in California, its implementation is remote and speculative.
Conservation and Demand-Side Management	Conservation and demand-side management consist of a variety of approaches to reduce electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution.	This alternative was eliminated from detailed analysis because it is ineffective in responding to the BLM's purpose and need to respond to the application at hand.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* AFC = Application for Certification; BLM = Bureau of Land Management; CEC = California Energy Commission; DWMA = Desert Wildlife Management Area; EIS = environmental impact statement; I-15 = Interstate 15; I-40 = Interstate 40; LLC = limited liability company; LWCF = Land and Water Conservation Fund; MW = megawatts; OHV = off-highway vehicle; PV = photovoltaic; ROW = right-of-way; SCE = Southern California Edison; SES = Stirling Energy Systems; Twentynine Palms = Marine Corps Air Ground Combat Center at Twentynine Palms.

## 2.10 Environmentally Preferred Alternative

When the BLM prepares its ROD for the proposed Calico Solar project based on this FEIS, it is required to identify all alternatives considered in reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable (40 CFR 1505.2[b]). The environmentally preferable alternative is the alternative that would promote the national environmental policy as expressed in NEPA Section 101 (46 FR 18026). The BLM considers the Agency Preferred Alternative (Alternative 1a) to be the Environmentally Preferred Alternative.

# Chapter 3

## Affected Environment

### 3.1 Introduction

This chapter describes the existing condition of the resources, resource uses, and other features of the environment that could be affected by the alternatives selected for analysis. The affected environment serves as the baseline of existing conditions from which the impacts of the alternatives are analyzed.

#### 3.1.1 Weather/Topography

The Mojave Desert portion of San Bernardino County has a typical desert climate characterized by low precipitation, hot summers, mild winters, low humidity, and strong temperature inversions. Total rainfall in Barstow, California, which is approximately 37 miles west of the project site, averages 4.33 inches per year with about 74 percent of total rainfall occurring during the winter rainy season and 20 percent occurring during late summer and early fall thunderstorms (Western Regional Climate Center [WRCC] 2010). The Mojave Desert is in the rain shadow of several mountain groups, including the San Gabriel, San Bernardino, and Tehachapi Mountains, which greatly reduce the winter season rainfall in comparison with coastal and mountain areas. The highest average monthly temperature is 103 degrees Fahrenheit in July and the lowest average monthly temperature is 33 degrees Fahrenheit in December (WRCC 2010).

### 3.2 Air Quality and Climate

This section describes the existing conditions in the project vicinity as related to air quality. This section was developed from Section C.1, Air Quality, of the SA/DEIS.

#### 3.2.1 Definition of Resource

Air quality is influenced by a number of conditions and activities that cause air pollution. The primary factors that influence air quality in the area of analysis are the locations of air pollution sources, the amounts and chemical characteristics of the pollutants emitted, the topography of the region, and local meteorological conditions.

### 3.2.2 Environmental Setting and Existing Conditions

The project site is located in the Mojave Desert region of San Bernardino County, California, and is surrounded by mountainous terrain. The Mojave Desert is in the rain shadow of several mountain groups including the San Gabriel, San Bernardino, and Tehachapi Mountains, which greatly reduces the winter season rainfall compared to coastal and mountain areas to the south and west.

The highest average monthly temperature is 103 degrees Fahrenheit in July and the lowest average monthly temperature is 33 degrees Fahrenheit in December (WC 2009). During all seasons, the prevailing winds are predominantly from the west-northwest through the west-southwest, with the highest single wind direction frequency being overwhelmingly from the west. This pattern is apparent from the annual wind rose for the Barstow-Daggett Airport from 2003 to 2007 (SES 2008).

### 3.2.3 Applicable Laws, Regulations, Plans, and Policies

As directed by the federal Clean Air Act (CAA), the EPA has established National Ambient Air Quality Standards (NAAQS) for seven “criteria” pollutants. These standards were adopted by the EPA to protect public health (primary standards) and public welfare (secondary standards). The seven pollutants are carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), inhalable particulate matter (PM<sub>10</sub>), fine particulate matter (PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), and lead (Pb). States are required to adopt standards that are at least as stringent as the NAAQS. Under Section 176 of the CAA and as required by 40 CFR 93 Subpart B, there are requirements for any projects that must obtain a federal permit in nonattainment areas. The project must adhere to general conformity (also referred to as federal conformity) to ensure conformity with the NAAQS and the State Implementation Plan (SIP).

The ambient air quality standards (AAQS), established by the California Air Resources Board (CARB), are typically more stringent than the NAAQS. In addition, the CARB has established AAQS for four additional pollutants including sulfates (SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), vinyl chloride (chloroethene), and visibility-reducing particulates. Table 3-1 lists the federal and state air quality standards.

**Table 3-1 Federal and State Ambient Air Quality Standards**

Pollutant	Averaging Time	Federal Standard	California Standard
O <sub>3</sub>	8 hours	0.075 ppm (147 µg/m <sup>3</sup> ) [Table Note 1]	0.070 ppm (137 µg/m <sup>3</sup> )
O <sub>3</sub>	1 hour	Not applicable	0.09 ppm (180 µg/m <sup>3</sup> )
CO	8 hours	9 ppm (10 mg/m <sup>3</sup> )	9.0 ppm (10 mg/m <sup>3</sup> )
CO	1 hour	35 ppm (40 mg/m <sup>3</sup> )	20 ppm (23 mg/m <sup>3</sup> )

Pollutant	Averaging Time	Federal Standard	California Standard
NO <sub>2</sub>	Annual	0.053 ppm (100 µg/m <sup>3</sup> )	0.03 ppm (57 µg/m <sup>3</sup> )
NO <sub>2</sub>	1 hour	0.100 ppm (188 µg/m <sup>3</sup> ) [Table Note 2]	0.18 ppm (339 µg/m <sup>3</sup> )
SO <sub>2</sub>	Annual	0.030 ppm (80 µg/m <sup>3</sup> )	Not applicable
SO <sub>2</sub>	24 hours	0.14 ppm (365 µg/m <sup>3</sup> )	0.04 ppm (105 µg/m <sup>3</sup> )
SO <sub>2</sub>	3 hours	0.5 ppm (1,300 µg/m <sup>3</sup> )	Not applicable
SO <sub>2</sub>	1 hour	Not applicable	0.25 ppm (655 µg/m <sup>3</sup> )
PM <sub>10</sub>	Annual	Not applicable	20 µg/m <sup>3</sup>
PM <sub>10</sub>	24 hours	150 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>
PM <sub>2.5</sub>	Annual	15 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>
PM <sub>2.5</sub>	24 hours	35 µg/m <sup>3</sup>	Not applicable
Pb	30-day average	Not applicable	1.5 µg/m <sup>3</sup>
Pb	Calendar quarter	1.5 µg/m <sup>3</sup>	Not applicable
SO <sub>4</sub>	24 hours	Not applicable	25 µg/m <sup>3</sup>
H <sub>2</sub> S	1 hour	Not applicable	0.03 ppm (42 µg/m <sup>3</sup> )
Chloroethene	24 hours	Not applicable	0.01 ppm (42 µg/m <sup>3</sup> )
Visibility-reducing particulates	8 hours	Not applicable	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

Table Source: CARB 2009a.

Table Note 1: This is the 2008 standard, but as of September 16, 2009, this standard is being reconsidered. In January 2010, EPA published a proposed rule to lower the standard to the 0.060- to 0.070-ppm range.

Table Note 2: EPA published the final rule establishing this new standard on February 9, 2010, stating that it is effective as of 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. Because this regulation is new, no areas in the United States are in nonattainment for this federal standard, nor have SIPs been developed for this standard yet.

Table Key: O<sub>3</sub> = ozone; CO = carbon monoxide; NO<sub>2</sub> = nitrogen dioxide; SO<sub>2</sub> = sulfur dioxide; PM<sub>10</sub> = inhalable particulate matter; PM<sub>2.5</sub> = fine particulate matter; Pb = lead; SO<sub>4</sub> = sulfates; H<sub>2</sub>S = hydrogen sulfide; chloroethene = vinyl chloride; ppm = parts per million; mg/m<sup>3</sup> = milligram per cubic meter; µg/m<sup>3</sup> = micrograms per cubic meter; CARB = California Air Resources Board; EPA = Environmental Protection Agency; SIPs = state implementation plans.

Based on the adopted air quality standards, the CAA requires that states classify air basins as either in attainment or nonattainment with respect to the criteria pollutants. The classifications are defined below.

- **Attainment Area:** This is a geographic or politically delineated air basin that meets the NAAQS for criteria pollutants.

- *Nonattainment Area:* This is a geographic or politically delineated air basin that does not meet the NAAQS for one or more pollutants. Nonattainment areas/states are required to formulate and submit SIPs to the EPA that outline those measures the state will implement to attain and maintain the NAAQS.
- *Serious Nonattainment Area:* All PM<sub>10</sub> nonattainment areas were initially classified as moderate and were assigned an attainment date of December 31, 1994. A moderate attainment area can subsequently be reclassified as a serious nonattainment area if EPA determines that the area cannot “practicably” attain the PM<sub>10</sub> NAAQS by the attainment date or, following the passage of the original attainment date, if EPA determines that the area has failed to attain the standard.
- *Unclassifiable:* This is an area that lacks sufficient monitoring data. Unclassifiable areas are conservatively managed as if they were in attainment in order to maintain or improve existing air quality.
- *Maintenance Area:* This is an area that was previously in nonattainment but that has achieved attainment of the NAAQS, as demonstrated by recent data.

A particular geographic region may be designated as an attainment area for some pollutants and as a nonattainment area for others. The Mojave Desert Air Quality Management District (MDAQMD) has designated the portion of the Mojave Desert Air Basin (MDAB) surrounding the project site as a nonattainment area for the federal and state O<sub>3</sub> and PM<sub>10</sub> standards and the state PM<sub>2.5</sub> standard (MDAQMD 2010). This area is in attainment or unclassified for the federal and state CO, NO<sub>2</sub>, and SO<sub>2</sub> standards and the federal PM<sub>2.5</sub> standards. Table 3-2 summarizes the status of the air quality designations for San Bernardino County.

**Table 3-2 Federal and State Attainment Status for San Bernardino County**

Pollutant	Federal Attainment Status	State Attainment Status
O <sub>3</sub>	Moderate nonattainment	Moderate nonattainment
CO	Attainment	Attainment
NO <sub>2</sub>	Attainment [Table Note 1]	Attainment
SO <sub>2</sub>	Attainment	Attainment
PM <sub>10</sub>	Moderate nonattainment	Nonattainment
PM <sub>2.5</sub>	Attainment	Nonattainment
Pb	[Table Note 2]	[Table Note 2]

*Table Source:* CARB 2009b; EPA 2009a.

*Table General Note:* “Attainment status” means attainment or unclassified.

*Table Note 1:* Attainment status for the new federal 1-hour NO<sub>2</sub> standard is scheduled to be determined by January 2012.

*Table Note 2:* Data on Pb emissions are not collected at the monitoring stations located in or near the project area.

*Table Key:* O<sub>3</sub> = ozone; CO = carbon monoxide; NO<sub>2</sub> = nitrogen dioxide; PM<sub>2.5</sub> = fine particulate matter; PM<sub>10</sub> = inhalable particulate matter; Pb = lead; SO<sub>2</sub> = sulfur dioxide; CARB = California Air Resources Board; EPA = Environmental Protection Agency.

### 3.2.4 Current CDCA Plan

The CDCA Plan contains guidelines pertaining to air quality as described below (BLM 1999). The guidelines are the same for Multiple-Use Class L and Class M land, and state that the “. . . areas will be managed to protect their air quality and visibility in accordance with Class II objectives of Part C of the Clean Air Act Amendments unless otherwise designated another class by the State of California as a result of recommendations developed by any BLM air-quality management plan.”

There is no element pertaining to air quality in the CDCA Plan.

### 3.2.5 Existing Air Quality

Ambient air quality monitoring data for O<sub>3</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO, NO<sub>2</sub>, and SO<sub>2</sub>, compared to most restrictive applicable standards from 2003 to 2008 (the last year that the complete annual data is currently available) at the most representative monitoring stations for each pollutant are shown in Figure A-1, and the 1-hour and 8-hour O<sub>3</sub>, and 24-hour PM<sub>10</sub> and PM<sub>2.5</sub> data for 1999 to 2008 are shown in Table 3-3. All data, except PM<sub>2.5</sub> and sulfur-oxygen compounds (SO<sub>x</sub>) data, are from the Barstow monitoring station. PM<sub>2.5</sub> data for 1999 are from Victorville-Amargosa Road monitoring station, and PM<sub>2.5</sub> data for 2000 to 2008 and all SO<sub>x</sub> data are from the Victorville-14306 Park Avenue monitoring station.

**Table 3-3 Criteria Pollutant Summary Maximum Ambient Concentrations**

Pollutant	Averaging Period	Units	2003	2004	2005	2006	2007	2008	Limiting AAQS [Table Note 1]
O <sub>3</sub>	1 hour	ppm	0.105	0.1	0.099	0.112	0.099	0.104	0.09
O <sub>3</sub>	8 hours	ppm	0.095	0.083	0.092	0.094	0.088	0.096	0.07
PM <sub>10</sub> [Table Note 2]	24 hours	µg/m <sup>3</sup>	143	40	78	80	47	50	50
PM <sub>10</sub>	Annual	µg/m <sup>3</sup>	25.7	21.3	25.4	21.9	29.8	26.1	20
PM <sub>2.5</sub> [Table Note 2]	24 hours	µg/m <sup>3</sup>	28	34	27	22	28	17	35
PM <sub>2.5</sub>	Annual	µg/m <sup>3</sup>	NA	10.8	NA	10.3	9.7	NA	12
CO	1 hour	ppm	2.7	1.6	3.3	3.5	1.4	1.4	20
CO	8 hours	ppm	1.51	1.18	1.34	1.19	0.7	1.23	9.0

Pollutant	Averaging Period	Units	2003	2004	2005	2006	2007	2008	Limiting AAQS [Table Note 1]
NO <sub>2</sub>	1 hour	ppm	0.095	0.101	0.087	0.082	0.073	0.081	0.18
NO <sub>2</sub>	Annual	ppm	0.024	0.023	0.022	0.022	0.020	0.019	0.03
SO <sub>2</sub>	1 hour	ppm	0.011	0.011	0.012	0.018	0.009	0.006	0.25
SO <sub>2</sub>	24 hours	ppm	0.006	0.003	0.003	0.005	0.005	0.002	0.04
SO <sub>2</sub>	Annual	ppm	0.001	0.001	0.001	0.001	0.001	0.001	0.03

Table Source: CARB 2009b; EPA 2009a.

Table Note 1: The limiting AAQS is the most stringent of the state and federal standards for each pollutant and averaging period.

Table Note 2: Exceptional PM<sub>10</sub> concentration events, such as those caused by wind storms, have been removed to the extent possible, but still may be included in the data presented.

Table Key: O<sub>3</sub> = ozone; PM<sub>2.5</sub> = fine particulate matter; PM<sub>10</sub> = inhalable particulate matter; CO = carbon monoxide; NO<sub>2</sub> = nitrogen dioxide; SO<sub>2</sub> = sulfur dioxide; ppm = parts per million; µg/m<sup>3</sup> = micrograms per cubic meter; AAQS = ambient air quality standards; CARB = California Air Resources Board; EPA = Environmental Protection Agency; NA = not applicable.

### 3.2.5.1 Ozone

Ozone is not emitted directly into the atmosphere from emission sources. It is produced through photochemical (light catalyzed) reactions in the atmosphere involving hydrocarbons and nitrogen oxides (NO<sub>x</sub>, consisting primarily of nitric oxide [NO] or NO<sub>2</sub>), known generically as O<sub>3</sub> precursors. Because O<sub>3</sub> formation is the result of large-scale atmospheric processes, O<sub>3</sub> formation and transport is more of a regional concern and is therefore not directly associated with individual, localized sources of pollution. As indicated in Table 3-3, the 1-hour and 8-hour O<sub>3</sub> concentrations measured at the Barstow monitoring station have been relatively flat or slowly decreasing over time and continue to exceed the state and federal AAQS.

### 3.2.5.2 Nitrogen Dioxide

The entire MDAB air basin is in attainment for the state 1-hour and federal annual NO<sub>2</sub> standards. The NO<sub>2</sub> attainment status could change due to the new federal 1-hour standard, although a review of the monitoring data from the entire air basin suggests that this would not occur.

Approximately 90 percent of the NO<sub>x</sub> emitted from combustion sources is NO, while the rest is NO<sub>2</sub>. Nitrous oxide is oxidized in the atmosphere to NO<sub>2</sub>, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO<sub>2</sub> typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking sufficient photochemical activity (sunlight), NO<sub>2</sub> levels are relatively low. In the summer the conversion rates of NO to NO<sub>2</sub> are high, but the relatively high temperatures and windy

conditions disperse pollutants, which prevents the accumulation of NO<sub>2</sub>. The NO<sub>2</sub> concentrations in the project area are well below the state and federal AAQS.

### 3.2.5.3 Carbon Monoxide

The area is in attainment for the state 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 1 or 2 hours after sunrise. The project area has a lack of substantial mobile source emissions and has CO concentrations that are well below the state and federal AAQS.

### 3.2.5.4 Inhalable and Fine Particulate Matter

Particulates in the air are caused by a combination of windblown fugitive dust (e.g., road dust; particles emitted from combustion sources [primarily carbon particles]; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, SO<sub>x</sub>, and NO<sub>x</sub>). PM<sub>10</sub> can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere. PM<sub>10</sub> tends to occur more frequently in arid, windy areas with sparse vegetation. PM<sub>2.5</sub> is derived mainly from either the combustion of materials or from precursor gases (SO<sub>x</sub>, NO<sub>x</sub>, and volatile organic compounds [VOCs]) through complex reactions in the atmosphere. PM<sub>2.5</sub> consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

The MDAB in the site area is in nonattainment for both the state and federal PM<sub>10</sub> standards. The portion of San Bernardino County in the project area is in nonattainment for the state PM<sub>2.5</sub> standard but is in attainment for the federal PM<sub>2.5</sub> standard.

Table 3-3 shows recent PM<sub>10</sub> and PM<sub>2.5</sub> concentrations. The table shows fluctuating concentrations patterns and exceedance of the state 24-hour PM<sub>10</sub> standard. Exceedance does not necessarily mean violation or nonattainment; exceptional events (such as sustained high winds) do occur, and some of those events, which do not count as violations, may be included in the Table 3-3 data.

### 3.2.5.5 Sulfur Dioxide

The entire air basin is in attainment for the state and federal SO<sub>2</sub> standards. SO<sub>2</sub> is typically a by-product emitted from the combustion of fuels containing sulfur. Sources of SO<sub>2</sub> emissions within the MDAB come from a wide variety of fuels: gaseous, liquid, and solid; however, the total SO<sub>2</sub> emissions within the western MDAB are limited due to the limited number of major

stationary emission sources and California's significant reduction in the sulfur content in motor vehicle fuel. The project area's SO<sub>2</sub> concentrations are well below the state and federal AAQS.

### 3.2.5.6 Lead

The main sources of Pb emissions are (1) vehicles operating in the area of analysis that are fueled with leaded gasoline and (2) any existing lead smelters in the area. Because no lead smelters and very few vehicles using leaded fuel remain in San Bernardino County, levels of atmospheric Pb are essentially nondetectable. Data on Pb emissions are not collected at the monitoring stations located in or near the project area.

### 3.2.6 Background Concentrations

Background concentrations are ambient criteria pollutant concentrations due to natural sources that cannot be reduced by controlling emissions from human-made sources. The maximum criteria pollutant concentrations from the past 3 years of available data collected at the monitoring stations within San Bernardino County are used to estimate background concentrations.

Table 3-4 lists the estimated background concentrations, limiting (or most stringent) AAQS, and the percentage of the limiting AAQS attributed to background concentrations for each criteria pollutant where data from nearby monitoring stations were available.

**Table 3-4 Estimated Background Concentrations (micrograms per cubic meter)**

Pollutant	Averaging Time	Recommended Background	Limiting AAQS [Table Note 1]	Percentage of Standard
NO <sub>2</sub>	1 hour	154.4	339	46
NO <sub>2</sub>	Annual	41.8	57	73
PM <sub>10</sub>	24 hours	80	50	160
PM <sub>10</sub>	Annual	29.8	20	149
PM <sub>2.5</sub>	24 hour	28.0	35	80
PM <sub>2.5</sub>	Annual	10.3	12	86
CO	1 hour	4,025	23,000	18
CO	8 hours	1,367	10,000	14
SO <sub>2</sub>	1 hour	47.2	655	7
SO <sub>2</sub>	3 hours	42.4	1,300	3
SO <sub>2</sub>	24 hours	13.1	105	13
SO <sub>2</sub>	Annual	2.7	80	3

Table Source: CARB 2008, 2009b; EPA 2009b; CEC 2009a, 2009b.

*Table Note 1:* The limiting AAQS is the most stringent of the state and federal standards for each pollutant and averaging period.

*Table Key:* NO<sub>2</sub> = nitrogen dioxide; PM<sub>2.5</sub> = fine particulate matter; PM<sub>10</sub> = particulate matter; CO = carbon monoxide; SO<sub>2</sub> = sulfur dioxide; AAQS = ambient air quality standards; CARB = California Air Resources Board; EPA = Environmental Protection Agency.

The background ambient air concentrations are used in the modeling and evaluation of air quality impacts. The criteria pollutant modeling analysis is limited to the pollutants listed in Table 3-4. Estimated background concentrations were not determined for O<sub>3</sub> and Pb.

### 3.3 Biological Resources

This section of the FEIS describes the existing biological resources occurring on the Calico Solar Project site and in the project vicinity, and is modified from C.2, Biological Resources of the SA/DEIS.

#### 3.3.1 Definition of Resource

Biological resources include plants, animals, habitats, ecosystems, and ecological processes; the specific resources that are evaluated in this section are vegetation, wildlife, and special-status species.

#### 3.3.2 Applicable Laws, Regulations, Plans, and Policies

The applicable laws, regulations, plans, and policies for the Calico Solar Project are identified in Table 3-5. Management goals for vegetation, wildlife, and special-status species are identified in the CDCA Plan (BLM 1999) and are described below.

**Table 3-5 Biological Resources Applicable laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Endangered Species Act (16 USC 1531 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species and their critical habitat. "Take" of a federally-listed species is prohibited without an incidental take permit, which may be obtained through Section 7 consultation (between federal agencies) or a Section 10 Habitat Conservation Plan.
<b>Federal:</b> Migratory Bird Treaty (16 USC 703–711)	Makes it unlawful to take or possess any migratory bird (or any part of such migratory bird including active nests) as designated in the Migratory Bird Treaty Act unless permitted by regulation (e.g., duck hunting).

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Clean Water Act (33 USC1251–1376)	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the United States Army Corps of Engineers for a discharge from dredged or fill materials into waters of the United States, including wetlands. Section 401 requires a permit from a regional water quality control board 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.
<b>Federal:</b> Bald and Golden Eagle Protection Act (16 USC 668)	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.
<b>Federal:</b> BLM California Desert Conservation Area Plan (BLM 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.
<b>Federal:</b> California Desert Protection Act of 1994	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 significant portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
<b>Federal:</b> West Mojave Plan (BLM et al. 2005)	The BLM produced the West Mojave Plan as an amendment to the CDCA Plan. The West Mojave Plan is a federal land use plan amendment that 1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other plants and animals and the natural communities of which they are part, and 2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts
<b>Federal:</b> BLM 6840 Manual for Management of Special Status Species	The Manual supports the BLM's broad conservation authorities and duties pertaining to fish, wildlife and plant conservation pursuant to multiple statutes including the Federal Land Policy and Management Act, the Sikes Act, and the Endangered Species Act (ESA). The BLM's special status species policies set forth the procedures by which these species will be managed to ensure their recovery or promote their conservation so that protections afforded under the ESA or BLM policy are no longer warranted.

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Desert Tortoise Recovery Plan (USFWS 1994a)	The Desert Tortoise (Mojave Population) Recovery Plan established recovery goals and objectives for six “recovery units” and recommended that Desert Wildlife Management Areas be established within each recovery unit. The Recovery Plan is advisory; federal agencies are not required to adopt its suggestions. The principle agency mechanism for implementing recovery plan tasks is through amendments to existing resource management plans or through the development of broader bioregional plans in collaboration with local governments. A Draft Revised Recovery Plan was published in 2008, but has not been finalized yet.
<b>State:</b> California Endangered Species Act of 1984 (Fish and Game Code 2050–2098)	Protects California’s rare, threatened, and endangered species. “Take” of a State-listed species is prohibited without an Incidental Take Permit.
<b>State:</b> 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.
<b>State:</b> 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).
<b>State:</b> 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.
<b>State:</b> Birds of prey (Fish and Game Code, Section 3503.5)	Birds of prey are protected in California making it “unlawful to take, possess, or destroy any birds of prey (in the order Falconiformes or Strigiformes).”
<b>State:</b> 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.
<b>State:</b> Fur-bearing Mammals (Fish and Game Code, Sections 4000 and 4002)	Lists fur-bearing mammals that require a permit for take, as well as those for which take is prohibited.
<b>State:</b> Significant Natural Areas (Fish and Game Code, Section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
<b>State:</b> Streambed Alteration Agreement (Fish and Game Code, Sections 1600 et seq.)	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 the California Department of Fish and Game 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.
<b>State:</b> California Native Plant Protection Act of 1977 (Fish and Game Code, Section 1900 et seq.)	Designates State rare, threatened, and endangered plants.

Law, Regulation, Plan, or Policy	Description
<b>State:</b> California Desert Native Plants Act of 1981 (Food and Agricultural Code, Section 80001 et seq., and California Fish and Game Code, Sections 1925 and 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.
<b>State:</b> California Food and Agriculture Code (Section 403)	The California Department of Food and Agriculture is designated to prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.
<b>State:</b> Noxious Weeds (California Code of Regulations, Title 3, Section 4500)	Lists plant species that are considered noxious weeds.
<b>Local:</b> San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (San Bernardino County 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; CFR = Code of Federal Regulations; USC = United States Code; USFWS = United States Fish and Wildlife Service.

### 3.3.3 Current CDCA Plan

The CDCA Plan contains guidelines and elements pertaining to vegetation and wildlife species and habitat as described below (BLM 1999). The West Mojave (WEMO) Plan is an amendment to the CDCA Plan for public lands and a habitat conservation plan for private lands.

#### 3.3.3.1 Vegetation

The Vegetation guidelines pertain to vegetation harvesting; rare, threatened, and endangered state and federal species, sensitive plant species and unusual plant assemblages (UPA). With the exception of the guidelines for rare threatened and endangered species, they are the same for Multiple-Use Class L and Class M land. There are also guidelines for vegetation manipulation which vary some for Multiple-Use Class L and Class M land. The CDCA Plan vegetation guidelines are summarized in Table 3-6.

**Table 3-6 CDCA Plan Guidelines for Vegetation**

<b>Guideline</b>	<b>M-U Class L</b>	<b>M-U Class M</b>
<b>Vegetation Harvesting</b>		
Native Plants	Removal of vegetation, commercial or noncommercial, may be allowed by permit only after NEPA requirements are met and after development of necessary stipulation.	Same guidelines as for M-U Class L
Harvesting by Mechanical Means	Harvesting by mechanical means may be allowed by permit only.	Same guidelines as for M-U Class L
Rare, Threatened, and Endangered Species, State and Federal	All state and federally listed species will be fully protected. Actions which may jeopardize the continued existence of federally listed species will require consultation with the United States Fish and Wildlife Service.	Same guidelines as for M-U Class L
Sensitive Plant Species	Identified sensitive species will be given protection in management decisions consistent with BLM policies.	Same guidelines as for M-U Class L
Unusual Plant Assemblages	Identified Unusual Plant Assemblages will be considered when conducting all site-specific environmental impact analyzes to minimize impacts.	Same guidelines as for M-U Class L
<b>Vegetation Manipulation</b>		
Mechanical Control	Mechanical control will not be allowed.	Mechanical control may be allowed, but only after consideration of possible impacts.
Chemical Control	Aerial broadcasting application of chemical controls will not be allowed.  Noxious weed eradication may be allowed after site-specific planning. Types and uses of pesticides, in particular herbicides, must conform to Federal, State, and local regulations.	Aerial broadcasting application of chemical controls will not be allowed.  Spot application will be allowed after site-specific planning. Types and uses of pesticides, in particular herbicides, must conform to Federal, State, and local regulations.

<b>Guideline</b>	<b>M-U Class L</b>	<b>M-U Class M</b>
Exclosures	Exclosures may be allowed.	Same guidelines as for M-U Class L
Prescribed Burning	Prescribe burning may be allowed after development of a site-specific management plan.	Same guidelines as for M-U Class L

*Table Source:* BLM 1999.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; M-U = Multiple-Use; NEPA = National Environmental Policy Act.

The CDCA Plan also includes a Vegetation Element, which provides more specific application of the multiple-use guidelines described above. The goals of the Vegetation Element include the following (BLM 1999):

- (1) Maintain the productivity of the vegetative resource while meeting the consumptive needs of wildlife, livestock, wild horses and burros, and man. Provide for such uses under the principles of sustained yield.
- (2) Manage those plant species on the Federal and State lists of threatened and endangered species and their habitats so that the continued existence of each is not jeopardized. Stabilize and, where possible, improve populations through management and recovery plans developed and implemented cooperatively with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG).
- (3) Manage those plant species officially designated as sensitive by the BLM for California and their habitats so that the potential for Federal or State listing is minimized. Include consideration of sensitive species habitats in all decisions such that impacts are avoided, mitigated, or compensated.
- (4) Manage UPAs so that their continued existence is maintained. In all actions, include consideration of UPAs so that impacts are avoided, mitigated or compensated.
- (5) Manage wetland and riparian areas in the CDCA, with the following specific objectives:
  - (a) To avoid the long-term and short-term impacts associated with the destruction, loss, or degradation of wetland and riparian areas;
  - (b) To preserve and enhance the natural and beneficial values of wetland and riparian areas which may include constraining or excluding those uses that cause significant long-term ecological damage;

- (c) To include practical measures to minimize harm in all actions causing adverse impacts on wetlands and riparian areas; and
  - (d) To retain all wetlands and riparian habitats presently under BLM administration wherever high resource values exist and adverse impacts cannot be mitigated.
- (6) Accomplish the objectives of other resource by altering plant composition, density, and/or cover. Objectives include eliminating harmful or noxious plants, increasing livestock or wildlife forage production, and improving wildlife habitat characteristics. Diversified, native plant communities are favored over monocultures or communities based on nonnative species.

### 3.3.3.2 Wildlife Species and Habitat

The Wildlife Species and Habitat guidelines pertain to rare, threatened and state and federal endangered species; sensitive species, predator and pest control; habitat manipulation; and the reintroduction or introduction of established or exotic species. The guidelines are the same for Multiple-Use Class L and Class M land with the exception of habitat manipulation and are summarized in Table 3-7.

**Table 3-7 CDCA Plan Guidelines for Wildlife Species and Habitat**

<b>Guideline</b>	<b>M-U Class L</b>	<b>M-U Class M</b>
Rare, Threatened and Endangered Species (both State and Federal)	All State and federal listed species and their critical habitat will be fully protected. Actions which may affect or jeopardize the continued existence of federally listed species will require formal consultation with the United States Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act.	Same guidelines as for M-U Class L
Sensitive Species	Identified species will be given protection in management decisions consistent with BLM policies.	Same guidelines as for M-U Class L
Predator and Pest Control	Control of depredation wildlife and pests will be allowed in accordance with existing State and Federal laws.	Same guidelines as for M-U Class L

<b>Guideline</b>	<b>M-U Class L</b>	<b>M-U Class M</b>
Habitat Manipulation	Projects to improve wildlife habitat may be allowed subject to environmental assessment.	Same as Classes C and L, except that chemical and mechanical vegetation manipulation may be allowed.
Reintroduction or Introduction of Established Exotic Species	Reintroduction or introduction of native species or established exotic species is allowed.	Same guidelines as for M-U Class L

*Table Source:* BLM 1999.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; M-U = Multiple-Use.

The CDCA Plan also includes a Wildlife Element which provides more specific application of the multiple-use guidelines. The goals of the Wildlife Element include the following (BLM 1999):

- (1) Avoid, mitigate, or compensate for impacts of conflicting uses on wildlife populations and habitats. Promote wildlife populations through habitat enhancement projects so that balanced ecosystems are maintained and wildlife abundance provides for human enjoyment.
- (2) Develop and implement detailed plans to provide special management for: a) areas which contain rare or unique habitat, b) areas with habitat which is sensitive to conflicting uses, c) areas with habitat which is especially rich in wildlife abundance or diversity, and (d) areas which are good representatives of common habitat types. Many areas falling into these categories contain listed 1 species, which may become the focus of management as indicator 2 species.
- (3) Manage those wildlife species on the Federal and State lists of threatened and endangered species and their habitats so that the continued existence of each is not jeopardized. Stabilize and, where possible, improve populations through management and recovery plans developed and implemented cooperatively with the USFWS and the CDFG.
- (4) Manage those wildlife species officially designated as sensitive by the BLM for California and their habitats so that the potential for Federal or State listing is minimized.
- (5) Include consideration of crucial habitats of sensitive species in all decisions so that impacts are avoided, mitigated, or compensated.

### 3.3.3.3 West Mojave Plan Biological Goals

Measurable biological goals have been developed for each of the species addressed by the WEMO Plan. The biological goals are intended to be broad guiding principles for the WEMO conservation program. The relevant biological goals, based on species presence on the proposed project site, are presented below. All of the following goals are contained in the WEMO Plan (BLM et al. 2005).

The WEMO Plan contains four biological goals for desert tortoise conservation identified by the USFWS and CDFG in 1998:

- Goal 1: Protect sufficient habitat to ensure long-term tortoise population viability.
- Goal 2: Establish an upward or stationary trend in the tortoise population of the West Mojave Recovery Unit for at least 25 years.
- Goal 3: Ensure genetic connectivity among desert tortoise populations in the West Mojave Recovery Unit, and between this and other recovery units.
- Goal 4: Reduce tortoise mortality resulting from interspecific (i.e. raven predation) and intraspecific (i.e. disease) conflicts that likely result from human-induced changes in the ecosystem processes.

The WEMO Plan contains the following biological goal for bats:

- Goal 1: Maintain and enhance viability of all bat populations in the planning area, regardless of species.

The WEMO Plan contains the following biological goal for the Bendire's thrasher:

- Goal 1: Protect and enhance known populations and habitat on public lands.

The WEMO Plan contains the following biological goal for the Le Conte's thrasher:

- Goal 1: Protect and enhance known populations and habitat.

The WEMO Plan contains the following biological goals for burrowing owl:

- Goal 1: Prevent direct incidental take.
- Goal 2: Protect and enhance known populations and habitat on public land.

The WEMO Plan contains the following biological goal for crucifixion thorn:

- Goal 1: Preserve disjunct populations on public land and protect the crucifixion thorn woodland community.

The WEMO Plan contains the following biological goals for golden eagle:

- Goal 1: Preserve at least 90 percent of the baseline number of nesting territories.
- Goal 2: Minimize electrocutions.

The WEMO Plan contains the following biological goal for the Mojave fringe-toed lizard:

- Goal 1: Establish Conservation Areas at eight of the fourteen occupied habitats.

The WEMO Plan contains the following biological goals for the prairie falcon:

- Goal 1: Preserve all nest sites.
- Goal 2: Maintain population numbers.

The WEMO Plan contains the following biological goal for the white-margined beardtongue:

- Goal 1: Preserve the wash and sand field habitat of the disjunct population on public land near Pisgah Crater.

### **3.3.4 Environmental Setting and Existing Conditions**

The Calico Solar Project site located within the Mojave Desert Ecoregion (The Nature Conservancy 2001) at approximately 1,925 to 3,050 feet above mean sea level. This ecoregion is characterized by high temperatures, low precipitation, and an assemblage of vegetation and wildlife species that is specifically adapted to these conditions. The Mojave Desert is located between the Great Basin Desert to the north and the Colorado Desert to the south, and lies in the rain shadow of the Sierra Nevada and Transverse Mountain ranges. The Mojave Desert receives most of its annual precipitation during winter months, although summer thunderstorms also occur (Schoenherr 1992). The average annual precipitation at the Barstow-Daggett Airport, located approximately 23 miles to the east of the project site, is approximately 3.8 inches, and average monthly temperatures at this location generally range from lows near 36 degrees Fahrenheit in January and highs near 104 degrees Fahrenheit in July (WRCC 2010).

The project site is located on a broad alluvial plain bordered by the Cady Mountains to the north, an existing SCE transmission line to the east, and I-40 to the south (SES 2008). Developments in this area include the BNSF railroad, a gas pipeline which traverses the lower portion of the site from east to west, several east-west dirt roads that cross the site, and a maintained north-south dirt access road for the existing transmission line on the eastern border of the project site

connecting to the existing Pisgah substation east of the site. Historical land uses in the area include cattle grazing and limited mining. There is also evidence of disturbance from off-road vehicle (ORV) activities. However, habitats on the project site are generally undisturbed. Nonnative, invasive weeds occur in disturbed soils such as roadsides throughout the area, but have not substantially altered native vegetation and habitat on the project site as they have elsewhere in the Mojave Desert.

The project area is located in close proximity to several BLM-designated conservation areas including the Pisgah Crater Area of Critical Environmental Concern (ACEC), Cady Mountains Wilderness Study Area (WSA), Rodman Mountains Wilderness, Newberry Springs Wilderness, Bristol Mountains Wilderness, Ord-Rodman Desert Wildlife Management Area (DWMA), and Superior-Cronese DWMA (Figure A-2).

The ACEC designation is used by the BLM to identify areas with special management issues and priorities related to the conservation of important natural, cultural, and scenic resources. The Pisgah ACEC supports species such as Mojave fringe-toed lizard (*Uma scoparia*), desert tortoise (*Gopherus agassizii*), crucifixion thorn (*Castela emoryi*), white-margined beardtongue (*Penstemon albomarginatus*), and sand linanthus (*Linanthus arenicola*) (BLM et al. 2005). The Cady Mountains north of the project site have been designated as a WSA by the BLM. A population of Nelson's bighorn sheep inhabits the Cady Mountains within the WSA. The Ord-Rodman and Superior-Cronese DWMA include designated critical habitat for the desert tortoise and were established by the West Mojave Plan for the conservation and recovery of the desert tortoise.

### **3.3.5 Vegetation and Wildlife**

#### **3.3.5.1 Vegetation**

The AFC (SES 2008) and the Applicant's Biological Resources Technical Report (SES 2009) identified two vegetation communities, Mojave creosote bush scrub, and desert saltbush scrub, on the project site (Figure A-3). The Applicant mapped approximately 7,889 acres of Mojave creosote bush scrub (92 acres of this is previously disturbed) and 242 acres of desert saltbush scrub within the project footprint. In addition, approximately 68 acres of unvegetated habitat consisting of sparsely-vegetated rock outcrops and 31 acres of developed lands (e.g., paved and unpaved roads, transmission line and underground gas pipeline corridors) were identified and mapped on the project site. Table 3-8 lists the acreages for each vegetation community mapped on the project site.

**Table 3-8 Vegetation communities on the project site**

<b>Vegetation Type</b>	<b>Acres [Table Note 1]</b>
Mojave creosote bush scrub (including 3.3. acres of microphyll woodland)	7,797
Disturbed Mojave creosote bush scrub	92
Salt bush scrub	242
Unvegetated habitat (rock outcrop)	68
Developed lands	31

Table Note 1: Rounded to the nearest acre.

The Mojave creosote bush scrub and desert saltbush scrub communities are coarse-scale units of classification that give an indication of the general ecological setting of a given site. Within the Mojave creosote bush scrub and desert saltbush scrub communities, there are vegetation associations that can be further distinguished based on their species composition; the identification of these associations can provide a finer-scale description of the vegetation communities that are present at a given site.

The Mojave creosote bush scrub and desert saltbush scrub descriptions used by the Applicant in their mapping of the vegetation communities on the project site correspond to the natural communities classification system described by Holland (1986), which is defined at a relatively coarse scale and which combines several vegetation associations into the broader category of Mojave creosote bush scrub. Within the areas mapped as Mojave creosote bush scrub on the project site, numerous smaller patches of specific vegetation associations have been identified. Although they have not been quantified or mapped, they include microphyll woodlands such as catclaw acacia thorn scrub that are typically associated with dry desert washes; lower elevation wash and sandfield vegetation; smoke tree woodland; and big galleta shrub-steppe. These smaller units are named and described briefly below as subcategories within the Mojave creosote bush scrub community.

### **Mojave Creosote Bush Scrub**

The majority of the project site (over 7,800 acres of the 8,230 acre site) is mapped as Mojave creosote bush scrub (SES 2009; Thomas et al. 2004). For most of the proposed project area, the dominant shrub species are creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Other common shrubs include desert senna (*Senna armata*), Nevada ephedra (*Ephedra nevadensis*), encelia (*Encelia farinosa*, *E. actoni*, *E. frutescens*), and range ratany (*Krameria erecta*, *K. grayii*) (SES 2009). Shrubs are typically widely spaced and occur along with a diverse assemblage of annual and perennial herbs in years of adequate seasonal precipitation. A number of cactus species also occur on the project site, including beavertail

cactus (*Opuntia basilaris* var. *basilaris*), diamond cholla (*Cylindropuntia ramosissima*), cotton-top cactus (*Echinocactus polycephalus*), California barrel cactus (*Ferocactus cylindraceus*), and Engelmann hedgehog cactus (*Echinocereus engelmannii*). Outcrops of black volcanic rock associated with lava flows from Pisgah Crater also occur within the mapped Mojave creosote bush scrub vegetation community in the southeastern portion of the project site.

### ***Catclaw Acacia Thorn Scrub (Desert Microphyll Woodland)***

Catclaw acacia (*Acacia greggii*) is a large, deep-rooted shrub or small tree and is characteristic of desert washes, occurring in habitats similar to other desert microphyllous wash woodland species. It resprouts rapidly following disturbance by floods, and seed dispersal and germination are apparently initiated by flooding. Within the mapped creosote bush scrub community, dry desert washes in the northern portion of the proposed project site (i.e., foothills of the Cady Mountains and the upper bajada) often support catclaw acacia in equal or greater cover and density than creosote bush. Scattered blue palo verde (*Parkinsonia florida*) and smoke tree (*Psoralea argophylla*) are also found in these washes. The Applicant has provided field data indicating that 3.3 acres of the mapped creosote bush scrub supports catclaw acacia or other microphyllous species in high enough density to warrant its delineation as desert microphyll woodland.

### ***Lower Elevation Wash and Sandfield Vegetation***

Areas mapped as Mojave creosote bush scrub in the southern portion of the project site, generally from about 0.25 mile north of the BNSF railroad tracks and southward to the southern project area boundary, include patches of lower elevation wash and sandfield vegetation. These areas are characterized by sandy soils in deep sandy washes, open sandfields, and active windblown sandfields.

Sand and sediment transport from desert mountain ranges downslope to bajadas and, in some cases, sand dunes, occurs by fluvial (water) and aeolian (wind) processes. Sediments from the Cady Mountains tend to be transported downslope toward the southern part of the project site by these processes, particularly the southeastern part of the site. Here, fine windblown sands spread across the lower bajada, accumulate in braided wash channels, and form a small dune system with partially stabilized (that is, sparsely vegetated) sandfields. Vegetation associations found in these dunes, sandfields, and washes include smoke tree woodland, big galleta shrub-steppe, and desert saltbush scrub. These vegetation associations are described below.

### ***Smoke Tree Woodland***

Smoke tree woodland is characteristic of desert washes and arroyos in the Mojave Desert. Smoke tree is a shrub or small tree that is typically the dominant or co-dominant species in this

association, often occurring with other desert wash species (see catclaw acacia thorn scrub, above). Smoke tree is relatively short lived (to approximately 50 years), and is strongly tied to washes. Its stands regenerate following floods, which abrade dormant seeds, permitting them to germinate (Sawyer et al. 2009). In lower washes on the project site, smoke tree is visually dominant although it does not make up a substantial portion of total cover; a few small smoke trees occur in the washes on the upper bajada. Smoke trees are protected under the San Bernardino County Plant Protection and Management Ordinance.

### ***Big Galleta Shrub-Steppe***

Big galleta (*Pleuraphis rigida*) is a grass that occurs in low sandy areas and around the margins of dunes in the southeastern portion of the project site. In dune habitats, it is often interspersed with small stands of the desert sand verbena (*Abronia villosa*) or desert panic grass (*Panicum urvilleanum*). Throughout the Mojave Desert, big galleta commonly occurs in patches within creosote bush shrublands and has often been included within that vegetation community description (Thomas et al. 2004). On the project site, big galleta occurs in open stands around dune margins and other sandy areas; it is distinguished here from the broader creosote bush scrub community due to its occurrence on sandy substrates which provide a unique habitat type for the Mojave fringe-toed lizard on the project site.

### **Desert Saltbush Scrub**

Desert saltbush scrub is generally associated with fine-textured and poorly drained saline or alkaline soils on gently sloping lands and valley floors. Approximately 237 acres of desert saltbush scrub were mapped in the southwestern portion of the project site (SES 2009). Desert saltbush (*Atriplex polycarpa*) is the dominant species within this shrub-dominated community, which grades into creosote bush scrub over a wide area in this part of the project site.

### **Unvegetated Habitat**

Areas of rock outcrop in the northern part of the project site were mapped as “unvegetated” (SES 2008, SES 2009). Although scattered small shrubs occur do occur at low densities in these areas, these sparsely vegetated rock outcrops provide almost no vegetative cover. Nonetheless, crevices, rock shelves, and small hollows or caves that occur in these areas can serve as denning sites for mammals such as coyote or kit fox; packrat nest sites; nest sites for burrowing owls or barn owls; roosting sites for bats; crevices where chuckwallas find protection from predators; or shaded sites where desert tortoises can find thermal cover.

### 3.3.5.2 Invasive, Nonnative, and Noxious Weeds

The term “weed” can refer to a plant species that is generally considered invasive but doesn’t have an official noxious weed designation, or to an invasive species that has been designated by county, state, or national agricultural authorities as a plant that is injurious to crops, natural habitats/ecosystems, and/or humans or livestock. Species that are part of this second category and have an official designation are “noxious” weeds. Plants that are considered weeds are typically aggressive colonizers that (1) multiply quickly without natural controls and adversely affect native habitats or croplands and (2) are injurious to humans, wildlife, and livestock.

Weed species addressed in this section include species of nonnative, invasive plants on the weed lists of the California Department of Food and Agriculture (CDFA) (CDFA 2007) and the California Invasive Plant Council (Cal-IPC), as well as federally listed noxious weeds. The spread of nonnative invasive plants is a threat to biological resources in the Mojave Desert because these plants can displace native plants; increase the threat of wildfire; supplant forage that is important to herbivorous wildlife species; alter the habitat structure and ecological function of wetland, riparian, and desert wash communities; and invade or threaten special-status plant occurrences and habitat (Zouhar et al. 2008; Lovich 1998; Lovich et al. 1997).

Numerous nonnative and invasive weeds have already become widespread throughout the Mojave Desert, and for some invasive species the prevention of further spread is impracticable. Examples of these species include red brome (*Bromus rubens*), cheat grass (*Bromus tectorum*), Mediterranean grass (*Schismus* spp.), red-stemmed filaree (*Erodium cicutarium*), and Russian thistle (*Salsola* spp.). Other invasive species such as Sahara mustard (*Brassica tournefortii*) can substantially alter native habitats if left uncontrolled. Still others (e.g., saltcedar [*Tamarix ramosissima*]) are damaging to specific habitat types (in this case, riparian communities) but pose little or no threat to upland habitats.

Invasive nonnative weeds are relatively low in abundance and diversity throughout the project site. Seven species of invasive weeds were detected during the Applicant’s floristic surveys in 2007, 2008, and 2010 (SES 2009; SES 2010a; SES 2010e), as described below.

- Sahara mustard was reported as “abundant throughout the site” by the applicant (SES 2009), though BLM and CEC staff noted it only occasionally. Sahara mustard is of high concern; Cal-IPC has declared this plant highly invasive (Cal-IPC 2006) and recommends that it should be eradicated whenever encountered.
- Red brome is widespread and patchy in the project area, “often at the bases of shrubs” and “too extensive to control” (SES 2009). It is an introduced Eurasian grass adapted to microhabitats that, in desert environments, can be found in partial shade (e.g., at the bases of desert shrubs or near structures). It can also form carpet cover in pockets of fine grained soils in rough terrain off the bajada. Red brome is widespread and abundant in the Mojave Desert, and its seeds can disperse readily and across large distances.

Cal-IPC has declared this plant highly invasive (Cal-IPC 2006). Because of its widespread distribution, red brome is not considered feasible for general control. Cheat grass is a closely related species, not reported by the applicant, but undoubtedly common on the project site. It is also highly invasive (Cal-IPC 2006) but also not considered feasible for general control.

- Mediterranean grass was observed patchily distributed throughout the project site. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to control.
- Russian thistle, also known as tumbleweed, was reported as widespread, with a patchy distribution throughout the project site. More so than most other invasive species, Russian thistle tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed (that is, within a few years). Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006).
- London rocket (*Sisymbrium irio*) is widespread throughout the warm deserts of North America. It was reported as widespread with a patchy distribution throughout the project area. Cal-IPC has declared this plant moderately invasive (Cal-IPC 2006). More so than the other invasive herbs, it tends to be in slightly mesic or shaded sites around structures, and monitoring for this species should particularly focus on moist and shaded areas around the solar generators.
- Saltcedar, also known as tamarisk, is present in two windrows that parallel the BNSF railroad. This species was planted on site and there is evidence of an abandoned irrigation system. This species is primarily associated with mesic and hydric areas and is therefore restricted to habitats where there is perennial soil water availability (though often no surface water). Cal-IPC has declared this plant highly invasive (Cal-IPC 2006).
- Red-stemmed filaree, or storksbill, is a widespread annual species common in disturbed habitats and often on undisturbed desert uplands. It was reported by the applicant as “widespread and abundant” and “too extensive to be controlled” on the project site (SES 2009). It has a limited overall rating by Cal-IPC, generally because the ecological impacts of the species are minor. Because of its widespread distribution, eradication of red-stemmed filaree is not considered feasible.

### 3.3.5.3 Wildlife

The project site currently supports a diversity of desert-adapted wildlife species. With the exception of the areas surrounding the BNSF railroad and existing roads, the majority of the site consists of relatively undisturbed desert scrub habitats. While the project site primarily contains

Mojave creosote bush scrub, some unique habitat features also occur on the project site, including outcrops of black volcanic rock associated with lava flows from Pisgah Crater, and wind-blown sand dunes. Numerous sandy washes also occur throughout the site. These types of features tend to increase biodiversity when they are present, as some wildlife species use these areas exclusively. For example, the Mojave fringe-toed lizard is closely associated with sand dunes, sand sheets, and sandy soils in the Mojave Desert. In addition, distinct morphological variations of several reptile and small mammal species have been recorded in association with the dark substrates from the Pisgah lava flows, including melanistic (i.e., darker colored) forms of desert horned lizard (*Phrynosoma platyrhinos*), side-blotched lizard (*Uta stansburiana*), and long-nosed leopard lizard (*Gambelia wislizenii*); and coat color variations in desert woodrats (*Neotoma lepida*) (Lieberman and Lieberman 1969; Rosenblum et al. 2004; SES 2009).

Some of the species that were detected during the pre-project biological surveys include desert tortoise (*Gopherus agassizii*), Mojave fringe-toed lizard (*Uma scoparia*), side-blotched lizard, desert iguana (*Dipsosaurus dorsalis*), western whiptail (*Aspidoscelis tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert horned lizard, western banded gecko (*Coleonyx variegatus*), long-nosed leopard lizard, and sidewinder (*Crotalus cerastes*). Mammals recorded during the surveys include black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus*), coyote (*Canis latrans*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and desert kit fox (*Vulpes macrotis*) (SES 2009).

Despite the moderate to low shrub density on the project site, the area provides cover and foraging, roosting, and nesting habitats for a variety of bird species. Common resident and migratory birds detected on the project site and in adjacent habitats include the black-throated sparrow (*Amphispiza bilineata*), common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), mourning dove (*Zenaida macroura*), white-crowned sparrow (*Zonotrichia leucophrys*), and yellow-rumped warbler (*Dendroica coronata*). California quail (*Callipepla californica*), common raven (*Corvus corax*), house finch (*Carpodacus mexicanus*), northern mockingbird (*Mimus polyglottos*), sage sparrow (*Amphispiza belli*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Sturnella neglecta*), and violet-green swallow (*Tachycineta thalassina*) were also observed. Raptors and owls detected at the site include burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), and turkey vulture (*Cathartes aura*) (SES 2009).

#### **3.3.5.4 Special-Status Species**

Special-status species addressed in this section include plant and animal species that are:

- Listed as threatened or endangered, proposed for listing, or identified as a candidate for listing by the USFWS under the federal Endangered Species Act of 1973, as amended (16 USC 1531–1544) (ESA)
- Listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act of 1984 (California Fish and Game Code, Sections 2050–2098) (CESA)
- Listed by the BLM as Sensitive
- Protected under California Fish and Game Code
- Identified by agencies as species of special concern, such as those listed in the West Mojave Plan for special management consideration

The project vicinity is known to support a number of special-status plant and wildlife species based on a series of large-area sampling surveys and focused surveys for a variety of special-status species that have been conducted within and adjacent to the project site (SES 2009; SES 2010a; SES 2010b; SES 2010c; SES 2010d; SES 2010e; SES 2010f). Table 3-9 provides a list of the special-status species that are known to occur or could potentially occur on the project site. Special-status plants considered possible or likely to occur were identified based on habitat descriptions and geographic ranges as summarized by Baldwin et al. (2001), Munz (1974), the California Native Plant Society (CNPS) (2010), the Consortium of California Herbaria (2010), and the California Natural Diversity Database (CNDDDB; CDFG 2010a). Special-status wildlife species considered possible or likely to occur were identified based on known occurrences in the project vicinity, as documented by BLM, USFWS, and CDFG, and assessments of habitat suitability. Potential for occurrence is defined as follows:

- *Present*: Species or sign of their presence observed on the site during surveys conducted for the proposed project.
- *High*: Species or sign not observed on the site, but reasonably certain to occur on the site based on species' known range, suitable habitat conditions, and/or recent records (within approximately 20 years and 10 miles of project site).
- *Moderate*: Species or sign not observed on the site, but conditions are suitable for occurrence and/or an historical record (greater than 20 years old) exists in the project vicinity (within approximately 10 miles of project site).
- *Low*: Species or sign not observed on the site, and conditions marginal for occurrence.

- *Not likely to occur:* Species or sign not observed on the site, the site is outside of the species' known range, or conditions are unsuitable for occurrence.

**Table 3-9 Special-Status Species, Their Status, and Potential Occurrence at the Calico Solar Project Site**

Common Name	Scientific Name	Status [Table Notes 1 and 2]	Potential for Occurrence at the Project Site
<b>Plants</b>			
Alkali mariposa lily	<i>Calochortus striatus</i>	BLM S, CNPS 1B.2	Low
Barstow woolly-sunflower	<i>Eriophyllum mohavense</i>	BLM S, CNPS 1B.2	Low
Creamy blazing-star	<i>Mentzelia tridentata</i>	BLM S, CNPS 1B.3	Low
Desert cymopterus	<i>Cymopterus deserticola</i>	BLM S, CNPS 1B.2	Low
Emory's crucifixion thorn	<i>Castela emoryi</i>	CNPS 2.3	Present
Lane Mountain milk-vetch	<i>Astragalus jaegerianus</i>	ESA LE, CNPS 1B.1	Low
Mojave monkeyflower	<i>Mimulus mohavensis</i>	BLM S, CNPS 1B.2	Low
Small-flowered androstephium	<i>Androstephium breviflorum</i>	CNPS 2.2	Present
Unnamed lupine species	<i>Lupinus sp.</i>	N/A	Present
White-margined beardtongue	<i>Penstemon albomarginatus</i>	BLM S, CNPS 1B.1	Present
<b>Reptiles</b>			
Banded gila monster	<i>Heloderma suspectum cinctum</i>	BLM S, CSSC	Low
Desert tortoise (Mojave population)	<i>Gopherus agassizii</i>	ESA LT, ST	Present
Mojave fringe-toed lizard	<i>Uma scoparia</i>	BLM S, CSSC	Present
<b>Birds</b>			
Bendire's thrasher	<i>Toxostoma bendirei</i>	BLM S, CSSC	Present
Burrowing owl	<i>Athene cunicularia</i>	BLM S, CSSC	Present
Golden eagle	<i>Aquila chrysaetos</i>	BLM S, SP, CDFG WL	Present
Le Conte's thrasher	<i>Toxostoma lecontei</i>	BLM S, CDFG WL	Present
Mountain plover	<i>Charadrius montanus</i>	BLM S, CSSC	Low
Swainson's hawk	<i>Buteo swainsoni</i>	BLM S, ST	Present
<b>Mammals</b>			
American badger	<i>Taxidea taxus</i>	CSSC	Present
Desert kit fox	<i>Vulpes macrotis arsipus</i>	N/A	Present
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	BLM S	Present
Pallid bat	<i>Antrozous pallidus</i>	BLM S, CSSC	Moderate
Spotted bat	<i>Euderma maculatum</i>	BLM S, CSSC	Low

Common Name	Scientific Name	Status [Table Notes 1 and 2]	Potential for Occurrence at the Project Site
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	BLM S, CSSC	Present
Western mastiff bat	<i>Eumops perotis</i>	BLM S, CSSC	High

*Table Note 1:* CNPS List 1A = Plants presumed extinct in California; List 1B = Plants considered by CNPS to be rare, threatened, or endangered in California, and throughout their range; List 2 = Plants that are rare, threatened, or endangered in California, but more common elsewhere in their range; List 3 = Plants about which we need more information – a review list; List 4 = Plants of limited distribution – a watch list.

*Table Note 2:* CNPS Threat Rank: .1 = Seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat); .2 = Fairly endangered in California (20–80% occurrences threatened); .3 = Not very endangered in California (<20 percent of occurrences threatened or no current threats known)

*Table Key:* BLM = Bureau of Land Management; BLM S = BLM Sensitive; CDFG WL = California Department of Fish and Game Watch List species; CNPS = California Native Plant Society; CSSC = California Species of Special Concern (wildlife); ESA = Endangered Species Act; LE = Listed Endangered; LT = Listed Threatened; SP = State Fully Protected Species; ST = State Listed Threatened (wildlife).

## Special-Status Plants

Surveys for special-status plants were conducted on the project site and in adjacent parcels in 2007, 2008, and 2010 (SES 2009, 2010a, 2010e). These surveys were conducted using several different methodologies, which were based on the size of the study area at the time of each survey and the specific purpose of the survey that was being conducted. For example, floristic surveys conducted in 2007 and 2008 covered a much larger area and were broader in scope than the focused special-status species surveys that were more recently conducted in April and May 2010 (SES 2010a, 2010e). The floristic surveys conducted in 2010 covered 100 percent of the project site and a 250-foot buffer with 50- to 100-foot-wide survey transects, resulting in a much higher level of confidence that most of the occurrences of special-status plant species on the project site were detected. Refer to the Applicant's Biological Resources Baseline Survey Report (SES 2009) and more recent survey reports (SES 2010a, 2010e) for more information regarding the study area and methods for the various pre-project plant surveys. These reports can be found in the Applicant's Plan of Development, which can be reviewed at the BLM's Barstow Field Office, and can also be reviewed on the CEC's Web site: <http://www.energy.ca.gov/sitingcases/calicosolar/documents/index.html>.

Four special-status plant species have been documented during pre-project surveys on the project site and in adjacent parcels: Emory's crucifixion-thorn, small-flowered androstephium, an unnamed lupine species, and white-margined beardtongue. None of these species are state or federally listed, and only one of these species (white-margined beardtongue) is designated as a Sensitive species by the BLM. An undescribed lupine species whose taxonomic status has not yet been identified was found to occur on the project site and is considered here as a special-status species.

***Alkali Mariposa Lily (Calochortus striatus)***

Alkali mariposa lily is a bulbiferous, perennial herb that blooms from April to June, and is a CNPS List 1B.2 species and BLM Sensitive species. This species occurs on moist alkaline areas in chaparral, saltbush scrub, Mojave desert scrub, and in seeps and meadows from 230 to 5,233 feet in elevation (CNPS 2010). It is found in California in Kern, Los Angeles, San Bernardino, and Tulare counties, as well as in southern Nevada (CNPS 2010). Alkali mariposa lily was not detected during botanical surveys conducted in 2007, 2008, and 2010, and has a low potential for occurring on the project site based on the criteria listed above.

***Barstow Woolly-Sunflower (Eriophyllum mohavense)***

Barstow woolly-sunflower is an annual herb that blooms from April to May, and is a CNPS List 1B.2 species and BLM Sensitive species. Barstow woolly-sunflower is known from Fresno, Kern, Los Angeles, and San Bernardino counties, California, between 1,640 and 3,150 feet in elevation (CNPS 2010); all known populations of Barstow woolly sunflower occur within the West Mojave Planning Area (BLM et al. 2005). This species is found on playas in creosote bush scrub, shadscale scrub, and alkali sinks (Calflora 2010). Barstow woolly-sunflower was not detected during botanical surveys conducted in 2007, 2008, and 2010, and is considered to have a low potential for occurring on the project site based on the criteria listed above.

***Creamy Blazing-Star (Mentzelia tridentata)***

Creamy blazing-star is an annual herb that blooms from March to May, and is a CNPS List 1B.3 species and BLM Sensitive species. This species occurs in Mojave desert scrub communities at elevations from 2,297 to 3,806 feet (CNPS 2010). It only occurs in California and is known from Imperial, Inyo, Kern, Riverside, San Bernardino, and San Diego counties (CNPS 2010). Its habitat is sandy, gravelly, and rocky substrates. This species was not detected during botanical surveys conducted in 2007, 2008, and 2010, and is considered to have a low potential for occurring on the project site based on the criteria listed above.

***Desert Cymopterus (Cymopterus deserticola)***

Desert cymopterus is a perennial herb that blooms from March to May, and is a CNPS List 1B.2 species and BLM Sensitive species. This species occurs on sandy soils in Joshua tree “woodlands” and Mojave desert scrub communities at elevations from 2,067 to 4,921 feet (CNPS 2010). It occurs only in California and is known from Kern, Los Angeles, and San Bernardino counties (CNPS 2010). Desert cymopterus was not detected during botanical surveys conducted in 2007, 2008, and 2010, and is considered to have a low potential for occurring on the project site based on the criteria listed above.

### ***Emory's Crucifixion Thorn (Castela emoryi)***

Emory's crucifixion thorn is a leafless, densely spiny shrub that grows from 6 to 20 feet tall, and is a CNPS List 2.3 species. It occurs along washes or other places where water may accumulate on plains or bajadas. Its fruits are held on the plant for several years, and the seeds have a thick wall which must be worn down before germination occurs. The common name "crucifixion thorn" is also used for two unrelated plant species, *Koeberlinia spinosa* and *Canotia holacantha*.

Emory's crucifixion thorn is known from only a few widely scattered occurrences in the Sonoran Desert and southern Mojave Desert in eastern California, southwestern Arizona, northern Baja California, and western Sonora (Mexico). Most populations are fairly small, though one occurrence in Imperial County near the Mexican border includes about a thousand plants. That site is managed by the BLM as "Crucifixion Thorn Natural Area" (Turner et al. 1995).

A total of four individuals of this species has been documented on the project site near its northern boundary (SES 2009, 2010a, 2010e). Potential habitat occurs throughout the project site in areas with desert washes and ephemeral drainage channels. Emory's crucifixion thorn is a fairly large shrub species that is easily identifiable, so it is considered unlikely that any additional individuals are present on the project site that were not detected during pre-project surveys conducted by the Applicant.

### ***Lane Mountain Milk-Vetch (Astragalus jaegerianus)***

Lane Mountain milk-vetch is a perennial herb that climbs up through desert shrubs, and is the only federally listed (endangered) plant species with any potential to occur in the project area. Lane Mountain milk-vetch is also CNPS List 1B.1 species. Lane Mountain milk-vetch is locally endemic in the central Mojave Desert, generally on and near Fort Irwin. It flowers during spring and dies back during summer, and almost always occurs on shallow soils on low ridges or hills of granitic outcrops rather than on bajadas (USFWS 2004; Charlton 2007).

All known occurrences of this species are about 25 miles northwest of the proposed project site, and occur at higher elevations (3,100–4,200 feet) (USFWS 2004; Charlton 2007) than the project site. Lane Mountain milk-vetch has not been found on or near the project site during pre-project surveys conducted by the Applicant in 2007, 2008, and 2010, and is considered to have a low potential for occurring on the project site based on the criteria listed above.

In 2004, the USFWS proposed four critical habitat units for Lane Mountain milk-vetch, all located to the north of the proposed project site (USFWS 2004). The USFWS finalized its critical habitat designation for Lane Mountain milk-vetch in 2005, designating zero acres of critical habitat (USFWS 2005). The Calico Solar project site does not include any critical habitat that has been proposed or designated for Lane Mountain milk-vetch under the ESA.

### ***Mojave Monkeyflower (Mimulus mohavensis)***

Mojave monkeyflower is an annual herb that blooms from April to June, and is a CNPS List 1B.2 species and BLM Sensitive species. This species only occurs in the Mojave Desert in Joshua tree ‘woodlands’ and Mojave desert scrub communities at elevations from 1,969 to 3,937 feet (CNPS 2010). It is only known to occur in San Bernardino County, California (CNPS 2010). Its habitat includes sandy or gravelly substrates, often occurring in washes. It has purplish-red stems and leaves reaching 1 to 6 inches (University and Jepson Herbaria 2010). This species was not detected during botanical surveys conducted in 2007, 2008, and 2010, and is considered to have a low potential for occurring on the project site based on the criteria listed above.

### ***Small-Flowered Androstephium (Androstephium breviflorum)***

Small-flowered androstephium is ranked on CNPS List 2.2 (i.e., rare, threatened or endangered in California but more common elsewhere) and as S2.1 by CDFG (2010b; i.e., fewer than 1,000 known individuals or fewer than 2,000 acres of occupied habitat). This species is a bulbiferous, perennial herb that generally occurs in sandy or rocky soil of open desert shrublands in eastern California and through the Great Basin to western Colorado (Cronquist et al. 1977; Keator 2001).

As of 1993, formal documentation of small-flowered androstephium occurrence in California was still needed (Keator 1993) and as of 1996 it was known in California from only four herbarium specimens and a photograph (White et al. 1996). Since then, botanical field surveys conducted to compile baseline data for numerous new land use proposals (e.g., the Fort Irwin Land Expansion Project and various energy projects) have discovered numerous additional occurrences, documented in part by CNPS (2010) and the Consortium of California Herbaria (2010). The documentation of many new occurrences implies that small-flowered androstephium may be more common in California than previously thought, although it is noted that a large percentage (85 percent) of the occurrences documented in the CNDDDB are threatened by development (solar energy projects and Fort Irwin expansion).

Small-flowered androstephium was detected at 52 locations on the project site and 14 additional locations within a 1,000 foot buffer surrounding the project site during the pre-project surveys conducted by the Applicant in 2007 and 2008 (SES 2009). Numerous additional occurrences were documented on public lands to the west and east, including many in the Pisgah ACEC. This species was detected throughout the sandy southern portion of the project site during more intensive surveys conducted by the Applicant in April and May 2010 (SES 2010a; SES 2010e). While it is a cryptic species that is difficult to detect, there were over 1,500 individual occurrences across the southern portion of the project site that were recorded during the 2010 plant surveys.

### ***Unnamed Lupine Species (Lupinus sp.)***

An undescribed lupine species was detected during pre-project surveys conducted by the Applicant in April and May 2010; eight individuals were documented in six separate locations within the project footprint along the northern boundary of the project site and five individuals were documented in four separate locations within 250 feet of the site boundary (SES 2010a; SES 2010e). The unnamed species does not currently have a special-status designation, but it does have some taxonomic precedent. Dr. Jim Andre previously vouchered this unnamed taxon from the eastern Cady Mountains, and its detection on the Calico site is a new locality. Dr. Andre has labeled the voucher specimen as *Lupinus concinnus* J. Agardh var. *agardhianus* (A. A. Heller) C. P. Smith. The varieties of *Lupinus concinnus*, recognized in the past have been found to be indistinct. Dr. Andre believes this form merits taxonomic recognition, either as a new species, or as a new variety under *Lupinus concinnus* (SES 2010a).

### ***White-Margined Beardtongue (Penstemon albomarginatus)***

White-margined beardtongue is a perennial herb that flowers in spring (between March and May) and dies back to the ground in summer, and is the only CNPS List 1B species documented within the proposed project area (SES 2009). It is also managed by the BLM as a sensitive species. White-margined beardtongue occurs in stabilized or drifting wind-blown sand habitat (Jaeger 1941; Munz 1974; The Nature Conservancy 2007; CNPS 2010).

White-margined beardtongue is known from three widely-disjunct locations in California, Nevada, and Arizona. In California, its known range is limited to the valley south of the Cady Mountains, near Hector, Lavic, and Ludlow, and most of its geographic range is in and around the Pisgah lava flow that includes the Pisgah ACEC (MacKay 2003; MacKay no date). The Consortium of California Herbaria (2010) reports 40 specimens, all from the same general area. There also is a report from the Fenner Valley in California (The Nature Conservancy 2007) though that occurrence apparently is not supported by a herbarium specimen. There is also one report from the “Baghdad Chase Mine,” which was south of Ludlow on or near what is now Twentynine Palms Marine Base. White-margined beardtongue was not reported on the Twentynine Palms Marine Base in the inventory of its natural resources which included extensive botanical surveys (Minnich et al. 1993). In Nevada, it is known from several populations southeast of Interstate 15 (I-15), between Stateline and Las Vegas. These occurrences are threatened by a proposed construction project. In Arizona, white-margined beardtongue occurs at Dutch Flat (Arizona Rare Plant Committee 2004), described as “a large plain extending west of the Hualapai Mountains” (i.e., southwest of Kingman) (MacKay 2003). In Arizona, as in California, it is regarded as “a rare species throughout its range” (Arizona Rare Plant Committee 2004).

This species is present on the project site and also occurs in adjacent habitats in the immediate project vicinity. One white-margined beardtongue occurrence was mapped on the project site

along with numerous other occurrences off-site to the southeast within the Pisgah ACEC during surveys conducted by the Applicant in 2008 (SES 2009). Five distinct occurrences of white-margined beardtongue totaling 25 individual plants were documented in the southern half of the project site during surveys conducted by the Applicant in April and May 2010 (SES 2010a; SES 2010e).

## **Special-Status Reptiles**

### ***Banded Gila Monster (Heloderma suspectum cinctum)***

The banded Gila monster is a BLM Sensitive species and a California Species of Special Concern. The banded Gila monster is considered rare in California with only 26 credible records of the species documented within the past 153 years (Lovich and Beaman 2007). This large and distinct lizard is difficult to observe even in areas where they have been recently recorded. As a result, little is known about this species' distribution, population status, and life history in California. Habitat in which the species has been observed in California is characterized by rocky, deeply incised topography and is, in most cases, associated with large and relatively high mountain ranges (Lovich and Beaman 2007). Despite the widespread distribution of potential habitat throughout the desert in California, the few documented observations suggest the current distribution is a function of summer rainfall. As reported by Lovich and Beaman (2007), all California Gila monster observations except one (an unconfirmed sighting along the Mojave River) occurred east of the 116th meridian in areas that received at least 25 percent of their annual precipitation during the summer months. Throughout their range, Gila monsters appear to be most active during or following summer rain events.

Banded Gila monsters were not detected onsite during surveys; however, desert scrub communities, rocky outcrops, and lava flows present onsite are potentially suitable habitats. Much of the habitat between the BNSF railroad and I-40 has been subject to historic disturbance and is lower quality habitat compared to the bajadas that are situated closer to the Cady Mountains. This species is not known from the area and the closest known sighting is an historic record from the Providence Mountains approximately 50 miles to the east of the project site (Lovich and Beaman 2007); however, Gila monsters are difficult to detect due to their secretive nature and tendency to remain in underground burrows for extended periods of time. Therefore, there is a low potential for this species to be present on the project site.

### ***Desert Tortoise (Gopherus agassizii)***

The desert tortoise is a desert-adapted, herbivorous reptile whose range includes the Mojave Desert region of Nevada, southern California, northwestern Arizona, and southwestern Utah, and the Sonoran Desert region of Arizona and northern Mexico. Desert tortoises occurring south and east of the Colorado River are considered part of the Sonoran population, while those

occurring north and west of the Colorado River are part of the Mojave population. Only the Mojave population of desert tortoise is state and federally listed as threatened. The desert tortoise in the vicinity of the Calico Solar project is part of the state and federally listed Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual vegetation for forage.

Plant species play a major role in defining desert tortoise habitat for the Mojave population. Creosote bush, white bursage (*Ambrosia dumosa*), Mojave yucca (*Yucca schidigera*), and blackbrush (*Coleogyne ramosissima*) are generally indicative of desert tortoise habitat, and at higher elevations, Joshua tree and galleta grass are common plant indicators (USFWS 1994b).

Suitable habitats include desert valleys washes, and broad alluvial fans, as well as canyon bottoms, rocky hillsides, and other steep terrain. Tortoises are most common in desert scrub, desert wash, and Joshua tree habitats, but occur in almost every desert habitat except on the most precipitous slopes. Friable soils are an important habitat component, particularly for burrow excavation and nesting. The presence of soil suitable for digging burrows is a limiting factor to desert tortoise distribution (USFWS 1994b).

The desert tortoise is able to live where ground temperature may exceed 140 degrees Fahrenheit because of its ability to dig burrows and escape intense solar radiation. At least 95 percent of a tortoise's life is spent in burrows. Tortoises enter hibernation between September and November and emerge from their burrows sometime in spring, when they are generally most active from March to May when foraging opportunities are more plentiful. Tortoises remain active between June and October, though to a lesser extent. Tortoises may seek shade in burrows or underneath bushes or rocks during the hottest parts of the day. A single tortoise may have a dozen or more burrows or cover sites within its home range, and different tortoises may use these burrows. During the summer months, tortoises retreat to burrows where they may aestivate during extended periods of intense heat and dryness. Desert tortoise predators include Gila monsters, kit foxes, and coyotes, which destroy and/or consume tortoise eggs; ravens, which prey on juvenile and immature tortoises; and golden eagles, which prey on immature and adult tortoises (USFWS 1994b). Tortoises are most vulnerable to predation when they are young and have few enemies once they are mature (Zeiner et al. 1989).

Desert tortoises are long-lived with delayed maturity. Tortoises typically reach maturity between 12 and 25 years of age, although size is more important than age for determining when a tortoise becomes capable of reproduction. Once reaching maturity, tortoises continue to reproduce throughout the rest of their lives (USFWS 1994b). Females typically reproduce every year, laying clutches of 2 to 9 eggs (the average is 5 eggs). Mating occurs in late March to early April; eggs are laid in late May to July and take 3 to 4 months to hatch (Zeiner et al. 1989).

Suitable habitat for the desert tortoise (including Mojave creosote bush scrub and desert saltbush scrub) is present throughout the project site. Desert tortoises have been documented

both on the project site and in adjacent desert areas. The Applicant recently conducted a 100 percent survey of the 8,230-acre project site using the USFWS's 2010 *Pre-project Field Survey Protocol for Potential Desert Tortoise Habitats*. The survey, conducted March 29 through April 15, 2010, documented a total of 104 individual tortoises on the project site (88 adults, 1 subadult, and 15 juveniles) (SES 2010b). These tortoises were concentrated in a band across the northern portion of the project site; two tortoises were also documented in the portion of the project site between the BNSF railroad and I-40 during the 2010 survey, where only tortoise sign had been documented during previous surveys.

The Calico Solar Project site does not include any critical habitat that has been proposed or designated for the desert tortoise under the ESA. The nearest designated critical habitat for this species is located approximately 0.5 mile south of the project site within the Ord-Rodman DWMA (Figure A-2). While I-40 and the BNSF railroad pose barriers to movement between this critical habitat and the project site, access to adjacent habitats is currently available through the many railroad trestles and culverts that span the drainages that traverse the site.

### ***Mojave Fringe-Toed Lizard (Uma scoparia)***

The Mojave fringe-toed lizard is a BLM Sensitive species and California Species of Special Concern that is found in arid, sandy, sparsely vegetated habitats and is associated with creosote scrub throughout much of its range (Norris 1958; Jennings and Hayes 1994). This species is restricted to habitats containing fine, loose, wind-blown sand, typically with sand grain size no coarser than 0.375 millimeter in diameter (Turner et al. 1984; Jennings and Hayes 1994; Stebbins 1944). It burrows in the sand to avoid predators and to thermoregulate (Stebbins 1944), though it will also seek shelter in rodent burrows. Sand dunes provide the primary habitat for this species, although it can also be found on the sandy margins of dry lakebeds and washes and in isolated pockets of sand against hillsides (BLM et al. 2005). The most important factor in this species' habitat is the presence of fine sands.

Mojave fringe-toed lizards are known almost exclusively from California, primarily in San Bernardino and eastern Riverside Counties, but are also found to the north in southeastern Inyo County and historically to the west in eastern Los Angeles County (Jennings and Hayes 1994). The Mojave fringe-toed lizard is widespread geographically across the Mojave and northern Colorado deserts in California, but its distribution is highly fragmented because it is restricted to habitats containing loose sand, which are patchily distributed (Murphy et al. 2007). This fragmented pattern of distribution leaves the species vulnerable to local extirpations from habitat disturbance and fragmentation as well as stochastic events (Murphy et al. 2007).

A study by Cablk and Heaton (2002) at the Marine Corps Air Ground Combat Center at Twentynine Palms (Twentynine Palms) documented Mojave fringe-toed lizard populations in a broader area than expected and concluded suitable habitat exists within a matrix of

heterogeneous conditions such as hummocks or pockets of soft sand with few annual species interspersed with hard packed sand and less suitable levels of vegetation and vegetation composition. While small patches of sand may not be large enough to support a population of Mojave fringe-toed lizards, these patches provide refugia and foraging habitat, and may play an important role in linking populations of this species.

The Mojave fringe-toed lizard is primarily insectivorous, but also eats plants including leaves, seeds, and buds (Stebbins 1944). This species normally hibernates from November to February, and emerges as early as February. The breeding season is April to July, and adult Mojave fringe-toed lizards reach sexual maturity two summers after hatching. Females deposit 2 to 5 eggs in sandy hills or hummocks May through July (Mayhew 1964; Jennings and Hayes 1994). From 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).

The Mojave fringe-toed lizard is present on the project site; this species was documented in a partially-stabilized dune complex located between the BNSF Railroad and I-40 during special-status species surveys conducted in 2008 (SES 2009). Based on the results of the surveys, the Applicant identified approximately 16.9 acres of Mojave fringe-toed lizard habitat on the project site; however, this is an underestimation of the amount of habitat that can be utilized by this species on the project site because sandy substrates occur in many areas adjacent to the identified dune complex, both within the numerous drainages that cross the project site and in small patches of windblown sand. Similarly, soft friable sands with small patches of micro dunes occur within the creosote bush scrub habitat across much of the lower portion of the project site. The CEC has estimated that an additional 147.8 acres of suitable occurs on the project site along the primary washes that transport sand and sediment across the project site and along the BNSF railroad where concentrations of windblown sand have accumulated; therefore, a total of 164.7 acres of Mojave fringe-toed lizard habitat is estimated to be present.

## **Special-Status Birds**

### ***Bendire's Thrasher (Toxostoma bendirei)***

Bendire's thrasher is a BLM Sensitive species and California Species of Special Concern. Bendire's thrashers are known in California from scattered locations in Kern, Inyo, San Bernardino, and Riverside counties, and one documented outlier in San Diego County (Sterling 2008). This species is a summer resident in California from March to late August, breeding from late March through July. In the Mojave Desert, this species favors Mojave desert scrub,

primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, or other succulents (Sterling 2008).

Bendire's thrasher was observed during pre-project surveys in an area adjacent to the project site (SES 2009); suitable nesting and foraging habitat occurs throughout the project site.

### ***Burrowing Owl (Athene cunicularia)***

The burrowing owl, a BLM Sensitive species and California Species of Special Concern, is a small owl that lives and nests in underground burrows. Burrowing owls favor flat, open grassland and sparse shrubland ecosystems that typically have sparse, or nonexistent, tree or shrub canopies. In the Mojave Desert, 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 (Gervais et al. 2008).

In California, burrowing owls are found in close association with California ground squirrels (*Spermophilus beecheyi*) (Coulombe 1971). These owls use the burrows of ground squirrels and other rodents for shelter and nesting (Martin 1973). Vegetation clipping by ground squirrels maintains areas of short vegetation height that provides foraging habitat and allows for visual detection of avian predators by burrowing owls (Haug et al. 1993). These owls can also use man-made features as burrows (e.g., drain pipes, debris piles) or burrows of other animals such as the desert tortoise. Burrowing owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding burrowing owls (Haug et al. 1993). The nesting season, as recognized by the California Burrowing Owl Consortium (CBOC) (1993), is February through August.

California ground squirrel burrows are present throughout the project site, providing suitable nesting habitat for burrowing owls. Burrowing owls are present on the project site, as two individuals were observed in the north-central portion of the project site and another individual was observed southeast of the project site in the Pisgah ACEC during field surveys conducted by the Applicant in 2008 (SES 2009). Protocol surveys for this species were conducted by the Applicant in January 2010, and two burrowing owls and approximately eleven burrows with sign were detected in various locations throughout the project site (SES 2010d).

### ***Golden Eagle (Aquila chrysaetos)***

The golden eagle is a BLM Sensitive species, a fully-protected species for the State of California, and a CDFG Watch List species. Golden eagles are year-round residents throughout most of the western United States. Suitable 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. This

species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Golden eagles primarily prey on rabbits 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 that provide overhanging ledges and cliffs and large trees used as cover. Golden eagle territories can typically have up to six nests, but have also been found to contain up to 14 nests in some locations (Kochert et al. 2002). Golden eagles breed from late January through August with peak activity occurring March through July (Kochert et al. 2002). Absent interference from humans, breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009a).

Golden eagles were observed flying over the project site during the pre-project surveys that were conducted in 2007 and 2008 (SES 2009). To document potential nest sites for golden eagles, the Applicant conducted helicopter surveys for this species in March 2010. One active golden eagle nest and up to ten potential nesting sites were documented within 10 miles of the project site during the 2010 helicopter surveys; the closest active nest was located 3.5 miles to the east of the project site and does not occur in the line of sight (SES 2010c). The BLM has determined that four golden eagle territories are present within 10 miles of the project site; only one of these territories is considered occupied, and the other three are considered historic (i.e., there has been no use of these territories within the last 10 years). Nesting habitat does not occur on the project site; however, the individuals observed nesting in the nearby Cady Mountains likely forage over the project site.

### ***Le Conte's Thrasher (Toxostoma lecontei)***

Le Conte's thrasher is a BLM Sensitive and CDFG Watch List species. Le Conte's thrashers inhabit some of the hottest and driest habitats in the arid southwest, including the deserts of southeastern California where it is a year-round inhabitant. Preferred habitats include sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes. Nests are typically placed in thorny vegetation such as cacti or thorny shrubs (Sheppard 1996). Population densities are among the lowest of passerine (perching) birds, estimated at less than five birds per square kilometer in optimal habitats (Fitton 2008); this low population density decreases the probability of their detection during field surveys. This thrasher forages for arthropods under plants in accumulated leaf litter and also feeds on seeds, small lizards, and other small vertebrates.

Le Conte's thrasher is present on the project site; one individual was observed on the project site during pre-project surveys conducted in 2008 (SES 2009). Suitable nesting and foraging habitat for this species occurs throughout the project site.

***Mountain Plover (Charadrius montanus)***

The mountain plover is a BLM Sensitive species and a California Species of Special Concern; this species has also recently been proposed for listing by the USFWS as a threatened species under the ESA. Mountain plovers do not breed in California but are winter visitors to low-elevation interior valleys and plains (Shuford and Gardali 2008). The species ranges in California from the southern Sacramento Valley and inner portion of the San Francisco Bay region south to the southern coastal slope and east to the Imperial Valley. This species is typically found in association with short-grass prairie habitats; however, mountain plover wintering habitat in the West Mojave Planning Area is almost exclusively private agricultural land. This species has not been documented on the project site or immediate project vicinity during any of the pre-project surveys conducted by the Applicant, and its potential for occurrence on the project site as a seasonal migrant is low.

***Swainson's Hawk (Buteo swainsoni)***

Swainson's hawk, a BLM Sensitive and state-listed Threatened species, was once one of the most common birds of prey in the grasslands of California and nested in the majority of the lowland areas of the state. This species' nesting range is now primarily restricted to portions of the Sacramento and San Joaquin valleys, northeast California, and the western Mojave Desert, including Antelope Valley (Bloom 1980). Swainson's hawk requires large amounts of foraging habitat, preferably grassland or pasture habitats. Its preferred prey includes voles (*Microtus* spp.), gophers, birds, and insects such as grasshoppers (Estep 1989). It has adapted to the use of some croplands, particularly alfalfa, as well as grain, tomatoes, and beets (Estep 1989). Crops such as cotton, corn, rice, orchards, and vineyards are not suitable because they either lack suitable prey, or prey is unavailable to the hawks due to crop structure. Swainson's hawks often establish territories in riparian systems adjacent to suitable foraging habitats as well as utilizing lone trees or groves of trees in agricultural fields.

Within the western Mojave Desert, the nearest documented nesting attempts have been recorded in Victorville, approximately 50 miles southwest of the project site (BLM et al. 2005); nesting is not known from east of this location (i.e., nesting by this species has not been documented in the project vicinity). Two Swainson's hawks were observed during pre-project surveys on March 30, 2008. These birds were likely migrants passing through the area, as potentially suitable foraging habitat is present throughout the project site. Swainson's hawks are not expected to nest on the project site because suitable nesting habitat is not present.

## Special-Status Mammals

### ***American Badger (Taxidea taxus)***

American badgers were once fairly widespread throughout open grassland habitats of California, but are now uncommon and considered a California Species of Special Concern. They are permanent residents throughout most of the state, with the exception of the northern North Coast area. Badgers are most abundant in the drier, open stages of most desert, shrub, forest, and herbaceous habitats with friable soils. Breeding occurs in late summer or early fall, and two to three young are born in March or April (Long 1973).

Badgers are fossorial mammals that dig large burrows in dry, friable soils and have multiple dens and burrows within their home range. They frequently reuse old burrows, although some may dig a new den each night, especially in summer (Sullivan 1996). Cover burrows are up to 30 feet in length and 3 feet in depth. Natal dens are larger and more complex than cover dens, and are used for extended periods, although litters are often moved several times. In undisturbed, high-quality habitat, badger dens can average 0.64 dens per acre, but are usually at much lower density in highly disturbed areas (Sullivan 1996). Badgers are carnivorous, feeding on fossorial rodents such as rats, mice, chipmunks, and especially ground squirrels and pocket gophers. This species will also eat some reptiles, insects, earthworms, eggs, birds, and carrion when preferred prey species are not available (Zeiner et al. 1990).

One American badger was detected in the northeastern portion of the project site during pre-project surveys conducted in 2008, and three badger burrows were observed during burrowing owl surveys that were conducted by the Applicant in January and February 2010 (SES 2009; SES 2010d; SES 2010f). Suitable habitat for this species is present throughout the project site, although there are likely to be few American badgers present based on the number of documented occurrences.

### ***Desert Kit Fox (Vulpes macrotis arsipus)***

While the desert kit fox is not listed as a special-status species by the State of California or the USFWS, it is protected under Title 14 of the California Code of Regulations (Section 460). Kit foxes are primarily nocturnal, and inhabit open level areas with patchy shrubs. The desert kit fox can be found in the Mojave Desert in much of the same habitat as the American badger. Friable soils are necessary for the construction of dens, which are used throughout the year for cover, thermoregulation, water conservation, and rearing pups. Kit foxes typically produce one litter of about four pups per year, with most pups born February through April (Ahlborn 2000). Kit foxes are primarily carnivorous, feeding mostly on black-tailed jackrabbits, desert cottontails, rodents (especially kangaroo rats and ground squirrels), insects, reptiles, birds, bird eggs, and sometimes vegetation (Zeiner et al. 1990). Desert kit fox habitat is present throughout the

project site, and this species has been incidentally detected during pre-project surveys. A total of 39 potential kit fox dens were detected during burrowing owl surveys that were conducted by the Applicant in January and February 2010 (SES 2010d; SES 2010f).

### ***Nelson's Bighorn Sheep (Ovis canadensis nelsoni)***

Nelson's bighorn sheep is a BLM Sensitive species that is named for the large, curved horns borne by the males, or rams. Females, or ewes, also have horns, but they are short with only a slight curvature. Bighorn sheep are typically found on open, precipitous terrain with rocky slopes, ridges, and cliffs or canyons, where there is at least some available surface water and herbaceous vegetation for forage. Most of the bighorn sheep in California inhabit areas between 300 to 4,000 feet in elevation where the annual precipitation is less than 4 inches and daily high temperatures average 104 degrees Fahrenheit in the summer (Beacham 2000).

Bighorn sheep migrate between winter and summer ranges, generally moving downslope in winter and spending summer months near dependable water sources at higher elevations. It is common for rams and ewes to segregate and occupy different habitats outside the breeding season, although they tend to congregate together near dependable water sources from May through October (Bleich et al. 1997). Areas associated with ridge benches or canyon rims adjacent to steep slopes or escarpments are commonly preferred lambing areas, if available. Alluvial fan areas are also used for breeding and feeding activities (Beacham 2000).

Breeding generally occurs between August and November; following a six month gestation period, ewes can give birth to single lambs (occasionally twins) any time from December through June. During the first few weeks after giving birth, ewes remain alone with their lambs in steep terrain, allowing them to escape predators such as coyotes (*Canis latrans*), golden eagles (*Aquila chrysaetos*), and cougars (*Felis concolor*). Males frequently occupy much less precipitous habitat during the lamb-rearing season (Bleich et al. 1997).

Bighorn sheep primarily browse shrubs and graze on native grasses, though the pulp and fruits of various cacti are also eaten during the dry season (Beacham 2000). Bighorn sheep are able to digest grasses even in a very dry state, which gives them the flexibility to select diets that optimize nutrient content from available forage (Hanly 1982). Consequently, bighorn sheep feed on a large variety of plant species and the composition of their forage varies seasonally and among locations. While the quality of available forage varies greatly among years, it is most predictably high in late winter and spring (Wehausen 1992), which coincides with the peak of lambing.

The population of bighorn sheep in the Cady Mountains just north of the project area is a native population (not reintroduced or augmented), and was estimated to contain 25 to 50 individuals in 1995 (Torres et al. 1994, 1996; BLM et al. 2005). By 2007, this population had grown to approximately 300 individuals (Defenders of Wildlife 2010). No Nelson's bighorn sheep were

observed during the pre-project surveys of the project site in 2007 or 2008; however, two bighorn sheep horns, two bighorn sheep skeletons, and two occurrences of scat were documented near the northern boundary of the project site during the April 2010 desert tortoise survey and during subsequent site visits by the CEC. Helicopter surveys conducted by the Applicant in March 2010 observed eight separate groups totaling 62 bighorn sheep (12 rams, 38 ewes, and 12 lambs) in the Cady Mountains within 10 miles of the project site (SES 2010c).

While little is currently known regarding the movements or specific habitat use of Nelson's bighorn sheep in the immediate project vicinity, they are known to move seasonally from the year-round use areas in the Cady Mountains to the north and northwest of the project site to winter ranges in the Bristol Mountains to the east of the project site (SES 2009 – Figure 9). Bighorn sheep in the Cady Mountains are known to forage in the bajadas near the foothills of the mountains and may occasionally move across the flatlands associated with the Calico Solar project. Approximately 2,240 acres of spring foraging habitat and 430 acres of year-round occupied habitat occur within the project footprint near the northeast boundary along the foothills of the Cady Mountains (SES 2009). There are no known seeps or springs in the Cady Mountains, but there is an existing wildlife guzzler that is maintained for bighorn sheep in the Cady Mountains that is currently accessed via routes through the project site.

### ***Pallid Bat (Antrozous pallidus)***

The pallid bat is a BLM Sensitive species and a California Species of Special Concern. The pallid bat is a long-eared, light brown or sandy colored bat of moderate size that occurs throughout California with the exception of the northwest corner of the state and the high Sierra Nevada (Zeiner et al. 1990). Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridges for roosting. They may also occur in open coniferous forests. This species commonly roost in deep crevices in rocky outcrops, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Colonies can range from a few individuals to over a hundred (Barbour and Davis 1969) and usually this species occurs in groups larger than 20 individuals (Wilson and Ruff 1999). Although crevices are important for day roosts, night roosts often include open buildings, porches, garages, highway bridges, and mines.

Pallid bats may travel up to several miles for water or foraging sites if roosting sites are limited. This bat prefers foraging on terrestrial arthropods in open habitats, and regional populations and individuals may show selective prey preferences (Johnston and Fenton 2001). Pallid bat roosts are very susceptible to human disturbance, and urban development has been cited as the most significant factor contributing to their regional decline (Miner and Stokes 2005).

Roosting habitat for this species occurs nearby in the Cady Mountains and in lava tubes associated with the Pisgah Crater. Although roosting habitat does not appear to exist on the

project site, there is a moderate potential for pallid bats to be present because of the presence of suitable foraging habitat in the area.

### ***Spotted Bat (Euderma maculatum)***

The spotted bat is a BLM Sensitive species and a California Species of Special Concern. Spotted bats are mostly solitary animals but occasionally roost or hibernate in small groups (Chambers and Herder 2005). Roost sites include cracks, crevices, and caves, and bats typically return to the same roost sites. Vegetation types range from desert to sub-alpine meadows, including desert-scrub, pinyon-juniper woodland, ponderosa pine, mixed conifer forest, canyon bottoms, rims of cliffs, riparian areas, fields, and open pasture (Chambers and Herder 2005). Elevation ranges from 187 feet below sea level to 10,600 feet above sea level. In California, the species is found in arid areas dominated by sagebrush (*Artemisia tridentata*), saltbush (*Atriplex* spp.), greasewood (*Sarcobatus vermiculatus*), and rabbitbrush (*Chrysothamnus nauseosus*) (Pierson and Rainey 1998). It feeds primarily on moths that it captures while foraging over water and along washes. Threats to spotted bats include recreational climbing and caving, construction of water reservoirs that inundate canyon walls, highway construction in canyon areas, and the use of pesticides (Pearson and Rainey 1998). Its solitary, crevice roosting habit makes it difficult to find; however, because of the presence of steep cliffs in the nearby Cady Mountains, this species is considered to have a low potential to occur on the project site.

### ***Townsend's Big-Eared Bat (Corynorhinus townsendii)***

Townsend's big-eared bat is a BLM Sensitive species and a California Species of Special Concern. In Southern California, Townsend's big-eared bat was once common in the coastal plains of Southern California where mines or caves are prevalent (Kruttsch 1948). However, this species has declined substantially in the region and is now primarily limited to the foothill and mountain regions of Southern California (Miner and Stokes 2005).

Townsend's big-eared bats are colonial roosters that feed primarily on moths. Females aggregate in the spring at nursery sites known as maternity colonies. Although Townsend's big-eared bat is usually a cave-dwelling species, many colonies are found in man-made structures such as the attics of buildings or old, abandoned mines. Roost sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other structures (Williams 1986). Townsend's big-eared bats are very susceptible to human disturbance, and females are known to completely abandon their young when disturbed. The loss of maternity and hibernation roosts has been cited as the most significant factor contributing to their decline throughout their range (Miner and Stokes 2005).

Roosting habitat for this species occurs nearby in the Cady Mountains and in lava tubes associated with the Pisgah Crater. Townsend's big-eared bat is present on the project site, as this species was detected during surveys conducted in 2008. Although roosting habitat does not appear to exist on the project site, suitable foraging habitat is present throughout the project site and in adjacent habitats.

### ***Western Mastiff Bat (Eumops perotis)***

The western mastiff bat is a BLM Sensitive species and a California Species of Special Concern. The western mastiff bat is a large, primarily cliff dwelling species; maternity colonies of 30 to several hundred bats will typically roost under exfoliating rock slabs and in some cases crevices in large boulders and buildings (Siders 2005). The species ranges from central Mexico to parts of California, southern Nevada, southwestern Arizona, southern New Mexico and western Texas. The species occurs throughout California and is most frequently encountered in broad open areas; its distribution is likely determined by the presence of significant rock features that offer suitable roosting habitat (Pierson and Rainey 1998). Foraging habitat includes dry desert washes, flood plains, open ponderosa pine forest, grassland, oak woodland, chaparral, and agricultural areas, where it feeds primarily on moths. Threats to the western mastiff bat include the loss of clean, open water; modification or destruction of roosting and foraging habitat; disturbance or destruction of hibernacula; and the use of pesticides (Siders 2005).

Roosting habitat for this species occurs nearby in the Cady Mountains and in lava tubes associated with the Pisgah Crater. Although roosting habitat does not appear to exist on the project site, suitable foraging habitat is present throughout the project site and in adjacent habitats.

## **3.4 Climate Change**

This section describes existing conditions pertaining to climate change and was modified from information included in Section C.1, Air Quality in the SA/DEIS.

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change (IPCC), the efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy have increased dramatically only in recent years. These efforts are primarily concerned with the emissions of GHG related to human activity that include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), tetrafluoromethane (CF<sub>4</sub>), hexafluoroethane (C<sub>2</sub>F<sub>6</sub>), sulfur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (HFCs).

### 3.4.1 Definition of Resource

According to the EPA, climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from the following:

- Natural factors, such as changes in the sun's intensity or slow changes in the earth's orbit around the sun
- Natural processes within the climate system (for example, changes in ocean circulation)
- Human activities that change the atmosphere's composition (for example, through burning fossil fuels) and the land surface (for example, deforestation, reforestation, urbanization, desertification)

Global warming is an average increase in the temperature of the atmosphere near the earth's surface and in the troposphere, which can contribute to changes in global climate patterns. There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Human-made emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. The California Legislature finds that “. . . global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California” (California Health and Safety Code).

### 3.4.2 Applicable Laws, Regulations, Plans, and Policies

The federal, state, and local laws and policies listed in Table 3-10 pertain to the control and mitigation of GHG emissions.

**Table 3-10 Climate Change Laws, Regulations, Plans and Policies**

Law, Regulation, Plan or Policy	Description
<b>Federal:</b> 40 CFR 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO <sub>2</sub> E emissions per year.
<b>Federal:</b> EO 13514	Expands energy reduction and environmental performance requirements for federal agencies identified in EO 13423. The goal of the EO is to establish and integrated strategy towards sustainability in the federal government and to make reduction of GHG emissions a priority for federal agencies.

Law, Regulation, Plan or Policy	Description
<b>Federal (DOI):</b> SO 3226; SO 3285; SO 3289	These orders direct bureaus and offices within the DOI to provide leadership by responding in a timely manner to climate change issues, makes development of renewable energy a priority, and identify DOI-wide approaches to applying scientific tools to understand climate change and coordinate an effective response to its impacts on DOI resources.
<b>Federal (EPA):</b> Mandatory GHG reporting Standard (40 CFR 98); Endangerment Finding for GHGs (74 FR 66496, December 15, 2009); Light-Duty Vehicle GHG Standards (75 FR 25324, May 7, 2010); Prevention of Significant Deterioration Tailoring Rule (May 13, 2010)	Findings that require GHG reporting for vehicles and general stationary fuel combustion sources, including electricity services and the identification of six key GHGs as a potential threat to human health and welfare.
<b>Federal (CEQ):</b> Draft NEPA Guidance on Consideration of the effects of Climate Change and Greenhouse gas emissions. (Feb. 2, 2010)	The guidance explains how agencies of the Federal government should analyze the environmental effects of GHG emissions and climate change when they describe the environmental effects of a proposed agency action in accordance with Section 102 of NEPA and the CEQ Regulations for Implementing the Procedural Provisions of NEPA, 40 C.F.R. parts 1500-1508.
<b>State:</b> California Code of Regulations (Title 17 Subchapter 10, Article 2, Sections 95100 et. seq.)	These CARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006.
<b>State:</b> California Code of Regulations (Title 20, Section 2900 et seq.); California Public Utilities Commission Decision D0701039 in proceeding R0604009	These regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a GHG emission standard of 0.5 metric tons of CO <sub>2</sub> per megawatt-hour, or 1,100 pounds of CO <sub>2</sub> per megawatt-hour.
<b>State:</b> California Global Warming Solutions Act of 2006 (Assembly Bill 32, Chapter 488, Sections 38500 et seq. of the Health and Safety Code)	This act requires CARB to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities are regulated by the CARB.
<b>State:</b> EO S-13-08	This State EO directs a number of state agencies to address California's vulnerability to sea level rise caused by climate change.

Table Source: EPA Web site, <http://www.epa.gov/climatechange/initiatives/index.html> (accessed June 3, 2010) and the CARB Web site, <http://www.arb.ca.gov/cc/cc.htm> (accessed June 3, 2010)

Table Source: Modified from BLM and CEC 2010.

Table Key: CO<sub>2</sub> = carbon dioxide; CO<sub>2</sub>E = carbon dioxide equivalent; CARB = California Air Resources Board; CFR = Code of Federal Regulations; DOI = Department of the Interior; EO = executive order; EPA = Environmental Protection Agency; FR = Federal Register; GHG = greenhouse gases; SO = secretarial order

In 2002, with the passage of Assembly Bill (AB) 1493, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the State level. AB 1493 requires the CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009 vehicle model year. To enact these

standards, however, California needed a waiver from the EPA. The waiver was denied by the EPA in December 2007 (see *California versus the Environmental Protection Agency*, 9th Circuit, July 25, 2008, No. 08-70011). However, on January 26, 2009, it was announced that the EPA would reconsider its decision regarding the denial of California's waiver. On May 18, 2009, President Obama announced the enactment of a 35.5 miles per gallon fuel economy standard for automobiles and light duty trucks, which will take effect in 2012. On June 30, 2009, the EPA granted California the waiver. California is expected to enforce its standards from 2009 through 2011 and then look to the federal government to implement equivalent standards from 2012 through 2016. The granting of the waiver will also allow California to implement even stronger standards in the future. The State is expected to start developing new standards for the post-2016 model years in late 2010.

On June 1, 2005, Governor Arnold Schwarzenegger signed EO S-3-05. The goal of this EO is to reduce California's GHG emissions to: (1) 2000 levels by 2010, (2) 1990 levels by the 2020, and (3) 80 percent below 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of AB 32, the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan that includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." EO S-20-06 further directs State agencies to begin implementing AB 32, including the recommendations made by the State's Climate Action Team.

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Climate change and GHG reduction are also concerns at the federal level; however, at this time, no federal legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. California, in conjunction with several environmental organizations and several other states, sued to force the EPA to regulate GHG as a pollutant under the federal CAA (*Massachusetts versus the Environmental Protection Agency et al.*, 549 United States Supreme Court 497 [2007]). The court ruled that GHG does fit within the CAA definition of a pollutant and that the EPA does have the authority to regulate GHG. Despite the Supreme Court ruling, there are no promulgated federal regulations to date that limit GHG emissions.

On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHG under Section 202(a) of the federal CAA:

- (1) *Endangerment Finding*: The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, perfluorocarbons [PFCs], and SF<sub>6</sub>) in the atmosphere threaten the public health and welfare of current and future generations.

- (2) *Cause or Contribute Finding*: The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing EPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by EPA and the United States Department of Transportation National Highway Safety Administration on September 15, 2009.

The Secretary of Interior issued three secretarial orders (SO) to BLM staff related to alternative energy proposals on federal lands:

- (1) SO 3226 ("Amendment No. 1: Climate Change and the Department of the Interior"): This SO provides guidance to bureaus and offices within the DOI on how to provide leadership by developing timely responses to emerging climate change issues.
- (2) SO 3285 ("Renewable Energy Development by the Department of the Interior"): This SO establishes the development of renewable energy as a priority for the DOI and establishes a Departmental Task Force on Energy and Climate Change. This order amends and clarifies DOI roles and responsibilities to accomplish this goal.
- (3) SO 3289 ("Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources"): This SO establishes a Department-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the DOI manages.

### **3.4.3 Current CDCA Plan**

The CDCA Plan does not contain any guidelines or elements pertaining to climate change (BLM 1999).

### **3.4.4 Greenhouse Gases**

Ongoing scientific research has identified the potential impacts of anthropogenic (human-made) GHG emissions and changes in biological carbon sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into

space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO<sub>2</sub> and equivalent concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The IPCC recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-twentieth century is very likely due to the observed increase in anthropogenic GHG concentrations (IPCC 2007).

Global mean surface temperatures have increased nearly 1.8 degrees Fahrenheit from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24 degrees north) have exhibited temperature increases of nearly 2.1 degrees Fahrenheit since 1900, with nearly a 1.8 degrees Fahrenheit increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4 degrees Fahrenheit above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. The IPCC concluded in a statement released February 2, 2007, that “the widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone” (IPCC 2007). Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict.

As with any field of scientific study, there are uncertainties associated with the science of climate change. This does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documents trends (EPA 2008).

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially CO<sub>2</sub> and CH<sub>4</sub>) from fossil fuel development, large wildfires, and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years.

It may be difficult to discern whether global climate change is already affecting resources. In most cases there is more information about potential or projected effects of global climate change on resources. It is important to note that projected changes are likely to occur over several decades to a century. Therefore many of the projected changes associated with climate change described below may not be measurably discernible within the reasonably foreseeable future.

Global warming potential (GWP) is a measure of how much a given mass of GHG is estimated to contribute to global warming and is devised to enable comparison of the warming effects of different gases. It is a relative scale that compares the gas in question to that of the same mass of CO<sub>2</sub>. CO<sub>2</sub> equivalent (CO<sub>2</sub>E) is a measure used to compare the emissions from various GHGs based on their GWP, when measured over a specified timescale (generally 100 years). CO<sub>2</sub>E is commonly expressed as million metric tons of CO<sub>2</sub>E. The CO<sub>2</sub>E for a gas is obtained by multiplying the mass (in tons) by the GWP of the gas. For example, the GWP for CH<sub>4</sub> over 100 years is 25. This means that the emission of 1 million metric ton of CH<sub>4</sub> is equivalent to the emission of 25 million metric tons of CO<sub>2</sub>, or 25 million metric tons of CO<sub>2</sub>E.

#### **3.4.4.1 Potential Effects of Climate Change**

In November 2004, the California Climate Action Team (CAT) was formed, comprising 14 agencies and 11 subgroups to assist CARB with the Climate Change Scoping Plan. According to the 2006 California CAT Report, the following climate change effects, based on the IPCC trends, can be expected in California over the next century:

- A diminishing Sierra snowpack, declining by 70 to 90 percent, threatening the state's water supply
- Increasing temperatures from 0.5 to 5.8 degrees Fahrenheit under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas
- Increased vulnerability of forests due to pest infestation and increased temperatures
- Increased electricity demand, particularly in the hot summer months

#### **3.4.4.2 Existing Greenhouse Gas Emissions**

Statewide emissions of GHG from relevant source categories in 1990 and 2000 to 2005 are summarized in Table 3-11. Specific contributions from air basins such as MDAB are not currently specified as part of the state inventory. Emissions of CO<sub>2</sub> occur largely from

combustion of fossil fuels. The major categories of fossil fuel combustion CO<sub>2</sub> sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. Other GHG emissions, such as CH<sub>4</sub> and N<sub>2</sub>O, are also tracked by state inventories but occur in much smaller quantities.

The generation of electricity can produce GHG with the criteria air pollutants that have been traditionally regulated under the federal and state CAAs. For fossil fuel-fired power plants, the GHG emissions include primarily CO<sub>2</sub>, with much smaller amounts of N<sub>2</sub>O and CH<sub>4</sub> (often from incomplete combustion of 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 the same. Other sources of GHG emissions include SF<sub>6</sub> from high voltage equipment and HFCs and PFCs from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO<sub>2</sub> emissions from carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled, reused or recycled, but are nevertheless documented in this EIS as some of the compounds have very high GWPs.

**Table 3-11 California GHG Emissions (million metric tons of CO<sub>2</sub>E)**

<b>Emission Inventory Category</b>	<b>1990</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Residential fuel combustion (CO <sub>2</sub> )	29.7	30.25	27.21	27.32	26.40	27.86	NA
Commercial fuel combustion (CO <sub>2</sub> )	14.40	15.63	12.04	17.84	15.06	12.10	NA
Industrial fuel combustion (CO <sub>2</sub> )	103.00	76.17	80.48	71.53	65.47	67.20	NA
Transportation fuel combustion (CO <sub>2</sub> )	150.7	181.68	182.49	190.19	180.64	187.95	NA
Electricity generation, in-state (CO <sub>2</sub> )	49.0	55.87	61.35	47.78	45.92	55.10	49.00
Methane (CH <sub>4</sub> )—all CH <sub>4</sub> shown as CO <sub>2</sub> E	NA	26.32	26.62	27.07	27.49	27.80	NA
Nitrous oxide (N <sub>2</sub> O)—all N <sub>2</sub> O shown as CO <sub>2</sub> E	NA	31.43	30.76	34.48	33.85	33.34	NA
Electricity transmission and distribution—SF <sub>6</sub> shown as CO <sub>2</sub> E	2.60	1.14	1.10	1.04	1.01	1.02	NA
Total California GHG emissions without electricity imports	371.10	440.47	446.35	444.86	423.20	439.19	NA
Electricity imports—CO <sub>2</sub> E	61.60	40.48	47.37	51.73	56.44	60.81	NA
Total California GHG emissions with electricity imports	433.29	480.94	493.72	496.59	479.64	500.00	NA

Table Source: CPUC 2008.

Table Key: CH<sub>4</sub> = methane; CO<sub>2</sub> = carbon dioxide; CO<sub>2</sub>E = carbon dioxide equivalent; GHG = greenhouse gases; N<sub>2</sub>O = nitrous oxide; NA = not available; SF<sub>6</sub> = sulfur hexafluoride.

### 3.4.5 Existing Conditions on the Project Site

There are currently no human-made sources of GHGs on the Calico Solar Project site. The site is unimproved desert landscape with native vegetation. The area has open roads and therefore there are some GHG emissions from recreational uses and accessing property within the area. These emissions are nominal. There are no existing point sources (single, identifiable, localized sources) of GHG emissions at the site.

## 3.5 Cultural Resources and Paleontology

This section was developed from Section C.3, Cultural Resources and Native American Values, and Section C.4, Geology and Paleontology of the SA/DEIS.

The Calico Solar Project's Area of Potential Effect (APE) is located within the Mojave Valley-Granite Mountains ecological subsection (Subsection 322Ah) of the broader Mojave Desert (Miles and Goudey 1997). The general environmental setting is a wide valley within arid desert, along an expansive alluvial fan that is dissected by numerous unnamed south-southwest trending washes and ephemeral drainages.

No springs are shown on the USGS quad maps for the Project APE, although three well sites are depicted on the USGS quad maps and were observed during the pedestrian surveys conducted for this study. Of these, the well located in southwestern quarter of Section 1 of Township 8 North, Range 5 West (Hector – 1982 Provisional 7.5 minute series quad) was observed to contain water; the remaining two wells did not appear to contain water. The nearest reliable water source existing outside the Project APE occurs approximately 12 miles to the west, in the Mojave Valley. Numerous springs and wells surround the dry lake bed of ancient Troy Lake, which is located just west of the Project APE. Water is seasonally available in the form of rain-swollen drainages, as indicated by the existence of numerous washes originating in the Cady Mountains and off site to the east. A substantial east-west drainage (axial channel) crosses the southern portion of the Project APE, eventually emptying into Troy Lake. Numerous dry stream drainages and lake remnants (i.e., Troy Lake, Lavic Lake, and Broadwell Lake) are located in the vicinity of the Project APE. It is believed that these areas contained surface water during the terminal Pleistocene and early Holocene periods. Based on paleoenvironmental data, the general climatic pattern in the Mojave Desert seems to be that of cool and wet periods followed by warmer and drier conditions, from the Late Pleistocene through the Late Holocene periods, as reflected in the numerous dry lake beds that are interspersed throughout the area (Sutton, et al., 2007; S. Hall 1985; Spaulding 1991).

### 3.5.1 Definition of Resource

#### 3.5.1.1 Cultural Resources

According to 36 CFR Part 800.16(l)(1):

- “*Historic property* means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.”
- Based on previous archaeological and cultural resource management research projects completed in, or in the vicinity of, the Project, it was possible to identify archaeological site or property types that would potentially be encountered during the Class III intensive field survey. Human utilization of the Mojave region as early as the Paleo-Indian Complex (10,000 to 8,000 cal B.C.) has been proposed though no conclusive information to date has been published that validates such early dates.
- The earliest evidence to date places human occupation of the Mojave Desert in the Mojave Complex (ca. 8,000 – 6,500 cal. B.C.). Since the first appearance of prehistoric populations, human exploitation and utilization of the rich and diverse natural resources of the Mojave continued through the subsistence, settlement strategies, and trade networks of prehistoric people, as well as through historic-period industries such as mining and the modern-day development of transportation routes and corridors, which are predominantly represented by the construction of railroad and automobile routes.
- The identification and classification of archaeological sites most likely to be encountered during survey was of primary importance in the Project and represented the core of the methodology of this investigation. Those site classifications provided a framework for definition and documentation of past human use of the desert.
- Past studies recorded evidence within the archaeological record of human occupation, migration, and utilization of the Mojave through time. The descriptions of the classes (definition of resources) for known cultural resources within the APE are as follows:

- **Isolated Find:** Per the guidelines applied to intensive field survey and recordation of cultural resources within the Project APE, provided by the BLM archaeologist, an isolated find is defined as a group of five or fewer prehistoric and/or historic artifacts more than 30 meters from any other prehistoric and/or historic artifacts. Based on this definition, individual and groups of less than five historic period cans were not recorded during the survey.
- **Lithic Reduction Scatter:** This site type includes all sites containing flaked and/or battered stone artifacts indicative of lithic reduction activities, including lithic debitage, cores (including early-stage bifacial cores), tested (or assayed) cobbles, and hammerstones; with no other artifact types present.
- **Complex Lithic Scatter:** This site type may contain the same artifact types defined above for Lithic Reduction Scatters, but also contains formed flaked stone tools indicative of a wider range of activities beyond lithic reduction. Those tools may include projectile points or other late-stage bifacial tools, patterned or unpatterned flake tools, and edge-modified flakes.
- **Ground Stone Scatter:** This site type includes milling-related artifacts, including “top” and “bottom” stones, such as manos and/or expedient hand stones and metates, respectively.
- **Ceramic Scatter:** This site type contains objects made of clay that were fired and hardened to form utilitarian vessels or objects for use by prehistoric cultures. These objects are usually found as fragments at archaeological sites.
- **Fire-Affected Rocks and/or Hearths:** These site types are typically loose scatters or discrete concentrations of rocks that have been affected by intense heat and display cracking or pot lid fractures, charring, and/or fire/smoke blackening.
- **Cleared Circles:** These features are typically found on desert pavement surfaces. They consist of roughly circular areas ranging from approximately one to three meters in diameter where the larger rocks on the ground surface have been removed or relocated to the outer edge of the area, leaving only the smaller, surficial pebbles remaining within the circumference of the features. Similar features may result from natural or cultural processes.
- **Trails:** These site types are 30- to 50-centimeter-wide footpaths that appear tamped or pushed (constructed) into the surrounding soils. These features are most apparent on desert pavement surfaces or other stable landforms. Often, particularly on desert pavement surfaces, the larger rocks have been cleared from the path of

the trail. These site types may or may not be associated with other archeological remains.

- **Rock Cluster Features:** These are features that may occur as isolated finds or can be associated with prehistoric or historical archaeological sites and are often referred to as cairns. These features consist of constructed rock concentrations that stand out from the surrounding ground surface. Such features can consist of a single course of rocks, or rocks stacked higher than one course. These features may represent prehistoric activity, or they may be associated with mining claims and homesteading land claims. Similar rock clusters are also commonly used by off-highway vehicle (OHV) users to demarcate OHV tracks, trails, and racecourses.
- **Historical Refuse:** This site type consist of a deposit and/or sparse distribution of domestic, commercial, construction, or industrial debris (e.g., cans, bottles, ceramic tableware, milled lumber, machinery, and appliances) that pre-dates 1963.
- **Historical Structure:** This site type consists of any structure constructed prior to 1963 including, but not limited to, residential buildings, commercial buildings, ancillary structures, and electrical sub-stations.
- **Historical Survey/Mapping Features:** These site types are built/constructed features erected prior to 1963 (not including Rock Cluster Features) that may be isolated and/or associated with other site types listed. Examples of such features include United States General Land Office (GLO) benchmarks, aerial photograph markers, and concrete foundations.
- **Historical Linear Sites:** These linear sites include the following subtypes constructed prior to 1963: roads, railroads, and transmission lines. These sites may or may not be associated with other historical resources.
- **Historical Mining Sites:** These sites may include, but are not limited to, borrow pits; shafts; adits/prospects or other surface mining features; access roads; mining-related equipment and other mining-related artifacts; mining-related structural ruins; and raked and scraped surfaces resulting from gravel mining that pre-date 1963.

### **3.5.1.2 Paleontological Resources**

The term “paleontological resource” means any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth, except that the term does not include:

- (1) Any materials associated with an archaeological resource (as defined in section 3(1) of the Archaeological Resources Protection Act of 1979 (16 USC 470bb[1]).
- (2) Any cultural item (as defined in section 2 of the Native American Graves Protection and Repatriation Act [25 USC 3001]).

### 3.5.2 Applicable Laws, Regulations, Plans, and Policies

Table 3-12 provides the laws, regulation, plans and policies that are applicable to cultural and paleontological resources.

**Table 3-12 Cultural and Paleontological Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
American Indian Religious Freedom Act (Title 42, USC, Section 1996)	Protects Native American religious practices, ethnic heritage sites, and land uses.
Antiquities Act of 1906 (16 USC, 431-433)	Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 CFR Part 3), 'objects of antiquity' has been interpreted to include fossils by the Federal Highways Act of 1956, the National Park Service, the BLM, the United States Forest Service, and other Federal agencies.
Archaeological Resources Protection Act of 1979 (16 USC 470aa-470mm; Public Law 96-95, as amended)	This statute was enacted "...to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals" (Sec. 2(4)(b)).
1980 CDCA Plan (BLM 1999)	The CDCA Plan requires that proposed development projects are compatible with policies that provide for the preservation and protection of archaeological and paleontological resources.
Executive Order 11593 May 13, 1971 (36 Federal Register 8921)	This order mandates the protection and enhancement of the cultural environment through providing leadership, establishing state offices of historic preservation, and developing criteria for assessing resource values.
Federal Guidelines for Historic Preservation Projects, Federal Register 44739-44738, 190 (September 30, 1983)	The Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation are considered to be the appropriate professional methods and techniques for the preservation of archaeological and historic properties.

Law, Regulation, Plan, or Policy	Description
Federal Land Policy and Management Act of 1976 (43 USC 1701-1784)	Authorizes the BLM to manage public lands to protect the quality scientific, scenic, historical, archeological, and other values, and to develop 'regulations and plans for the protection of public land areas of critical environmental concern', which include 'important historic, cultural or scenic values'.
National Environmental Policy Act	The NEPA establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal Government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." Cultural resources need not be determined eligible for the NRHP as in the NHPA of 1966 (as amended) to receive consideration under NEPA. The NEPA is implemented by regulations of the Council on Environmental Quality, 40 CFR 1500–1508, and provides for public participation in the consideration of cultural resources issues, among others, during agency decision-making.
National Historic Preservation Act of 1966, as amended (16 USC 470f)	Section 106 of the NHPA (16 USC 470f) requires Federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places and to afford the ACHP a reasonable opportunity to comment on such undertakings (36 CFR Part 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed resolve effects. Significant cultural resources are those resources that are listed in or are eligible for listing in the NRHP per the criteria listed at 36 CFR 60.4 (ACHP 2000) and are presented in the next subsection. Properties of traditional religious and cultural importance to Native Americans are considered under Section 101(d) (6) (A) of the NHPA.
Native American Graves Protection and Repatriation Act (25 USC 3001)	NAGPRA's implementing regulations (43 CFR Part 10) address the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations (parties with standing) to Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. The statute requires Federal agencies and museums to provide information about Native American cultural items to parties with standing and, upon presentation of a valid claim, ensure the item(s) undergo disposition or repatriation.
Paleontological Resources Preservation Act	Signed into law in 2009 as a part of the Omnibus Public Land Management Act of 2009 (Public Law 111 – 11), the Paleontological Resources Preservation Act requires federal agencies to preserve paleontological resources.

Table Source: Modified from BLM and CEC 2010.

Table Key: ACHP = Advisory Council on Historic Preservation; BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; CEC = California Energy Commission; CFR = Code of Federal Regulations;

NAGPRA = Native American Graves Protection and Repatriation Act; NEPA = National Environmental Policy Act; NHPA = National Historic Preservation Act; NRHP = National Register of Historic Places; USC = United States Code.

### 3.5.2.1 National Historic Preservation Act (NHPA)

The NHPA established the Advisory Council on Historic Preservation (ACHP) and State Historic Preservation Offices (SHPO) to assist Federal and state officials regarding matters related to historic preservation. As previously noted, the administering agency, the ACHP, has authored regulations implementing Section 106 that are located in 36 CFR Part 800, *Protection of Historic Properties* (as revised). Regulations at 36 CFR Part 800 provide detailed procedures, called the Section 106 process, by which the assessment of impacts on archaeological and historical resources, as required by the NHPA, is implemented.

Section 106 of the NHPA (16 USC 470f) requires Federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the ACHP a reasonable opportunity to comment on such undertakings (36 CFR Part 800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to resolve effects. Significant cultural resources are those resources that are listed in or are eligible for listing in the NRHP per the criteria listed at 36 CFR 60.4 and are presented in the next subsection.

Given that the proposed Calico Solar Project is located on lands managed by the BLM and requires authorization by the BLM, the project is considered an undertaking, and therefore must comply with the NHPA and implementing regulations. The NEPA addresses compliance with the NHPA, and the required environmental documentation, whether it is an Environmental Assessment or an EIS, must discuss cultural resources. It is important to recognize, however, that project compliance with NEPA does not mean the project is in compliance with the NHPA.

According to the NHPA (36 CFR Part 800), three steps are required for compliance:

- (1) Identification of significant resources that may be affected by an undertaking
- (2) Assessment of project impacts on those resources
- (3) Development and implementation of mitigation measures to offset or eliminate adverse impacts

All three steps require consultation with interested Native American tribes, local governments, and other interested parties.

## Identification and National Register of Historic Places Evaluation

Regulations at 36 CFR Part 800.3 discuss the consultation process. Section 800.4 sets out the steps the ACHP must follow to identify historic properties. The process for NRHP eligibility determinations are at 36 CFR Part 800.4(c) (1).

The Historic Sites, Buildings and Antiquities Act of 1935 required the survey, documentation, and maintenance of historic and archaeological sites in an effort to determine which resources commemorate and illustrate the history and prehistory of the United States. The NHPA expands on this legislation and assigns the responsibility for carrying out this policy to the DOI, National Park Service (NPS). Per NPS regulations, 36 CFR Part 60.4, and guidance published by the NPS, *National Register Bulletin, Number 15, How to Apply the National Register Criteria for Evaluation*, different types of values embodied in districts, sites, buildings, structures, and objects are recognized. These values fall into the following categories:

- (1) *Associate Value (Criteria A and B)*: Properties significant for their association with or linkage to events (Criterion A) or persons (Criterion B) important in the past
- (2) *Design or Construction Value (Criterion C)*: Properties significant as representatives of the man-made expression of culture or technology
- (3) *Information Value (Criterion D)*: Properties significant for their ability to yield important information about prehistory or history

The quality of *significance* in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess *integrity* of location, design, setting, materials, workmanship, feeling, and association. Cultural resources that are determined eligible for listing in the NRHP, along with SHPO concurrence, are termed “historic properties” under Section 106, and are afforded the same protection as sites listed in the NRHP.

### 3.5.2.2 Paleontological Resources Preservation Act (PRPA)

Signed into law in 2009 as a part of the Omnibus Public Land Management Act of 2009 (Public Law 111 – 11), the PRPA requires federal agencies to:

- (1) Promulgate regulations as soon as practical.
- (2) Develop plans for fossil inventories, monitoring, and scientific and educational use.
- (3) Manage and protect paleontological resources on Federal land using scientific principles and expertise.

- (4) Establish a program to increase public awareness about the significance of paleontological resources.
- (5) Allow casual collection of common invertebrate and plant fossils on BLM, Forest Service and Bureau of Reclamation lands where consistent with the laws governing those lands.
- (6) Manage fossil collection via specific permitting requirements.
- (7) Curate collected fossils in accordance with PRPA's requirements.
- (8) Implement PRPA's criminal and civil enforcement, penalty, reward and forfeiture provisions.
- (9) Protect information about the nature and specific location of fossils where warranted. PRPA authorizes appropriations necessary to carry out these requirements.

### **3.5.2.3 Discovery of Human Remains in California**

All discovered human remains shall be treated with respect and dignity. California state law (California Health & Safety Code 7050.5) and federal law and regulations ([Archaeological Resources Protection Act (ARPA) 16 USC 470 & 43 CFR 7], [Native American Graves Protection & Repatriation Act (NAGPRA) 25 USC 3001 & 43 CFR 10] and [Public Lands, Interior 43 CFR 8365.1-7]) require a defined protocol if human remains are discovered in the State of California regardless if the remains are modern or archaeological.

Upon discovery of human remains in California, all work in the area must cease immediately, nothing may be disturbed and the area is to be secured. The County Coroner's Office of the county where the remains are located must be called. The Coroner has two working days to examine the remains after notification. The appropriate land manager/owner or the site shall also be called and informed of the discovery.

If the remains are located on federal lands, federal land managers/federal law enforcement/federal archaeologist are to be informed as well because of complementary jurisdiction issues. It is very important that the suspected remains and the area around them remain undisturbed and the proper authorities be called to the scene as soon as possible as it could be a crime scene.

The Coroner will determine if the bones are historic/archaeological or a modern legal case.

## **Modern Remains**

If the Coroner's Office determines the remains are of modern origin, the appropriate law enforcement officials will be called by the Coroner and conduct the required procedures. Work will not resume until law enforcement has released the area.

## **Archaeological Remains**

If the remains are determined to be archaeological in origin and there is no legal question, the protocol changes depending on whether the discovery site is located on federally or non-federally owned/managed lands.

### **Remains discovered on federally owned/managed lands**

After the Coroner has determined the remains are archaeological or historic and there is no legal question, the appropriate Field Office Archaeologist must be called. The archaeologist will initiate the proper procedures under ARPA and/or NAGPRA. If the remains can be determined to be Native American, the steps as outlined in NAGPRA, 43 CFR 10.6 Inadvertent discoveries, must be followed.

### **Remains discovered on non-Federally owned/managed lands**

After the Coroner has determined the remains on non-federally owned/managed lands are archaeological and there is no legal question, the Coroner will make recommendations concerning the treatment and disposition of the remains to the person responsible for the excavation, or to his or her authorized representative. If the Coroner believes the remains to be those of a Native American he/she shall contact by telephone within 24 hours, the California Native American Heritage Commission (NAHC). The NAHC will immediately notify the person it believes to be the most likely descendant of the remains. The most likely descendant has 48 hours to make recommendations to the land owner for treatment or disposition of the human remains. If the descendant does not make recommendations within 48 hours, the land owner shall reinter the remains in an area of the property secure from further disturbance. If the land owner does not accept the descendant's' recommendations, the owner or the descendants may request mediation by the NAHC.

### **3.5.3 Current CDCA Plan**

The CDCA Plan contains guidelines for cultural resources and paleontological resources and a cultural resources element. The guidelines are the same for Multiple-Use Class L and Class M land:

- “Archaeological and paleontological values will be preserved and protected. Procedures described in 36 CFR 800 will be observed where applicable. A Memorandum of Agreement has been signed by the BLM, the California State Historic Preservation Officer, and for cultural resources the President’s Advisory Council on Historic Preservation to protect cultural resources” (BLM 1999).

The Cultural Resources Element provides more specific application of the multiple-use guidelines towards cultural and paleontological resources. The goals of the element include:

Cultural Resources:

- (1) Broaden the archaeological and historical knowledge of the CDCA through continuing inventory efforts and the use of existing data. Continue the effort to identify the full array of the CDCA’s cultural resources.
- (2) Preserve and protect representative sample of the full array of the CDCA’s cultural resources.
- (3) Ensure that cultural resources are given full consideration in land use planning and management decisions, and ensure that BLM authorized actions avoid inadvertent impacts.
- (4) Ensure proper data recovery of significant (NRHP quality) cultural resources where adverse impacts can be avoided.

Paleontological Resources:

- (1) Ensure that paleontological resources are given full consideration in land use planning and in management decisions.
- (2) Preserve and protect a representative sample of the full array of the CDCA’s paleontological resources.
- (3) Ensure proper data recovery of significant paleontological resources where adverse impacts cannot be avoided or otherwise mitigated.

### **3.5.4 Geology and Geomorphology**

This section was adapted from the AFC (SES 2008) and emphasizes the archaeological aspects of the geology of the project area.

The Mojave Desert Geomorphic Province is a wedge-shaped area largely bounded by major faults and structurally referred to as the Mojave Block. The Mojave Desert Geomorphic Province

is characterized by broad expanses of desert with localized mountains and dry lakebeds and is bound by the San Bernardino Mountains and the Pinto Fault to the south, the San Andreas Fault to the west, the Garlock Fault to the north and the Basin and Range Province to the east. The project APE is located within a broad valley between the Southwestern and Southeastern Cady Mountains in the central portion of the Mojave Desert Geomorphic Province.

The valley bottom is primarily composed of alluvial fill. Alluvial deposits from the adjacent highlands are composed of silty sands and gravels with localized gravel and cobble channels. In some areas, the alluvial deposits are locally intertwined with finer-grained basin deposits. The bounding highlands, which include a small portion along the northern Calico Solar Project boundary, are underlain by granitic and metamorphic terrain and along the southern edge by younger volcanic deposits (Dibble and Bassett 1966).

A major factor affecting the geomorphology of the Mojave Desert, and specifically the Calico Solar Project APE and its environs, is the Mojave River. The river and its drainage system represent the largest present-day hydrological system in the Mojave Desert (Enzel et al. 2003). Fluctuations in the paleoclimate between wet and dry periods, coupled with the changing path of the sizable Mojave River, resulted in the formation of several freshwater lakes in naturally occurring basins along or at the terminus of the Mohave River. The most notable of these lakes are Lake Manix and Lake Mojave.

Alluvial deposition within the area has also contributed to the formation of desert pavement within the project APE. In particular, the pavement areas on the slopes of the Cady Mountains are older, broader, and better developed than those present at the lower elevations. The desert pavement surfaces are thought to predate the accepted presence of humans in the new world, and therefore, buried cultural deposits beneath these stable surfaces are unlikely. Holocene alluvial deposits within and adjacent to an east-west drainage are the most likely source for buried deposits within the APE.

### **3.5.5 Vegetation and Wildlife**

California's diverse environment is separated into ten different bioregions. The Project APE lies within the Mojave Bioregion. The Mojave Bioregion is an arid desert environment that covers over 25 million acres in southern California, southern Nevada and southwestern Utah and is characterized by desert washes, high plateaus, mountain peaks, palm oases, and large dry prehistoric lake beds called playas.

These playas usually consist of sand and gravel basins surrounding central salt flats and were formed by pluvial lakes which once dominated the Mojave Bioregion. The Mojave is bordered on the north by the Sierra Nevada Bioregion and on the west by the Transverse and Peninsular ranges, and is separated from the Great Basin on the east by the Garlock Fault (Moratto

1984:16, 17). Elevations in the bioregion average between 2,000 and 3,000 feet above sea level with isolated peaks of 6,000 to 7,000 feet above sea level occurring sporadically.

Although the desert appears barren and remote, it contains a large variety of plant and animal life. Vegetation in the Mojave Bioregion includes Mojave creosote bush, scattered desert saltbush, Joshua tree scrub, alkali scrub, pinyon juniper woodland, numerous varieties of cacti, and hardwood and conifer forests at the higher elevations.

Rare plants in the bioregion include white bear poppy, Barstow woolly sunflower, alkali mariposa lily, Red Rock poppy, Mojave monkey flower, and Stephen's beardtongue (Ceres, n.d.).

The Mojave Bioregion is characterized by hot dry summers followed by cool winters with occasional rainstorms that often develop into flash floods. Much of the land within the Mojave Bioregion is owned and managed by the BLM or is contained in one of the three National Parks: Death Valley, Eastern Mojave, and Joshua Tree, as well as several other recreational areas (Ceres, n.d.).

The project area is composed of multiple Life Zones that contain animal and plant communities that attracted and influenced the settlement and adaptations of both prehistoric and Euro-American populations. Life Zones present in the project area include (from the highest altitude to the lowest): Transition (5,000 feet to 7,000 feet), Upper Sonoran (3,300 feet to 5,000 feet), and Lower Sonoran (3,300 feet and below).

Although prehistoric and historic inhabitants of the region exploited resources from each of these life zones, most settlement and subsistence activities were concentrated in the Transition, Upper Sonoran, and Lower Sonoran Zones, between 5,000 feet above mean sea level and 227 feet below mean sea level (a distance of approximately one vertical mile).

Within the region of the APE, when Troy Lake, Lavic Lake, and Broadwell Lake were wet, inhabitants of the project area lived primarily in the Lower Sonoran Life Zone, where they gathered acorns and piñon nuts in the foothills and honey mesquite, piñon nuts, yucca roots, mesquite, and cacti fruits in or near the desert (Bean and Smith 1978). During times when the lakes were dry, settlement and subsistence were focused on the Upper Sonoran Life Zone in and beyond the Cady Mountains, where edible varieties of agave cactus grew naturally on the rocky slopes. Acorns and piñon nuts were traded by Cahuilla bands residing in the mountains and passes of the Upper Sonoran and Transition life zones, and mesquite beans were often received in return. There is no archaeological evidence suggesting that dried fish from the lakes or the Colorado River were traded beyond the immediate area.

## 3.5.6 Cultural Setting

### 3.5.6.1 Prehistoric Background

This section was adapted from the AFC (SES 2008).

The chronological sequence of the cultural complexes for the Mojave Desert initially proposed by Warren (1980, 1984) and Warren and Crabtree (1986), divides the prehistoric era into five temporal periods: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. The four earlier periods encompass what is called the Archaic Period of the Great Basin; in the Saratoga Springs period, formative influences from the Southwest mark the transition into the Shoshonean period (Lyneis 1982). Although claims have been made for archaeological assemblages dating to the Pleistocene and periods earlier than Lake Mojave, Warren and Crabtree (1986) argue that all are controversial, and if valid, have little or no relationship to later cultural developments in the region.

The Mojave Desert cultural complex was recently expanded by Sutton et al. (2007) to include elements more closely aligned to prehistoric cultural complexes in the Central Mojave Desert. Like Warren and Crabtree (1986), Sutton et al. (2007) argue that there is little evidence for human occupation in the Mojave Desert prior to the Lake Mojave period; however, the possibility is not completely discounted. Therefore, in contrast to the earlier sequence, the Sutton et al. (2007) chronology includes a “Pre-Clovis” or “Paleo-Indian Complex” for the hypothetical Pleistocene era occupation. Temporal periods for the Holocene period include the Lake Mojave Complex, the Pinto Complex, the Dead Man Lake Complex, the Gypsum Complex, the Rose Spring Complex, and the Late Prehistoric Complex (Sutton et al. 2007).

Recent work conducted in the Mojave Desert at a wide range of archaeological sites has provided radiocarbon dates that support the cultural chronology proposed by Sutton et al. (2007). The chronological sequence presented below is based on both earlier and more recent archaeological surveys and excavation projects in the Mojave.

#### **Paleo-Indian Complex (10,000–8000 cal B.C.)**

The earliest evidence for human occupation in the Mojave Desert began about 12,000 years ago. The Paleo-Indian Complex existed in a time of environmental transition between the late Pleistocene and early Holocene in which increased rainfall and cooler temperatures formed deep lakes and marshes, even in the interior desert regions of California (Moratto 1984). These abundant lakes, marshes, and grassland resources were the focus of the earliest human activity in the region. Although claims for pre-Holocene era occupations have been made for numerous sites in the region (Davis 1978; Duvall and Venner 1979; Harrington and Simpson 1961; Simpson 1958, 1960, 1961), these claims remain largely unsubstantiated.

The tool assemblage associated with the Paleo-Indian period includes fluted points, scrapers, burins, awls, and choppers, all of which were to address subsistence, habitation, and personal needs. Fluted points, defined as diagnostic elements of the Clovis culture, have been found throughout California from coastal estuary environments to ancient Pleistocene lakeshores.

### **Lake Mojave Complex (ca. 8000–6500 cal B.C.)**

The Lake Mojave Complex emerged during the Altithermal Climatic Phase. During this phase, there was a dramatic climatic shift, which transformed the existing pluvial environment into a much warmer, arid environment in the desert regions. The climatic shift reduced the varieties of resources present in the region, and as a result, numerous groups occupying the desert regions migrated toward the coast.

The Lake Mojave Complex is characterized by relatively small nomadic social units centered on foraging strategies with undefined hunting and lacustrine resource exploitation patterns. Cultural materials dating from this Complex encompass the Playa cultures (Rogers 1939), the San Dieguito Complex (Warren 1967), and the Lake Mojave Complex (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto Complex, representing a shift towards a more diversified and generalized economy (Sutton 1996:228).

Artifacts attributed to the Lake Mojave Complex, first identified at Lake Mojave (Campbell et al. 1937), include Lake Mojave series projectile points (leaf-shaped, long stemmed points with narrow shoulders) and Silver Lake points (short bladed, stemmed points with distinct shoulders). Other diagnostic artifacts include flaked stone crescents; bifaces; and a variety of large, well made scrapers, graters, perforators, heavy core tools, and ground stone implements (Sutton et al. 2007:234).

Milling stones dating to this time have been identified in small numbers. Artifact assemblages are typically found around the margins of ancient lakes. Sites are more common in the eastern and central Mojave Desert, although rare occurrences have been recorded in the western Mojave Desert near China Lake, Coso, and Owens Lake (Sutton et al. 2007:229).

### **The Pinto Complex (ca. 6500–4000 cal B.C.)**

The Pinto Complex continued the use of flaked-stone technology and ground-stone implements and milling stones (Sutton et al. 2007:238). Climatic changes occurring between the Early and Middle Holocene periods around 7500 BP to 5000 BP created a more arid environment throughout the Mojave region (Hall 1985; Spaulding 1991). This climatic shift marked the beginning of the region's cultural adaptation to the desert, as materials characteristic of the Lake Mojave Complex were gradually replaced by those of the Pinto Complex.

The Pinto Complex is marked by the appearance of Pinto projectile points (thick, shouldered, expanding stem points with concave bases), and bifacial and unifacial core tools. Major technological shifts for this Complex include a significant increase in the use of milling stones (Warren and Crabtree 1986; Sutton et al. 2007:238). Warren (1990) attributes the latter development to the exploitation of hard seeds, part of a process of subsistence diversification brought on by increased aridity and reduced ecosystem carrying capacity.

Big game hunting probably continued as an important focus during this time, but the economic return of this activity likely decreased as mountain sheep and deer populations declined in response to increased aridity (Warren and Crabtree 1986). Faunal evidence also indicates the exploitation of rabbit, rodent, reptile, and freshwater mussel resources.

A variation of the Pinto Complex, the Dead Man Lake Complex (ca. 7000-3000 cal. B.C.), has been proposed by Sutton et al. (2007). The primary variation between the Pinto and the Dead Man Lake complexes is the presence of small to medium-sized contracting stemmed or lozenge shaped points, battered cobbles, bifaces, simple flaked tools, milling implements, and shell beads (Sutton et al. 2007:239).

### **Gypsum Complex (ca. 2000 cal B.C.–cal A.D. 200)**

During the Gypsum Complex, there was an increase in population, trade, and social complexity (Sutton 1996; Sutton et al. 2007). In addition to open sites, the use of rock shelters appears to have increased at this time. Base camps with extensive midden development are a prominent site type in well-watered valleys and near concentrated subsistence resources (Warren and Crabtree 1986). Evidence of ritualistic behavior during this time exists through the presence of rock art, quartz crystals, and paint (Sutton et al. 2007). Evidence from the western Mojave Desert suggests that there was a major population increase ca. 3000 to 2300 B.P (Gilreath and Hildebrandt 1991; Sutton 1988).

Gypsum Complex sites are characterized by medium to large stemmed and corner-notched projectile points, including Elko series, Humboldt Concave Base, and Gypsum. In addition, rectangular-based knives, flake scrapers, occasional large scraper planes, choppers and hammerstones; handstones and milling tools become relatively commonplace, and the mortar and pestle appear for the first time.

Near the end of the Gypsum Complex, there may have been a shift in subsistence orientation and mobility and an increased emphasis on hunting smaller mammals (Basgall et al. 1986; Sutton 1996:234). Rock art suggests that hunting mountain sheep occurred during the Gypsum Complex; mountain sheep and deer, rabbits and hares, rodents, and reptiles remains have been reported from Gypsum Complex sites in the central Mojave Desert (Hall and Basgall 1994).

### **Rose Spring Complex (ca. cal A.D. 200–1100)**

The climate was relatively stable during the middle of the Late Holocene period. In the western Mojave Desert, some regions showed an increase in lake stands, such as at Koehn Lake (Sutton et al. 2007). At the beginning of this period lakes were at their highest water levels; however, at the end of the Rose Spring Complex, the environment began to shift towards the end of this period and lakes began to dry up and recede.

The Rose Spring Complex is characterized by small projectile points, such as the Eastgate and Rose Spring series, stone knives, drills, pipes, bone awls, various milling implements, and marine shell ornaments. The use of obsidian is also prevalent during this time (Sutton et. al. 2007). Smaller projectile points appear to mark the introduction of a bow and arrow technology and the subsequent decline of atlatl and spear weaponry (Sutton 1996). Sutton (1996; 2007) notes that Rose Spring Complex sites are common in the Mojave Desert and are often found near springs, washes, and lakeshores.

With the advent of the bow and arrow, subsistence practices during the Rose Spring Complex shifted towards the exploitation of medium and small game, including rabbits/hares and rodents, with a decreased emphasis on large game. At the Rose Spring archaeological site, numerous bedrock milling features, including mortar cups and slicks are associated with rich midden deposits. This indicates a heavy reliance on plant foods. In addition, evidence of permanent living structures are found during this time and include wickiups, pit houses, and other types of structures (Sutton et al. 2007).

### **Late Prehistoric Complexes (cal A.D. 1100–Contact)**

Paleoenvironmental studies conducted within the western Mojave Desert suggest there was an increase in effective moisture in the Mojave Desert region beginning just after 2000 B.P. This phenomenon is evident at Koehn Lake, where a shoreline beach feature suggests that the site was abandoned 1,000 years ago during a major drought (Sutton 1996). The drought likely influenced the movement of people from the area north and east across the Great Basin (Sutton 1996). Eventually, the native population in the region began to decrease in part due to drier climates, and later, as a result of European contact.

Characteristic artifacts of this Complex include Desert series projectile points (Desert Side-notched and Cottonwood Triangular), brown ware ceramics, Lower Colorado Buff Ware, unshaped handstones and milling stones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986). Faunal assemblages typically contain deer, rabbits/hares, reptile, and rodents. The use of obsidian decreased during this time and cryptocrystalline silicates became a preferred material.

Between 1,000 and 750 years ago, ethnic and linguistic patterns within the Mojave Desert increased in complexity. One of the most important regional developments during the Late Prehistoric Period was the apparent expansion of Numic populations (Northern Paiute, Shoshoni, and Southern Paiute) throughout most of the Great Basin. Many researchers accept the idea that sometime around A.D. 1000, the Numic populations spread westward from a homeland in the southwestern Great Basin, possibly from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little dispute that the Numic spread occurred, there is much disagreement over its mechanics and timing (see Madsen and Rhode 1995).

The Late Prehistoric Complex reveals significantly different types of artifacts than those seen in the earlier Complex assemblages. Manos, metates, and milling stones became more frequent, as did other plant processing artifacts such as mortars and pestles. In addition, bow and arrow technology with the use of Desert Side-notched and Cottonwood points emerge during the Late Prehistoric Complex. The first locally produced pottery is also seen during this time in the Mojave Desert Region. Large occupation sites representing semi-permanent and permanent villages emerged during this time as well.

### **3.5.6.2 Ethnography**

Numerous ethnographic groups are associated with the project APE and surrounding Mojave Desert region. At time of contact, the Serrano, Vanyume (Beñeme), and the Chemehuevi occupied the vicinity of the project area. The Vanyume were a small division of the Serrano, about whom little ethnographic information is currently known.

The Chemehuevi entered the Mojave Desert much later in time. Other groups that could be affiliated with the project area include the Kawaiisu, the Kitanemuk, the Southern Paiute, and the Mohave. Eerkens (1999) states that the vicinity around Fort Irwin, northeast of the project area, was inhabited by the Kawaiisu, Chemehuevi, Las Vegas Paiute, and the Vanyume, who maintained flexible settlement patterns based on the availability of resources. Due to fluctuating environmental conditions and the arid nature of the region, the project APE and surrounding valleys were not conducive to large-scale habitation and most groups occupying or utilizing the area were small and nomadic (Zigmond 1986).

#### **Serrano**

The project area was home to the Yucaipaiem clan of the Serrano (Altschul, Rose and Lerch 1984; Kroeber 1925; Strong 1929; Bean and Smith 1978). According to Kroeber (1976), the Serrano were comprised of five groups or bands: the Kitanemuk, Alliklik, Vanyume, Kawaiisu and Serrano. The Serrano occupied most of modern day San Bernardino County (Bean and Smith 1978). Kroeber (1925) indicates that the Serrano were a hierarchically ordered society

with a chief who oversaw social and political interactions within their own culture and with other groups. The Serrano had multiple villages ranging from seasonal satellite villages to larger, more permanent villages.

### **Vanyume (Beñeme)**

Limited information is available on the Vanyume during the historic period. Ethnographic accounts suggest the Vanyume were a small division of the Serrano living in the Mojave Desert north of Serrano territory. They were referred to as the “Serrano of the Mohave River” (Kroeber 1925). The name Vanyume is a Mohave word; the name Beñeme was given to the entire Serrano cultural group by Father Garcés. The Vanyume spoke a Takic language related to the Kitanemuk to the west and the Serrano to the South. The Vanyume were hunters and gatherers, and are generally associated with similar life ways as the Serrano (Yohe II and Sutton 1991).

### **Chemehuevi**

The Chemehuevi were a band of the Southern Paiute that possibly entered the eastern Mojave Desert area from the north in recent prehistoric times. The Chemehuevi, also called the Pah-Utes, were closely related to the Southern Paiute in Death Valley and the Southern Nevada region. At the time of ethnographic contact, the Chemehuevi claimed a large portion of the eastern and central Mojave Desert, perhaps as far west as Afton Canyon on the Mojave River (Kelly and Fowler 1986). Although the Chemehuevi territory boundaries are unclear, it is certain that they inhabited the Providence Mountains. Based on archaeological data, the Chemehuevi entered the Mojave Desert sometime in the seventeenth century (Yohe II and Sutton 1991).

The Chemehuevi were strongly influenced by the Mohave, and it is possible they displaced the Desert Mohave, a Yuman speaking group (Kelly and Fowler 1986). Many Chemehuevi words are related to Mohave vocabulary, and they have similar agricultural practices, house construction, warfare, and other cultural elements including religious practices. Like the Mohave, the Chemehuevi used square metates, paddle and anvil pottery techniques, and hair dye (Kelly and Fowler 1986). In addition to their close association with the Mohave, the Chemehuevi traded widely with the Shoshone, Kawaiisu, Serrano, Vanyume, Cahuilla, and Diegueno (Kelly and Fowler 1986).

### **Mohave**

The Mohave lived along both the east and west banks of the Colorado River. During the winter, they inhabited semi-subterranean houses and cultivated maize for subsistence (Kroeber 1902, 1925). For the remainder of the year, they were a hunting and gathering group, often traveling west far into the Mojave Desert and throughout southern California and northern Arizona along a large network of trails (King and Casebier 1976). Two major geographical features influenced

the Mohave's trade routes: the location of their villages along the Colorado River, and the waterless portions of the desert, also known as the Mojave Sink or Mojave Trough. Two major trade routes were used, which started at villages along the Colorado River. The first route was the Pah-Ute Creek to Soda Springs route, which later became known as the Mojave Road wagon train. The other route ran south of the Mojave Road route through Poshay Pass and the Mojave River flood plain to the southeast corner of Soda Lake.

### **3.5.6.3 Regional Historic Context**

The following sections were adapted from URS (2008).

#### **Spanish Period (1540 to 1821)**

By 1769, the Spanish had explored much of the California coast, and San Francisco and Monterey bays, but paid little attention to the California interior. The California interior was first explored between 1775 and 1776 by Father Francisco Garcés, a Franciscan missionary originally stationed in Arizona, as part of Spain's effort to forge an overland route to its settlements in Alta, California.

Garcés traveled with the 1775 Anza expedition until it crossed the Colorado River near present-day Yuma, Arizona and then traveled north to the Mohave villages near present-day Needles, California (King and Casebier 1976:283). In the company of Mohave guides, Garcés continued west to Mission San Gabriel in Los Angeles along the Mohave Trail, in the approximate location of the Mojave Road wagon route. On his return trip he visited several Mohave villages on the banks of the Colorado River. The journal Garcés kept during this expedition is the earliest written record of the eastern Mojave Desert (King and Casebier 1976; Robinson 2005).

The closest Spanish mission, Mission San Gabriel in Los Angeles, was too far away to have an everyday effect on the Native Americans in the Mojave Desert. Native Americans who fled the missions often escaped into the Mojave Desert and exposed the Mohave tribe to Spanish influences, including the use of horses, which led to raids on the missions and horse thievery. In 1819, Lieutenant Gabriel Moraga led an expedition of 50 soldiers into the desert to retrieve stolen horses from the Mohave as an act of revenge for their raids on coastal Spanish settlements and their ability to spread unrest against Spanish and other Native American groups (King and Casebier 1976). Moraga's expedition was only the second Spanish-sponsored trip into the Mojave Desert. Ultimately, a lack of water forced Moraga and his soldiers to turn back.

#### **Mexican Period (1821 to 1848)**

In 1810, an independence movement began as many rancheros sought to split Mexico (and California) from Spain. In 1821, the desire came to fruition when New Spain (Mexico) became

independent. Following Mexico's independence, the Alta and Baja California missions received less financial support from Spain and Mexico, and ultimately, independence from Spain was a catalyst for Mexico to secularize all California missions.

During Mexican control of Alta California, Americans started to enter California through the Mojave Desert, many of them using the Mojave Trail located north of the project area. The first American to reach California using an overland route was mountain man and fur trapper, Jedediah Smith. Smith's ventures down the Virgin and Colorado rivers, combined with Garcés' route across the Mojave Desert, linked the Spanish settlements in New Mexico and California, stimulating trade between these regions (Wright 1982).

In 1829, New Mexico merchant Antonio Armijo reached the Las Vegas Valley pioneering a route that became known as the Old Spanish Trail. Armijo's route followed the Mojave Trail in the project vicinity, but later routes of the Old Spanish Trail turned southwest out of Utah and headed toward the Mojave River through the San Bernardino Mountains. The junction of the Northern Route of the Old Spanish Trail and the Mojave Trail was approximately 18 miles east of present-day Barstow, at a location historically called Fork of the Roads, northwest of the project area. Trade along the trail ended in 1848 with the Mexican-American War (Nystrom 2003; Robinson 2005; Rogge 2008).

### **American Period (1848 to Present)**

In 1848, the United States signed the Treaty of Guadalupe Hidalgo and acquired all Mexican territory north and west of the Rio Grande and Gila River. American settlers began migrating to the newly acquired territory, and the discovery of gold in 1848 and the ensuing Gold Rush in 1849 brought numerous settlers to California. Most of these travelers likely used the northern route of the Old Spanish Trail to enter California from New Mexico, Utah, and Nevada, although some likely followed the Mojave Trail as well (Robinson 2005).

Soon after California was granted statehood in 1850, the government wanted to recognize all of the trails running through California to promote immigration to the State, facilitate trade and communication, and develop routes of defense. Beale's Wagon Road was built in 1857 and followed the Mojave Trail west. In 1859, the U.S. Army established Fort Mojave in an effort to protect travelers from Mohave Indian attacks. As a result, the Mojave Trail developed into a wagon road which allowed supplies to be brought to Fort Mojave overland from Los Angeles. The wagon road was called the Mojave Road or the Government Road and was actively used until the beginning of the Civil War in 1861. Eventually, the northern route of the Old Spanish Road was selected for a transcontinental railroad line.

### ***Atlantic and Pacific Railroad***

Plans for a transcontinental railroad had been delayed due to the Civil War, but once the war ended, interest in the construction of a transcontinental railroad resumed. In 1866, Congress contracted the Atlanta and Pacific Railroad to construct a railway from the east to the California border. In 1879, the Atlanta and Pacific Railroad partnered with the St. Louis & San Francisco Railroad and the Atchison, Topeka, and Santa Fe Railroad to facilitate construction of the transcontinental route. The Atlanta and Pacific Railroad began construction of their track in Albuquerque, New Mexico in 1880 and by May 1883, the route reached Needles, California.

As the Atlanta and Pacific Railroad tracks were being laid, the Southern Pacific Railroad was constructing a new railroad line between Mojave and Needles to intercept the Atlanta and Pacific Railroad tracks at the Arizona border and protect its California interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their Mojave station (Gustafson and Serpico 1992; Myrick 1992). The Atlanta and Pacific Railroad and the Southern Pacific lines continued to operate independently until October 1884, when an agreement was signed granting ownership of the Needles to Mojave line to the Atlanta and Pacific Railroad.

Construction of the railroad changed the course of travel across the Mojave Desert. The railroad provided travelers with water sources across the vast desert and travel was much easier along the flat railroad corridor than along the mountainous Mojave Road to the north. A wagon road was constructed adjacent to the railroad alignment and use of the Mojave Road decreased.

### ***Old National Trails Road and U.S. Route 66***

Upon completion of the transcontinental railroad, the travel corridor shifted south of the Cady Mountains, where numerous new roads were constructed between local mines and railroad sidings, and a wagon road was built adjacent to the railroad tracks from Barstow to the Arizona border (Hathaway 2001). In the first decade of the 1900s, the wagon road, eventually known as the National Old Trails Road, was converted to an automobile route, and by the late 1920s, much of road had been widened and oiled or surfaced with gravelly sand. Aggregate mining for sand and gravel became prevalent in the area (King and Casebier 1976) and the scraping scars for the aggregate for the pavement of the Hector section of the National Old Trails Road can still be observed in the APE.

In 1926, the American Association of State Highway and Transportation Officials designated the Old National Trails Road in the Mojave Desert as U.S. Route 66. Throughout the 1950s and 1960s, U.S. Route 66 remained the main road between the Midwest and the West Coast until Interstate 15 (I-15) opened between Victorville and Barstow. I-40 begins at its junction with I-15 in Barstow and runs along the southern edge of the Calico Solar Project APE. Although the I-40 is now a cross-country highway, its last sections were not built until 1980. In the southwest,

much of historic Route 66 has been absorbed by present-day I-40. Many of the western portions of I-40 also follow the Beale Wagon Road. The segment of I-40 in the project vicinity was not constructed until 1968.

### ***Mining in the Mojave Desert***

Since the 1860s, mining has been the most important commercial industry near the Calico Solar Project APE. Silver was discovered in 1863 and the period between 1900 and 1919 was known as “the Great Years” for mining in northeastern San Bernardino County as it was more profitable than any other time (King and Casebier 1976:305). Copper, lead, zinc, and other base metals, as well as gold and silver, were mined throughout the Mojave Desert and San Bernardino County. More recently, other nonmetals such as clay, talc, and cinder mining have gained popularity, especially around the Kingston Mountains in the vicinity of I-15. Aggregate mining for sand and gravel has become prevalent in the area (King and Casebier 1976). Several manganese mines exist in this region, including the Logan Mine within the Calico Solar project APE, and the Black Butte Mine, located just over one-half mile east of project area.

### ***Southern California Edison and the Hoover Dam***

Two parallel SCE steel-tower 220-kV transmission lines are located in the Pisgah Substation Triangle area and the 0.5-mile buffer of the project APE. The SCE 220-kV North Transmission Line was constructed between 1936 and 1939, and the SCE South 220-kV South Transmission Line was built between 1939 and 1941. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. The transmission lines were constructed to deliver power from the Hoover Dam to SCE service areas in southern California.

### ***Natural Gas Pipelines***

Two natural gas pipelines run through the Calico Solar Project APE—the Pacific Gas and Electric Pipeline and the Mojave Pipeline. The Pacific Gas and Electric (PG&E) Pipeline is a 33- to 44-inch interstate pipeline that carries natural gas from Texas and New Mexico to Northern California. The 502-mile-long pipeline was constructed in 1948, and at the time, was the largest pipeline in the country (PG&E 2004).

The Mojave Pipeline is a 24-inch-diameter natural gas pipeline owned by El Paso Natural Gas Corporation, one of the largest natural gas companies in North America. The El Paso Natural Gas Corporation expanded their services into southern California in the 1940s in response to post World War II population growth. The Mojave Pipeline is a 450-mile-long interstate pipeline that carries natural gas from Arizona to Kern County, California. It was constructed in the late 1940s (El Paso Corporation 2008; International Directory of Company Histories 1996).

### 3.5.6.4 Class III Inventory

The purpose and scope of the current investigation are to provide the BLM with a Class III intensive field survey of the proposed Calico Solar APE, which comprises approximately 8,230 acres within the central Mojave Desert in San Bernardino County, California. The Applicant has retained URS Corporation to complete all of the investigations necessary to identify and evaluate cultural resources located within the APE for direct and indirect effects.

The Calico Solar Project is a federal undertaking involving a right-of-way (ROW) managed by the BLM, the lead federal agency for this Project. The CEC is the lead state agency for the Project, under CEQA, and has a certified regulatory program under CEQA. Because the Project also requires approval by the CEC, the BLM and the CEC have entered into a Memorandum of Understanding (MOU) that defines the joint NEPA/Section 106 of the NHPA (Section 106)/CEQA process to be followed by the two agencies for the approval of the Project. BLM's NEPA and Section 106 compliance requirements shall be accomplished in part through preparation and filing of a Final Environmental Impact Statement (FEIS) document. The CEC shall comply with CEQA through the preparation of a Final Staff Assessment (FSA) document based on data responses submitted in November 2009. In compliance with NEPA, the FEIS document shall address the effects of the Project and the proposed land use plan amendment to the 1980 Desert Conservation Area (CDCA) Plan, as amended.

The Project's effects on cultural resources eligible for or listed in the NRHP must be taken into account as per Section 106 of the NHPA, codified under 36 CFR §800. Cultural resource work for the Project was conducted in accordance with the BLM and SHPO Programmatic Agreement and BLM Handbook 8100 for identifying Cultural Resources. Approval of the Applicant's Proposed Project ROW Grant Application (Form 299, Applications CACA 49539 and 49537), if granted, will result in the issuance of a ROW grant for use of federal lands managed by the BLM.

Cultural resource investigations for the Project were also conducted in accordance with CEQA, Public Resources Code (PRC), § 21000 et seq., and the California Code of Regulations (CCR), Title 14, Chapter 3, § 15000. Additionally, the cultural resources investigation for the Project was conducted in compliance with "Instructions to the California Energy Commission Staff for the Review of and Information Requirements for an Application for Certification (AFC)" (CEC 1992), "Regulations Pertaining to the Rules of Practice and Procedure and Power Plant Site Certification" (CEC 2007), "Rules of Practice and Procedure and Power Plant Site Regulations Revisions" (CEC 2007), and Warren-Alquist State Energy Resources Conservation and Development Act, Public Resources Code (PRC) Section 25000 et seq.

The Class III intensive field survey was carried out under URS Corporation's (URS) statewide permit CA-06-I 11 and Fieldwork Authorization 680-08-026, issued in July 2008 (effective

through December 2009), and renewed on April 15, 2009 (CA-09-18 (effective through April 2012)).

The delineations of both the archaeological APE and built-environment APE were completed in accordance with BLM Manual 8100, BLM Barstow Field Office requirements, and CEC Rules of Practice and Procedure and Power Plant Site Regulations Revisions, Appendix B (g)(2)(C) (CEC 2007a). The Applicant engaged URS to provide support in compliance with Section 106 of the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), and the California Environmental Quality Act (CEQA).

URS Corporation conducted a review of the existing historic, archaeological, and ethnographic literature and records to identify known and recorded cultural resources and previous investigations completed in the project area and a surrounding 1-mile radius. Records were reviewed at the San Bernardino Archaeological Information Center housed at the San Bernardino County Museum in Redlands, California.

Information reviewed included location maps for all previously recorded trinomial and primary prehistoric and historical archaeological sites and isolates; site record forms and updates for all cultural resources previously identified; previous investigation boundaries; and National Archaeological Database citations for associated reports, historical maps, and historical addresses.

According to the SBAIC, 22 cultural resource studies have been conducted within the Project footprint and one-mile record search radius. Twelve of the previous studies occur within the one-mile record search radius (eleven linear and one rectangular parcel surveys); 9 occur both within the Project footprint and one-mile search radius (five linear and four rectangular parcels surveys).

Nineteen of the previous survey reports (10 of which occur within the Project footprint) were positive for cultural resources; Based on the previous studies, a total of 73 cultural resources have been reported in both the Project footprint and one-mile record search radius prior to this study. Of the 73 cultural resources, 15 occur within the Project footprint (10 prehistoric sites, 1 prehistoric isolate, 2 historic sites, and 2 historic built environment sites) and 58 occur within the one-mile record search radius [26 prehistoric sites, 23 prehistoric isolates, 4 historical sites, and 3 multi-component (prehistoric/historic) sites], and 2 historic built environment sites.

The record search revealed that two previously recorded historic built linear sites, CA-SBR-2910H and CA-SBR-6693H, of which segments (not occurring within the APE) are listed as eligible for the NRHP and California Register of Historical Resources (CRHR). CA-SBR-2910H is the Old National Trails Road/United States (U.S.) Route 66, which varies from a graded dirt road to a two-lane paved road. CA-SBR-6693H is the railway line that was originally built in 1883 for the Atlantic & Pacific Railroad Company.

Of the previous investigations, most were completed before the advent/availability of global position system (GPS) data collection and standardized archaeological data-recording processes. Much of the previously recorded information has not been evaluated, the site descriptions are poor, and location information tends to be inaccurate or unavailable.

The Class III intensive field survey of the Project APE was conducted between August 4, 2008 and October 31, 2008. In response to BLM and CEC data requests, additional field work was conducted between October 2009 and March 2010. In October 2009, 25 percent of the 143 sites identified in the April 2009 report within the Project APE were revisited and re-recorded, and 65 percent of those sites were expanded and/or combined with other sites. Concurrent with that effort, geoarchaeological studies were completed in areas within the Project APE. Between January and March 2010 the remaining 75 percent of the 143 sites in the April 2009 report within the Project APE were revisited and re-recorded and, again, a significant number of site boundaries were expanded and/or combined with other sites.

The URS team identified a total of 335 cultural resources within the Project APE: 119 archaeological sites (94 prehistoric, 8 historic, and 15 multi-component [including both prehistoric and historic elements] and 2 indeterminate rock feature sites [lack temporal data]), 206 archaeological isolates, and 10 historic built environment resources. Based on the proposed development for this Project, 119 archaeological sites and a portion of one historic built resource are subject to direct effect.

A final draft cultural resources report (*Final Class III Cultural Resources Technical Report for the Calico Solar Project, San Bernardino County, California* July 2010) presents the results of identification efforts and has been submitted to the BLM by the Applicant.

### **3.5.6.5 Paleontology**

The project area traverses the Mojave Desert region, beginning at the Pisgah Volcano area and terminating on the outskirts of Hesperia, California. A variety of paleontological resources have the potential to be present within the project site. Known areas of paleontology resources present within the general vicinity of the project site have been identified by the San Bernardino County Museum. The Victorville and Hesperia regions have Pliocene and Pleistocene age fossils present (SES 2008a). Deposits from these epochs have been identified as Irvingtonian and Blancan mammal. In the vicinity of Barstow, California, the Barstow Formation is known to contain a diversity of fossil resources, including Barstow Fauna and Tick Canyon Fauna.

Paleontological literature and records searches were conducted by the Natural History Museum of Los Angeles County (McLeod 2009). Applicable geologic maps, reports, and on-line resources for this area (Blake 2006; California Division of Mines and Geology (CDMG) 1977; CDMG 1981; CDMG 1984; CDMG 1988; CDMG 1990; CDMG 1994; CDMG 1998; CDMG 1999;

CDMG 2003; California Geological Survey (CGS) 2002a and b; CGS 2007; Jennings and Saucedo 2002; SCEC 2009; USGS 2003; USGS 2008a and 2008b) were reviewed, and reviews of the paleontological resources assessment in the AFC (SES 2008a) and the confidential paleontological resources report (URS 2008) were also conducted.

These studies indicate the Quaternary alluvium, fanglomerate, and volcanic rocks within and near the proposed project site contain few fossils. Older Quaternary alluvium, which underlies the site at uncertain depth, may contain significant fossil vertebrates. Low paleontological sensitivity roughly corresponds to Potential Fossil Yield Count Class 1 or 2 (Condition 3). Deeper excavations could potentially encounter a high sensitivity formation of Potential Fossil Yield Count Class 4 (Condition 2).

## 3.6 Fire and Fuels

This section describes the existing conditions in the project vicinity as related to wildland fire regimes and potential fuel sources for wildland fires. This resource information was partially discussed in Section C.15, Worker Safety and Fire Protection, of the SA/DEIS.

### 3.6.1 Definition of Resource

The fire and fuels analysis discusses the fire regimes and fuels in the project vicinity, and factors that influence fire activity, including fuel type, condition, and load.

### 3.6.2 Applicable Laws, Regulations, Plans, and Policies

The project area is under federal, state and local fire management policies and procedures (Table 3-13).

**Table 3-13 Fire and Fuels Management Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
California Desert Conservation Area Plan 1980, as amended (BLM 1999)	Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.
Federal Wildland Fire Policy, December 12, 1995	Provides common policies for wildland fire management by the United States Department of Agriculture and the United States Department of Interior.

Law, Regulation, Plan, or Policy	Description
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (San Bernardino County 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although the Calico Solar Project is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the regulations listed above.
The Healthy Forest Initiative and Healthy Forest Restoration Act, August 2002	Act directs agencies to improve the condition of public lands, increase firefighter safety, and conserve landscape attributes valued by society.
The National Fire Plan, August 2000	Designed to address five topics: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability.
West Mojave Plan	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan . The West Mojave Plan is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts .

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; CEC = California Energy Commission.

### 3.6.3 Current CDCA Plan

The CDCA Plan contains guidelines for fire management (BLM 1999). The guidelines are the same for Multiple-Use Class L and Class M land. The guidelines state that “[f]ire suppression measures will be taken in accordance with specific fire management plans subject to such conditions as the authorized officer deems necessary, such as use of motorized vehicle, aircraft, and fire retardant chemicals.” The CDCA Plan does not include an element pertaining to fire management.

### 3.6.4 Setting

Wildland fire does not play a large role in the Mojave Desert ecosystem. The project site is located in the BLM California Desert District Barstow Fire Management Area. This area is considered to be in a moderate fire hazard area and outside of regions where there is considerable risk of wildland fire, according to California Department of Forestry and Fire Protection Fire Hazard Severity Zones Maps (CALFIRE 2010).

The United States Geological Survey (USGS) Federal Wildland Fire Occurrence Data for the project area from 1980 to 2008 identifies two wildland fires, both of which occurred in 1987. One fire was less than 0.2 acre, and the second had less than recordable acreage (USGS 2010).

Winter precipitation is particularly important to fire and fuels as it generally occurs as slow, steady rain during winter storms. Live fuel moistures, which reduce the potential for fire, are consequently at their highest point in the spring when shrubs and grasses are actively growing and flowering. The period of highest fire danger (the fire season) varies and may start later in the year if weather remains cool into the spring. By mid-summer, several desert shrubs enter a dormant phase and may partially or fully lose foliage. Shrubs may accumulate dead leaves and other plant matter at their bases or on the ground, creating additional fuel bed. Leaves become very dry and plants appear to be dead or dying. The presence of continuous dry annual grasses between shrubs can also contribute to fire spread, providing additional fuel and connectivity between shrubs for spreading fire. The density and growth of annual herbaceous vegetation within the project site contribute to moderate potential for fire hazards. During the fire season winds are predominately from the west. The prevailing winds during the fire season contribute to the direction of wildfire movement across the landscape.

### **3.6.5 Fire Incident Response**

Fire protection and response is handled by multiple agencies depending on the specific location within the project area and the nature of the event. The BLM and San Bernardino County Fire Department have jurisdictional responsibility to respond to events in the project vicinity. The Newberry Springs Fire Department may also respond, depending on availability.

### **3.6.6 Fuels**

A “fuel” is any combustible material, especially petroleum-based products, but within a wildland setting, typical fuels include vegetation such as grass, shrubs, and timber. The project site is identified as having three fuel types. The predominant fuel type is bare ground occurring in the majority of the project site north of the BSNF railroad with interspersed areas south of the railroad. The area located between I-40 and the BSNF railroad has grass and grass-shrub combination fuel types. The dominant vegetation community in the project area is classified as creosote bush scrubland. Shrubs in the project vicinity are generally widely spaced with a sparse understory. Table 3-14 describes the fuel types identified in the project vicinity.

**Table 3-14 Fuel Type/Model**

Fuel Type	Description
NB9: bare ground	Land devoid of enough fuel to support wildland fire spread. Areas include gravel pits, arid deserts with little vegetation, sand dunes, rock outcroppings, beaches and so forth.
GR2: low-load, dry-climate grass	The primary carrier of fire is grass, though small amounts of fine dead fuel may be present.
GS2: moderate-load, dry-climate grass-shrub	The primary carrier of fire is grass and shrubs combined. Shrubs are 1 to 3 feet high, grass load is moderate. Spread rate is high; flame length moderate. Moisture of extinction low.

Table Source: Scott and Burgan 2005.

Invasive grasses may have proliferated due to previous ground disturbance activities along the BSNF railroad and I-40 corridors. Invasive, nonnative species can cause non-fire-adapted areas to be more susceptible to fire than intact shrublands. Typical invasive, nonnative grasses that may be found in creosote bush scrubland areas include red stem filaree (*Erodium cicutarium*), Saharan mustard (*Brassica tournefortii*), cheat grass (*Bromus tectorum*), Mediterranean grass (*Schismus* spp.) and red brome (*Bromus rubens*). The invasive nonnative grass/fire cycle has the potential to dramatically alter the natural plant communities in southwestern deserts because native shrubs such as creosote bush and white bursage are poorly adapted to frequent fire (Howard 2006). The presence of nonnative weeds may alter the natural fire frequency and intensity because nonnative species tend to grow more densely in the understory than native vegetation, creating a more continuous fuel bed that can result in potentially larger, faster spreading fires (Brooks and Matchett 2006). Invasive nonnative weeds were “relatively low” in abundance and diversity throughout the project site during the Applicant’s 2007-2008 floristic surveys (SES 2009aa). Further discussion of vegetation species and characteristics can be found in the Biological Resources section of this FEIS.

### 3.6.7 Fire Regimes and Behavior

The Landscape Fire and Resource Management Planning Tools Project was utilized to obtain characteristic information for fire regimes and fire behavior typical to the project site. A natural fire regime is a general classification of the role fire would play across a landscape in the absence of human mechanical intervention. Fire regimes are classified based on the average number of years between fires (fire frequency), combined with the severity of the fire (effect of fire on the ecosystem) (NWCG 2003). The prominent fire regime for this area is identified as a Group V, which has a fire frequency interval of 200 years or more (Table 3-15).

**Table 3-15 Fire Regime Groups and Descriptions**

Group	Frequency	Severity	Severity description
I	0–35 years	Low/mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory
II	0–35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35–200 years	Mixed/low	Generally mixed-severity; can also include low severity fires
IV	35–200 years	Replacement	High-severity fires
V	200+ years	Replacement/any severity	Generally replacement severity; can include any severity type in this frequency range

Table Source: IFRCC 2008.

The fire regime condition class (FRCC) is a classification of the amount of departure from the natural regime which results in changes to one (or more) of the following ecological components: vegetation, fuel composition, fire frequency, severity, pattern and other associated disturbances such as insect and disease mortality; grazing and drought. The prominent FRCC for the project area is Condition Class 2, which is a moderate departure from the natural regime. The highest concentration of this class for the project area is located north of I-40 to the BSNF railroad, continuing past the railroad and then dispersing into areas that are classified as sparsely vegetated with no FRCC classification. This pattern suggests that the departure from the natural regime in the general area of these manmade infrastructure elements may have been influenced by ground disturbance activities. The FRCC class descriptions with potential risks are described in Table 3-16.

**Table 3-16 Fire Regime Class Descriptions**

Fire Regime Condition Class	Description	Potential Risks
Condition Class 1 Less than 33 percent departure	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	<ul style="list-style-type: none"> <li>• Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics.</li> <li>• Composition and structure of vegetation and fuels are similar to the natural (historical) regime.</li> </ul>

Fire Regime Condition Class	Description	Potential Risks
Condition Class 2 33 to 66 percent departure	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	<ul style="list-style-type: none"> <li>• Risk of loss of key ecosystem components (e.g., native species, large trees, and soil) are low</li> <li>• Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe).</li> <li>• Composition and structure of vegetation and fuel are moderately altered.</li> <li>• Uncharacteristic conditions range from low to moderate</li> </ul>
Condition Class 3 More than 66 percent departure	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	<ul style="list-style-type: none"> <li>• Risk of loss of key ecosystem components are moderate</li> <li>• Fire behavior, effects, and other associated disturbances are highly departed (more or less severe).</li> <li>• Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high.</li> <li>• Risk of loss of key ecosystem components are high</li> </ul>

Table Source: NWCG 2003.

Table Key: NWCG = National Wildfire Coordinating Group.

Predicting the potential behavior and effects of wildland fire is an essential task in fire management. Fuel models are used in those predictions. A fuel model is a computer program that uses specified information such as fuel, weather, and topography to predict an hourly rate of fire spread from a point of origin.

### 3.6.8 Fire Hazard Potential

When considered alone, the type of vegetation within the project site contributes to a low potential for fire hazard. When combined with human-caused ignitions, fire behavior, and weather conditions, the fire hazard potential of the project site becomes moderate.

## 3.7 Geology, Soils, and Mineral Resources

The geology and mineral resources discussion in this section was developed from Section C.4 Geology and Paleontology of the SA/DEIS. The soils discussion was developed from Section C.7, Soils and Water of the SA/DEIS. A discussion of paleontological resources, originally in

Section C.4 of the SA/DEIS, is located in the Cultural Resources and Paleontology sections (Sections 3.5 and 4.5) of this FEIS.

### 3.7.1 Definition of Resource

This section provides information on the geology and mineral resources of the project site and surrounding area, and on the types and characteristics of the soil resources present. This section also addresses the geotechnical hazards present in the project vicinity.

The Calico Solar Project site is located within the structurally defined Eastern California Shear Zone and lies on the southwest flank of the Cady Mountains. Surface cover consists of Quaternary alluvium and conglomerate composed of sediments washed down from the Cady Mountains to the northeast. Small outcrops of Tertiary basalt, andesite, and volcanic breccia occur in the northernmost portion of the site. A small outcrop of basalt flow from the geologically recent Pisgah Crater eruption is present along the southernmost site boundary (Figure A-4). The geological hazards associated with the project site include faulting and seismicity, volcanic eruptions, liquefaction, dynamic compaction, hydro-compaction, subsidence, expansive soils, and landslides.

### 3.7.2 Applicable Laws, Regulations, Plans, and Policies

Table 3-17 briefly describes current laws, regulations, plans and policies applicable to geology, soils, and mineral resources.

**Table 3-17 Geology, Soils, and, Mineral Resources Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Federal Land Policy and Management Act of 1976 (43 USC 1701 1784)	Authorizes the BLM to manage public lands to protect the quality scientific, scenic, historical, archeological, and other values, and to develop 'regulations and plans for the protection of public land areas of critical environmental concern', which include 'important historic, cultural or scenic values'. Also charged with the protection of 'life and safety from natural hazards'.
<b>State:</b> The Seismic Hazards Mapping Act, Public Resources Code Section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches

Law, Regulation, Plan, or Policy	Description
<b>Local:</b> San Bernardino County 2007 Development Code, Chapters 82.15, 82.20 and Safety Element	Chapter 82.15 requires that a geological study will be undertaken where roads and structures are to be constructed. Also requires that roads and utilities will be perpendicular to faults. Chapter 82.20 defines criteria for site evaluation for paleontological resources in the county, including preliminary field surveys, monitoring during construction, and specimen recovery; also defines qualifications for professional paleontologists. The Safety Element requires compliance with geological/geotechnical reports, the California Building Code, and other state agencies and regulations.
<b>Local:</b> County of San Bernardino General Plan and Development Code	Grading in San Bernardino County is subject to terms and conditions of San Bernardino County's General Plan, Development Code and California Building Code, based upon the 2006 International Building Code. Although the proposed site is located on federal land, county regulations for public health and safety are considered to be applicable to the project. If a county grading permit is required, the grading plan would need to be completed in compliance with San Bernardino County's General Plan and Development Code.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CEC = California Energy Commission; USC = United States Code.

### 3.7.3 Current CDCA Plan

The CDCA Plan contains guidelines for mineral exploration and development (BLM 1999). The guidelines pertain to leasable minerals and are the same for Multiple-Use Class L and Class M land. The CDCA Plan also includes a Geology-Energy Minerals Plan Element which provides more specific application of the multiple-use guidelines towards these resources. As discussed below, the Calico Solar Project is not located within an established Mineral Resource Zone (MRZ), there are no economically viable mineral deposits are known to be present (Kohler 2006), and no active mines are known to have existed within the project boundaries.

### 3.7.4 Soils and Topography

Current soil survey data is limited in much of the Mojave Desert due its low potential for agricultural use. The Natural Resources Conservation Service (NRCS) is conducting soil mapping in the project vicinity, but results are not currently available. Soil Association level for the project area is derived from the State Soil Geographic (STATSGO) soil database. Two primary soil associations would be affected by project construction; the Carrizo-Rositas-Gunsight and the Nickel-Arizo-Bitter associations. The Carrizo-Rositas-Gunsight soil association occupies the majority of the site, while the Nickel-Arizo-Bitter association is present over much of the southern portion of the site, south of the BNSF rail lines. The Rock Outcrop-Lithic Torriorthents-Calvista association is present in the mountains along the northern site perimeter and the Rock Outcrop-Upspring-Sparkhule association is present on the southwest corner of the

Project Site, as well as north and northwest of the site (Table 3-18). Soils in the project area are vulnerable to erosion from wind and stormwater runoff.

**Table 3-18 Summary of Soil Characteristics**

Soil	Texture	Depth of Surface Layer (Inches)	Land Capability Class [Table Notes 1 and 2]	Wind Erodibility Group [Table Note 3]	Erosion (K) Factor [Table Note 4]	Natural Drainage Class	Permeability in inches per hour [Table Note 5]
Carrizo-Rositas-Gunsight	Loamy Fine Sand	9	7S	2	0.15	Somewhat Excessively Drained	6–20
Nickel-Arizo-Bitter	Gravelly Sandy Loam	7	7S	5	0.10	Well Drained	2–6
Rock Outcrop-Lithic Torriorthents-Calvista	Gravelly Loam	8	7E	8	0.20	Excessively Drained	2–6

*Table Source:* Except as otherwise indicated, table source is SES 2008.

*Table Note 1:* Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

*Table Note 2:* Table presents non-irrigated land capability classification. Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Capability classes range from 1 to 8, with higher numbers indicating progressively greater limitations and narrower choices for use: Class 7 = severe limitations, unsuitable for cultivation, restrictions: E = erosion is main hazard unless close-growing plant cover maintained; S = soil limited because shallow, droughty or stony.

*Table Note 3:* Wind erodibility groups range from 1 to 8, with 1 being highly erodible and 8 having low erodibility.

*Table Note 4:* This is an index of erodibility for standard condition and includes susceptibility of soil to erosion and rate of runoff. Low K values (below 0.15) indicate low erosion potential. High K values (above 0.4) are highly erodible. See report text for additional information.

*Table Note 5:* Permeability refers to saturated hydraulic conductivity for the surface layer. Permeability rates listed are minimum and maximum expressed in inches/hr.

The project site is located in the central portion of the Mojave Desert physiographic province. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins and occupies approximately 25,000 square miles in southeastern California and portions of Nevada, Utah and Arizona. In California, its overall topography is dominated by southeast- to northwest-trending faults with a secondary east-to-west-trending alignment that is attributable to Transverse Range faulting (Norris and Webb 1990). Overall, the project site slopes southwest toward the local topographic low at the normally dry Troy Lake.

### 3.7.4.1 Soil Erosion Potential

Current soil survey data is limited in much of the Mojave Desert due to the lower potential for agricultural use. Detailed soil mapping has not been performed by NRCS for the site. However, soil mapping in the general area is being conducted by NRCS. The results of that mapping effort will not likely be available for a few years.

Available soil data for the project area are derived from the STATSGO soil database which presents mapping at the association level. The mapped soil associations database contains several soil series within each map unit. Primarily two soil associations would be affected by project construction; the Carrizo-Rositas-Gunsight and the Nickel-Arizo-Bitter associations. The Carrizo-Rositas-Gunsight soil association occupies the majority of the site, while the Nickel-Arizo-Bitter association is present over much of the southern portion of the site, south of the BNSF rail lines. The Rock Outcrop-Lithic Torriorthents-Calvista association is present in the mountains along the northern site perimeter and the Rock Outcrop-Upspring-Sparkhule association is present on the southwest corner of the Project Site, as well as north and northwest of the site.

Carrizo soils are formed in alluvium present primarily on flood plains, alluvial fans, fan piedmonts, and bolson floors, with slopes up to 15 percent. These soils are typically very deep gravelly sand. The upper 2 inches is extremely gravelly sand with about 65 percent gravel. Below the upper 2 inches, the material contains coarse sand and averages 70 percent gravel and coarser materials, with clay content less than 8 percent. The soils are excessively drained with negligible or very low runoff and rapid or very rapid permeability.

Rositas soils are formed in sandy aeolian material on dunes and sand sheets, with slopes up to 30 percent. These soils are typically fine sand with up to 5 percent gravel and up to 10 percent clay. Rositas soils are very deep and somewhat excessively drained, with negligible or low runoff and rapid permeability.

The Gunsight series is comprised of very deep calcareous alluvial soils on fan or stream terraces with slopes up to 60 percent. The soils are very gravelly loam, with gravel content ranging from 40 percent to 75 percent gravel and an average of less than 18 percent clay. The soils are somewhat excessively drained with very low to high runoff and moderate or moderately rapid permeability.

Nickel soils are derived in alluvium from mixed rock sources and are present on fan remnants with slopes up to 35 percent. The soils are very gravelly loam, with gravel content ranging from 25 percent to 75 percent, generally increasing with depth and typically less than 15 percent clay. The A horizon contains approximately 20 percent gravel and cobbles and is classified as gravelly very fine sandy loam. The soils are very deep, well drained with very low to medium

runoff and moderate permeability. Nickel soils are commonly associated with Arizo and Bitter soils.

Arizo soils are also formed in mixed alluvium and are present on recent alluvial fans, inset fans, fan apron, fan skirts, stream terraces, and in intermittent stream and channel floodplains. The material is typically very gravelly fine sand with 35 percent to 80 percent gravel and cobbles, increasing with depth. The A horizon is very gravelly fine sand with 35 percent pebbles. The soils are very deep, excessively drained, with negligible to medium runoff and rapid to very rapid permeability.

Similar to Arizo and Nickel soils, Bitter soils are formed in mixed alluvium. They are present on dissected old fans between lower recent fans and the toes of steep slopes generally ranging from 2 percent to 15 percent. The material is extremely gravelly sandy loam with 45 percent to 75 percent pebbles and cobbles. The upper horizons are composed of extremely to very gravelly sandy loam with 50 percent pebbles and cobbles. Bitter soils are well drained with medium runoff and moderately slow permeability.

The rock outcrop classification is typically observed on mountainsides, ridges, and rugged hills. It can be composed of many rock types, typically granite, quartz monzonite, basalt, dacite, limestone, quartz, mica, schist, and fanglomerate.

Lithic torriorthents (shallow rocky soils) are present between rock outcrop areas, in small depressions and on relatively stable hillsides. Slopes typically range from 15 percent to 50 percent. The soil varies from sandy loam to very gravelly sand. They form in material weathered from granitic rock, with hard, fractured rock present at a depth of 1 to 18 inches. These soils are very shallow and shallow, well drained, with medium to rapid runoff and a high water erosion hazard.

The Calvista series consists of sandy loam formed from granitic rock with seams of calcite. It is typically present on slopes of 2 percent to 30 percent and mountain ridges, buttes and domes in Southern California deserts. Hard rock is generally present at a depth of 14 to 20 inches, although rock outcrops may be present. The gravel content is typically less than 35 percent. Calvista soils are shallow and well drained soils, with medium to rapid runoff and moderately rapid permeability.

### **3.7.5 Mineral Resources**

The Calico Solar Project is not located within an established MRZ and no economically viable mineral deposits are known to be present (Kohler 2006). No active mines are known to have existed within the project boundaries although several operating and closed mines and mineral

prospects are present within 5 miles of the project boundaries (USGS 2008). Mines in the area have produced a number of industrial minerals, primarily manganese, borates, clay and talc.

### 3.7.6 Faulting and Seismicity

The CEC reviewed numerous CDMG and USGS publications as well as informational websites to gather data on the location, recency and type of faulting in the project area. The project site is located with a structural area variously referred to in literature as the Barstow–Bristol trough (Glazner et al. 2000), the Eastern California Shear Zone (Dokka and Travis 1990), and the Mojave Extensional Belt (Ross 1995). All refer, fully or in part, to an area of the Mojave Desert geomorphic province (the Mojave Desert block). This geomorphic province is characterized by northwest-trending right lateral strike–slip faulting and accounts for approximately 40 miles of extensional faulting within the region since the middle Miocene (roughly 15 million years ago).

Several Type A and B faults exists within 80 miles of the proposed Calico Solar Project site are listed in Table 3-19. Type A faults have slip-rates greater than 5 millimeters per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 millimeters per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. The fault type, potential magnitude, and distance from the site are summarized in Table 3-19. Because of the large size of the site, the distances to faults are measured from the proposed control building location within the project boundaries.

Thirty-two Type A and B faults and fault segments were identified within 80 miles of the project site. Of these, two are in proximity to the proposed project site and warrant detailed discussion (Figure A-5). These are the Lavic Lake and Pisgah-Bullion fault zones. The Lavic Lake fault partially underlies the site, in Sections 12 and 15. The fault experienced surface ground rupture during the 1999 Hector Mine earthquake and was subsequently evaluated by the California Geological Survey. Both fault zones have been included within the Alquist-Priolo Earthquake Fault Zone (CGS 2002a). These are sub-parallel Type B right-lateral northwest-trending strike-slip fault systems which extend beneath the southern portions of the project site (USGS 2003). Lack of surface expression north of I-40 precludes mapping of these faults across the project site.

**Table 3-19 Active Faults Relative to the Proposed Calico Solar Project Site**

<b>Fault Name</b>	<b>Distance from Site (miles)</b>	<b>Maximum Earthquake Magnitude (Mw)</b>	<b>Estimated Peak Site Acceleration (g)</b>	<b>Movement and Strike</b>	<b>Slip Rate (mm/yr)</b>	<b>Fault Type</b>
Lavic Lake	1.5	7.1		Right-Lateral Strike Slip (Northwest)	0.2–1	B

<b>Fault Name</b>	<b>Distance from Site (miles)</b>	<b>Maximum Earthquake Magnitude (Mw)</b>	<b>Estimated Peak Site Acceleration (g)</b>	<b>Movement and Strike</b>	<b>Slip Rate (mm/yr)</b>	<b>Fault Type</b>
Pisgah-Bullion Mtn.– Mesquite Lake	4.1	7.3	0.391	Right-Lateral Strike Slip (Northwest)	0.6	B
Calico–Hidalgo	11.4	7.3	0.210	Right-Lateral Strike Slip (Northwest)	0.6	B
Landers	18.8	7.3	0.146	Right-Lateral Strike Slip (Northwest)	0.6	B
Emerson South– Copper Mtn.	20.9	7.0	0.115	Right-Lateral Strike Slip (Northwest)	0.6	B
Johnson Valley (Northern)	24.4	6.7	0.087	Left-Lateral Strike Slip (Northwest)	0.6	B
Lenwood–Lockhart–Old Woman Springs	26.7	7.5	0.124	Right-Lateral Strike Slip (Northwest)	0.6	B
Gravel Hills–Harper Lake	29.9	7.1	0.092	Right-Lateral Strike Slip (Northwest)	0.6	B
Northern Frontal Fault Zone (East)	35.2	6.7	0.080	Reverse (South)	0.5	B
Blackwater	38.2	7.1	0.076	Right-Lateral Strike Slip (Northwest)	0.6	B
Northern Frontal Fault Zone (West)	39.7	7.2	0.095	Reverse (South)	1.0	B
Helendale– South Lockhart	40.1	7.3	0.082	Right-lateral strike slip (northwest)	0.6	B
Pinto Mountain	46.3	7.2	0.069	Left-lateral strike slip (northwest)	2.5	B
Burnt Mountain	47.4	6.5	0.047	Right-lateral strike slip (northwest)	0.6	B
Eureka Peak	47.4	6.4	0.045	Right-lateral strike slip (northwest)	0.6	B
Garlock (East)	53.9	7.5	0.072	Left-lateral strike slip (northeast)	7.0	B
Death Valley (South)	54.2	7.1	0.058	Right-lateral strike slip (northwest)	4.0	B
Cleghorn	58.4	6.5	0.040	Right-lateral strike slip (northwest)	0.6	B
San Andreas–San Bernardino M-1	60.3	7.5	0.066	Right-lateral strike slip (northwest)	24.0	A
San Andreas–San Bernardino–Coachella M-1b-2	60.3	7.7	0.073	Right-lateral strike slip (northwest)	24.0	A

<b>Fault Name</b>	<b>Distance from Site (miles)</b>	<b>Maximum Earthquake Magnitude (Mw)</b>	<b>Estimated Peak Site Acceleration (g)</b>	<b>Movement and Strike</b>	<b>Slip Rate (mm/yr)</b>	<b>Fault Type</b>
San Andreas–Whole M-1a	60.3	8.0	0.086	Right-lateral strike slip (northwest)	34.0	A
San Andreas–San Bernardino–Coachella M-2b	60.3	7.7	0.073	Right-lateral strike slip (northwest)	25.0	A
San Andreas–Coachella M-1c-5	61.4	7.2	0.056	Right-lateral strike slip (northwest)	25.0	A
Owl Lake	61.5	6.5	0.038	Left-lateral strike slip (northwest)	2.0	B
Panamint Valley	62.6	7.4	0.061	Right-lateral, normal, oblique	2.5	B
San Andreas–Cholame–Mojave M-1b-1	72.0	7.8	0.067	Right-lateral strike slip (northwest)	34.0	A
San Andreas–Mojave M-1c-3	72.0	7.4	0.055	Right-lateral strike slip (northwest)	30.0	A
Cucamonga	72.2	6.9	0.051	Reverse (north)	5.0	B
San Jacinto–San Bernardino	72.3	6.7	0.038	Right-lateral strike slip (northwest)	12.0	A
San Jacinto–San Jacinto Valley	72.4	6.7	0.042	Right-lateral strike slip (northwest)	12.0	A
Tank Canyon	75.3	6.4	0.038	Normal (west)	1.0	B
San Jacinto–Anza	79.5	7.2	0.046	Right-lateral strike slip (northwest)	12.0	A

*Table Source:* BLM and CEC 2010.

*Table Key:* g = acceleration due to gravity; mm/yr = millimeters per year, Mw = movement magnitude.

In addition to the Type A and B faults, two other fault systems have potential to cause ground shaking at the proposed Calico Solar Project site: the Cady Fault and the Ludlow Fault. The Cady Fault is an east-west-trending left-lateral strike-slip fault within the Cady Mountains approximately three miles north of the northern site boundary. Quaternary movement has been documented on the Cady Fault where it offsets older alluvium. Younger alluvium covers the eastern end of the Cady Fault suggesting no recent movement. The Ludlow Fault is a northwest-trending right-lateral strike-slip fault which extends to within approximately 12 miles of the eastern boundary of the proposed project site. Quaternary movement has been reported for the Ludlow Fault (Southern California Earthquake Center [SCEC] 2009).

## 3.8 Grazing and Wild Horses and Burros

This section was developed from Section C.8, Land Use, Recreation and Wilderness of the SA/DEIS. This section discusses the existing conditions of the project area in regards to agriculture, rangelands, wild horses and burros.

### 3.8.1 Definition of Resource

The resource that would be affected by the proposed project is approximately 8,230 acres of public land which is currently open for a variety of uses, including grazing and wild horse and burro management. Changes in land use could cause impacts to rangelands and wild horses and burros. No agricultural use is located within or adjacent to the project area.

### 3.8.2 Applicable Laws, Regulations, Plans, and Policies

Table 3-20 lists the federal, state, and local environmental laws, regulations, plans, and policies applicable to the Calico Solar Project with regards to agricultural lands, rangelands, and wild horses and burros.

**Table 3-20 Grazing and Wild Horses and Burros Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
CDCA Plan (BLM 1999)	Chapter 3: Wild Horse and Burros Element, Goal 2 - Protect wild horses and burros on public lands by conducting surveillance to prevent unauthorized removal or undue harassment of animals.
West Mojave Plan (WEMO) (BLM et al. 2005)	As an amendment to the CDCA Plan, the BLM produced the West Mojave Plan. The West Mojave Plan is a federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel and nearly 100 other plants and animals and the natural communities of which they are part, and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts.
Farmland Protection Policy Act	As required by section 1541(b) of the Farmland Protection Policy Act, 7 USC 4202(b), federal agencies are (a) to use the criteria to identify and take into account the adverse effects of their programs on the preservation of farmland, (b) to consider alternative actions, as appropriate, that could lessen adverse effects, and (c) to ensure that their programs, to the extent practicable, are compatible with State and units of local government and private programs and policies to protect farmland.

Law, Regulation, Plan, or Policy	Description
Taylor Grazing Act (1934)	The Taylor Grazing Act of 1934 (43 USC 315) was intended to regulate grazing on public lands (excluding Alaska); prevent deterioration of rangeland by overgrazing; and provide for long-term management of grazing districts for the benefit of the livestock industry that utilized public rangelands.
Public Rangelands Improvement Act (1978)	Establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process; and continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros which pose a threat to themselves and their habitat and to other rangeland values.
Wild and Free-Roaming Horse and Burro Act (1971) (BLM 2009d)	Protects, manages, and controls wild horses and burros to ensure that healthy herds thrive on healthy rangelands. The BLM manages these animals as part of its multiple-use mission under the 1976 Federal Land Policy and Management Act. One of the BLM's key responsibilities under the Act is to determine the "appropriate management level" of wild horses and burros on the public rangelands.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; USC = United States Code; WEMO = West Mojave Plan.

### 3.8.3 Current CDCA Plan

The CDCA Plan contains guidelines and elements pertaining to livestock grazing and wild horses and burros as described below (BLM 1999). The plan also contains guidelines for agriculture.

#### 3.8.3.1 Agriculture

The agriculture guidelines are the same for Multiple-Use Class L and Class M land. The guidelines state that no agricultural uses other than livestock grazing are allowed within the CDCA planning area.

#### 3.8.3.2 Livestock Grazing

The livestock grazing guidelines pertain to the protection of sensitive resources, support facilities and vegetation manipulation and are slightly different for Multiple-Use Class L and

Class M land. The CDCA Plan also includes a Livestock Grazing Element, which provides more specific application of the multiple-use guidelines toward these resources.

### **3.8.3.3 Wild Horses and Burros**

The wild horses and burros guidelines state that “[p]opulations of wild and free-roaming horses and burros will be maintained in healthy, stable herds, in accordance with the Wild and Free-Roaming Horse and Burro Act of 1971 but will be subject to controls to protect sensitive resources.” The guidelines are the same for Multiple-Use Class L and Class M land. The CDCA Plan also includes a Wild Horses and Burrows Element, which provides more specific application of the multiple-use guidelines toward these resources through the protection and management of herd management areas (HMA) and herd management area plans (HMAP).

### **3.8.4 Agricultural Lands and Rangelands**

The project site is located within the desert region of central San Bernardino County, which is not notable for productive agricultural land. The U.S. Department of Agriculture’s (USDA) NRCS provides information on the designation of soils in areas with agricultural lands (NRCS 2009). Agricultural lands can be designated by the USDA as Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, or Unique Farmland. However, data for the project site was not available through the NRCS’s Web Soil Survey. Similarly, the California Department of Conservation’s Farmland Mapping and Monitoring Program (FMMP) provides designations and statistics on the conversion of farmland to non-agricultural uses throughout the state. However, the project site is not within the survey boundaries of the FMMP. As such, no designated agricultural land is located within the project boundaries.

Rangeland allotments are BLM-designated pastures for wildlife and livestock (BLM 2009e). The majority of the project is located within the 177,293-acre Cady Mountains allotment (Figure A-6) (BLM 2009a, 2009b). According to BLM’s online Global Information System mapping program (Geocommunicator), the southwest boundary of this allotment follows the BNSF railroad. Approximately 6,400 acres of the project site located north of the BNSF railroad is within the Cady Mountains rangeland allotment (BLM 2009c). Grazing is not presently occurring on the Cady Mountain allotment because the allotment is vacant with no grazing lessee and is pending voluntary relinquishment under the WEMO.

The portion of the project site south of the BNSF railroad is not within a designated allotment. The next closest allotment is the Ord Mountain allotment, which is located approximately 0.75 mile south of the project site.

### 3.8.5 Wild Horses and Burros

The BLM manages wild horses and burros as guided by the Wild and Free-Roaming Horse and Burro Act of 1971. This includes the management of Herd Areas (HAs), which are geographic areas where wild horse or burro populations were found at the passage of the Act in 1971, and HMAs, which are areas within HAs where populations of wild horses and/or burros are managed through LUPs (BLM 2009f). There are 33 HAs and 22 HMAs in California. The Granite-Providence Mountains is the closest HA, located approximately 32 miles east of the project site within the Mojave Preserve. In addition, the Cyma Dome, Lava Beds, and Woods-Hackberry HAs are located within the Mojave Preserve approximately 40 to 45 miles east of the proposed project site (BLM 2009d). No HMAs are within the vicinity of the project site (Figure A-6).

## 3.9 Land Use

This section was developed from Section C.8 Land Use, Recreation and Wilderness of the SA/DEIS. Section C.8 of the SA/DEIS discusses land uses including agricultural lands and rangeland management; wilderness, ACEC and recreation; and horses and burros. Those subjects are addressed in Section 3.8, Grazing and Wild Horses and Burros; Section 3.12, Recreation; and Section 3.14, Special Designations of this FEIS.

### 3.9.1 Definition of Resource

This section discusses land ownership, jurisdiction, land status, and current and planned land uses within the project vicinity. This section also discusses existing ROWs and encumbrances on the project site.

### 3.9.2 Applicable Laws, Regulations, Plans, and Policies

Table 3-21 provides a general description of the land use regulations, plans, and policies applicable to the proposed project.

**Table 3-21 Land Use Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
FLPMA (43 CFR 1600)	Establishes public land policy; guidelines for administration; and provides for the management, protection, development, and enhancement of public lands. In particular, the FLPMA's relevance to the proposed project is that Title V, Section 501 establishes BLM's authority to grant rights-of-way for generation, transmission, and distribution of electrical energy .

Law, Regulation, Plan, or Policy	Description
1980 CDCA Plan (BLM 1999)	The CDCA Plan is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and it is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan's goals and actions for each resource are established in its 12 elements. Each of the plan elements provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.
West Mojave Plan (BLM et al. 2005)	The West Mojave Plan is a habitat conservation plan and federal land use plan amendment to the CDCA Plan that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other sensitive plants and animals and their communities; and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Act.
Interim Policy on Management of Donated Lands and Lands Acquired with Land and Water Conservation Funds, Instruction Memorandum No. CA-2009-020CH1 (BLM 2009i)	<p>The LWCF Interim Policy provides guidance for the management of donated lands and lands acquired with LWCF funds (collectively "donated and acquired lands") as follows:</p> <p>Lands acquired by BLM under donation agreements, acquired for mitigation/ compensation purposes, or lands acquired with LWCF funds, are to be managed as avoidance/ exclusion areas for land use authorizations that could result in surface disturbing activities.</p> <p>Should BLM–California managers have use authorization applications pending, or receive new applications on lands that meet the above criteria, they are required to notify the State Director and set up a briefing to address how to respond to those applications.</p> <p>Should managers have inquiries related to pre-application activities for any land use authorizations on lands that meet the above criteria, please notify applicants regarding the location of these lands as soon as possible and advise them to avoid these lands or provide details on how they would plan to operate or mitigate their project in a manner consistent with the values of the lands donated or acquired for conservation purposes.</p>

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; FLPMA = Federal Land Policy and Management Act; LWCF = Lands and Water Conservation Fund.

### 3.9.3 Current CDCA Plan

Land uses on BLM land in the project vicinity are administered according to the CDCA Plan. The 25 million-acre CDCA contains over 12 million acres of public lands spread within the area known as the California Desert, which includes the following three deserts: the Mojave, the Sonoran, and a small portion of the Great Basin.

The CDCA Plan is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and it is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan's goals and actions for each resource are established in its twelve plan elements. Each of the plan elements provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

### 3.9.3.1 CDCA Plan Multiple Use Classes

The CDCA Plan identifies four multiple use classes for the purposes of land management: Controlled Uses (C), Limited Use (L), Moderate Use (M), and Intensive Use (I), each with a specific set of management guidelines. The project site includes two CDCA Plan Multiple-Use Class designations (Figure 2-3). Approximately 97 percent of the project site is currently designated as Multiple-Use Class M, which is described as follows in the CDCA Plan:

- “Multiple-Use Class M (Moderate Use) is based on a controlled balance between high intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.” (BLM 1999)

Two areas that contain approximately 208 acres (approximately 3 percent) of the project site at the northern boundary adjacent to the foothills of the Cady Mountains are designated as Multiple-Use Class L which is described as follows in the CDCA Plan:

- “Multiple-Use Class L (Limited Use) protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.” (BLM 1999)

### 3.9.3.2 CDCA Plan Elements and Guidelines

All CDCA land-use actions and resource management activities must meet the multiple-use guidelines within the Plan given for the specific multiple-use class. Guidelines are organized into 19 resource and activity categories. Activity Category 6, Electrical Generation Facilities, provides that wind, solar, and geothermal electrical generation facilities “May be allowed after NEPA requirements are met” in both Multiple-Use Classes L and M.

The Energy Production and Utility Corridors Element of the CDCA Plan provides that sites associated with power generation or transmission not identified in the CDCA Plan will be considered through the Plan Amendment process. Chapter 3 of the CDCA Plan, Energy Production and Utility Element (BLM 1999), provides the following:

- Specific electrical and natural gas right-of-way or power plant site applications made under the provisions of this element should be consistent with adopted California Energy Commission forecasts, which are reviewed biennially. Decision criteria are to:
  1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors.
  2. Encourage joint use of corridors for transmission lines, canals, pipelines, and cables.
  3. Provide alternative corridors to be considered during processing of applications.
  4. Avoid sensitive resources wherever possible.
  5. Conform to local plans whenever possible.
  6. Consider wilderness values and be consistent with final wilderness recommendations.
  7. Complete the delivery-systems network.
  8. Consider ongoing projects for which decisions have been made, for example, the Intermountain Power Project.
  9. Consider corridor networks which take into account power needs and alternative fuel resources.

#### **3.9.4 Interim Policy on Management of Donated and Acquired Lands**

Approximately 1,180 acres within the project site are lands that were either donated to the BLM or were acquired with assistance from the federal Land and Water Conservation Fund (LWCF). These lands are collectively referred to in this FEIS as “donated and acquired lands.” Within the project site, lands in Sections 5, 9, and 17, T8N, R6E; and in Section 33, T9N, R6E were either donated or acquired with LWCF assistance (Figure A-8).

The BLM California State Director issued IM No. CA-2009-020CH1 on May 28, 2009, to provide interim direction on the management of acquired and donated lands. The relevant text from the IM is as follows (BLM 2009):

- “Lands acquired by BLM under donation agreements, lands acquired for mitigation/compensation purposes, or lands acquired with LWCF funds, are to be managed as avoidance/exclusion areas for land use authorizations that could result in surface disturbing activities.”
- “Should BLM-California managers have use authorization applications pending, or receive new applications on lands that meet the above criteria, they are required to notify the State Director and set up a briefing to address how to respond to those applications.”
- “Should managers have inquiries related to pre-application activities for any land use authorizations on lands that meet the above criteria, please notify applicants regarding the location of these lands as soon as possible and advise them to avoid these lands or provide details on how they would plan to operate or mitigate their project in a manner consistent with the values of the lands donated or acquired for conservation purposes.”

#### **3.9.4.1 Terms of Acquisition of Donated Lands**

Approximately 88 acres in Section 17, Township 8 North, Range 6 East within the project site were acquired by the BLM as “Fee Land”, pursuant to a donation agreement subject to the following terms:

- “The United States, on behalf of itself and its successors, assigns and contractors, if any, will not allow or permit uses on the Fee Land that are not consistent with the terms of the California Desert Conservation Area Plan, and all laws applicable to the United States. The United States agrees that the Fee Land, and all estates, rights, privileges, and interests that are part of or associated with the Fee Land, shall be conserved and used for the conservation of the natural, cultural and aesthetic values associated with the Fee Land in a manner consistent with the California Desert Conservation Area Plan and all laws applicable to the United States.”

The BLM’s ROW regulations (43 CFR 2801.2) state that BLM will grant ROW in a manner that “[p]rotects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity.” Additionally, BLM’s regulations at 43 CFR 2804.26 [a][1] provide guidance on the circumstances for possible denial of a ROW, including if

the proposed use would not be consistent with the purposes for which the lands described in the application are managed.

### **3.9.5 Current Land Use**

The project site is located within the desert region of central San Bernardino County, and consists primarily of undeveloped desert land. The entire project site is public land administered by the BLM; no privately owned lands are within the project site. The SA/DEIS Section C.8, Land Use, Recreation, and Wilderness, discussed the effects of the proposed project on land uses including Agricultural Lands and Rangeland Management; Wilderness, ACECs, and Recreation; and Horses and Burros. Those subjects are addressed in Section 3.8, Grazing and Wild Horses and Burros; Section 3.12, Recreation; and Section 3.14, Special Designations. The discussion of the use of BLM routes in the project area appears in Section 3.15, Traffic and Transportation.

Existing land uses on the project site include dispersed recreation, the BNSF railroad, which traverses the project area from east to west; and several underground high pressure gas pipelines that generally parallel I-40 and the railroad. Hector Road, a San Bernardino County road, enters the site from an interchange on I-40 and traverses it for approximately 925 feet before ending near the BNSF railroad tracks.

There exist a number of ROWs and other encumbrances on the lands within the proposed project site that pre-date the Applicant's ROW applications. They include one un-patented mining claim; ten petroleum pipeline ROWs; twelve powerline and fiber optic ROWs; two access road ROWs, and a ROW in favor of the California Division of Highways. The Applicant was notified of the existence of these encumbrances by letters from the BLM California Desert District (CDD) office on June 30 and July 1, 2009.

### **3.9.6 Surrounding Area**

The southern boundary of the project site is adjacent to I-40, while the northern boundary borders the Cady Mountains. The surrounding area consists of undeveloped desert land and mountain terrain with small rural communities in the vicinity. The closest community is Newberry Springs, located approximately 17 miles west of the project site. The closest residence is located approximately 2 miles east of the project site. The existing SCE Pisgah Substation and overhead transmission line are adjacent to the southeast border of the project site (Figure 1-2).

Several parcels of private property totaling approximately 2,246 acres abut the project site, and some are bordered on three sides by the project boundaries (shown as NAP on Figure 1-2). The project site is adjacent to and near a number of BLM special designation areas, including the Cady Mountains WSA to the north; the Pisgah ACEC to the southwest; and the Ord-Rodman

DWMA to the southwest (Figure A-9). The recently proposed 2010 California Desert Protection Act would designate lands adjacent to the project site on the eastern and northern boundaries as part of the Mojave Trails National Monument, if enacted. Other wilderness areas in the project vicinity are the Rodman Mountains Wilderness, located approximately 8 miles southwest of the project site; the Bristol Mountains Wilderness and Kelso Dunes Wilderness, located approximately 10 miles east of the project site; and the Newberry Mountains Wilderness, located approximately 15 miles southwest of the project site.

### 3.10 Noise and Vibration

This section was developed from Section C.9, Noise and Vibration, of the SA/DEIS.

#### 3.10.1 Definition of Resource

Noise is the general term given to unwanted sound. Sound is measured in units of decibels, which is a logarithmic measure of sound power. Sound measurements are corrected to provide an approximate measure of normal human hearing. The correction to sound measurement is called the A-weighted decibel (dBA) scale. This scale provides a general correlation to a human's sensing of noise under normal circumstances. Noise control is regulated for two main purposes: (1) to control public nuisance associated with excessive noise in the public environment and (2) to provide worker safety with regard to chronic noise exposure that may cause permanent hearing damage.

#### 3.10.2 Applicable Laws, Regulations, Plans, and Policies

Table 3-22 presents the applicable regulatory framework relating to noise and vibration standards.

**Table 3-22 Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Occupational Safety and Health Act (29 USC 651 et seq.)	Protects workers from the effects of occupational noise exposure.
<b>State:</b> California Occupational Safety and Health Act (California Code of Regulations, Title 8, Sections 5095–5099)	Protects workers from the effects of occupational noise exposure.
<b>Local:</b> San Bernardino County General Plan (Noise Element)	Establishes noise limits as specified in the San Bernardino County Development Code (see description below).
<b>Local:</b> San Bernardino County Development Code (Chapter 83.01)	Establishes property line noise limits for various receiving uses. Exempts construction noise during certain hours. Establishes vibration limits.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CEC = California Energy Commission; USC = United States Code.

### 3.10.2.1 Federal

Under the Occupational Safety and Health Act of 1970 (29 USC 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR 1910.95). These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (Table 3-23). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise and that workers' hearing is periodically tested to detect any degradation.

**Table 3-23 OSHA Worker Noise Exposure Standards**

Duration of Noise (hours/day)	Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

*Table Source:* OSHA (29 CFR 1910.95)

*Table Key:* dBA = A-weighted decibel; CFR = Code of Federal Regulations; OSHA = Occupational Safety and Health Administration.

There are no federal laws governing off-site (community) noise. The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from groundborne vibration. The FTA measure of the threshold of perception is 65 vibration decibels, which correlates to a peak particle velocity of about 0.002 inch per second. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 vibration decibels, which correlates to a peak particle velocity of about 0.2 inch per second.

### 3.10.2.2 State

California Government Code Section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. Table 3-24 lists the State land use compatibility guidelines.

**Table 3-24 Land Use Compatibility for Community Noise Environment**

<b>Land Use Category</b>	<b>Normally Acceptable Noise Exposure, L<sub>dn</sub> or CNEL (db) [Note 1]</b>	<b>Conditionally Acceptable Noise Exposure, L<sub>dn</sub> or CNEL (db) [Note 2]</b>	<b>Normally Unacceptable Noise Exposure, L<sub>dn</sub> or CNEL (db) [Note 3]</b>	<b>Clearly Unacceptable Noise Exposure, L<sub>dn</sub> or CNEL (db) [Note 4]</b>
Residential (low-density single-family, duplex, mobile home)	50–65	57–72	72–77	77–90
Residential (multifamily)	50–67	62–72	72–77	77–90
Transient lodging (motel, hotel)	50–65	62–77	77–85	85–90
Schools, libraries, churches, hospitals, nursing homes	50–65	65–75	75–85	85–90
Auditorium, concert hall, amphitheaters	<50	50–72	67–90	>80
Sports arena, outdoor spectator sports	50–62	50–75	72–90	>90
Playgrounds, neighborhood parks	50–72	50–72	70–77	75–90
Golf courses, riding stables, water recreation, cemeteries	50–77	50–77	72–85	85–90
Office buildings, business commercial and professional	50–72	65–72	72–85	77–90
Industrial, manufacturing, utilities, agriculture	50–77	65–77	72–85	77–90

*Table Source:* Adapted from State of California, Office of Planning and Research, 1990.

*Table Note 1: Normally Acceptable Noise Exposure:* Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

*Table Note 2: **Conditionally Acceptable:*** New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

*Table Note 3: **Normally Unacceptable:*** New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

*Table Note 4: **Clearly Unacceptable:*** New construction or development generally should not be undertaken.

*Table Key:* < = less than; > = greater than; CNEL = community noise measurement; db = decibel; L<sub>dn</sub> = average day-night sound level.

The California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (California Code of Regulations, Title 8, Sections 5095–5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see Section 3.11, Public Health and Safety and Hazardous Materials, of this document).

### 3.10.2.3 Local

#### San Bernardino County General Plan Noise Element

The San Bernardino County General Plan Noise Element establishes noise performance standards for stationary sources. These limits are those specified in the San Bernardino County Development Code as described below.

#### San Bernardino County Development Code

Chapter 83.01 of the San Bernardino County (SBC) Development Code sets noise performance standards for noise from stationary noise sources measured at the boundaries of noise-sensitive land uses (Table 3-25). The Development Code stipulates an allowance to these limits if the measured ambient noise level exceeds any of the four noise limit categories, such that “the allowable noise exposure standard shall be increased to reflect the ambient noise level” (SBC 2007).

Construction noise is exempt from these limits between 7:00 a.m. and 7:00 p.m., except on Sundays and federal holidays (SBC 2007).

Vibration is limited to levels that cannot be felt without the aid of instruments at or beyond the lot line and that do not produce a particle velocity greater than or equal to 0.2 inch per second at the lot line (SBC 2007). Construction vibration is exempt from this limit between 7:00 a.m. and 7:00 p.m., except on Sundays and federal holidays (SBC 2007).

However, since the project would be built on federally owned land, these San Bernardino County regulations do not apply. They are listed here solely as guidelines.

**Table 3-25 Noise Standards for Stationary Noise Sources**

Receiving Land Use Category	Noise Level (dBA $L_{eq}$ ) 7:00 a.m. to 10:00 p.m.	Noise Level (dBA $L_{eq}$ ) 10:00 p.m. to 7:00 a.m.
Residential	55	45
Professional Services	55	55
Other Commercial	60	60
Industrial	70	70

*Table Source:* SBC 2007:Table 83-2.

*Table Key:* dBA = A-weighted decibel;  $L_{eq}$  = equivalent continuous sound level; SBC = San Bernardino County.

### 3.10.3 Current CDCA Plan

There are no guidelines or elements pertaining to noise in the CDCA Plan (BLM 1999).

### 3.10.4 Ambient Noise Measurement

The levels of noise in a given environment depend on the amount of human activity and the environmental conditions present. Although noise itself is not a natural, social, or cultural resource, the introduction of noise can interrupt or change the ambient noise levels in a given area. Perhaps, the resource that noise can affect is best described as “quietness.” Changes to quietness or ambient noise levels are the measured impacts of that resource.

To establish a baseline for comparison of predicted project noise to existing ambient noise, the Applicant measured noise levels at two locations from November 2 through November 7, 2008 (Figure A-10). Since the noise environment has not changed from that time—that is, no development or changes in land use—the results of that ambient noise survey is considered to be an accurate measurement of ambient conditions (SES 2008a). Measurements were conducted in two long-term measurement locations (LT). The measuring locations included the following:

- (1) Measuring Location 3 (LT3): Near the residence (Sensitive Receiver [SR]1) located approximately 1,200 feet southwest of the project site, to the south of U.S. Route 66 and west of Hector Road. This is the sensitive receiver closest to the project site. Long-term monitoring (25 hours) showed elevated ambient noise levels consistent with the receiver’s proximity to the nearby rail lines and highway.

- (2) Measuring Location 4 (LT4): Near an abandoned corral west of the project site. Long-term monitoring (18 hours) showed ambient noise levels consistent with a rural environment.

Ambient noise measurements were not taken at the second residence (SR2), a residence located approximately 7,800 feet east of the project site and 5,300 feet north of the rail line and I-40. On the basis of comparable noise conditions such as noise source proximity and exposure, ambient noise at this receiver is likely similar to that at measuring location LT4 (SES 2009). The project noise impacts at SR2 were determined with ambient noise data from LT4, as a proxy measurement. Table 3-26 summarizes the ambient noise measurements:

**Table 3-26 Summary of Measured Ambient Noise Levels**

Measurement Location	Daytime $L_{eq}$ (dBA) [Table Note 1]	Nighttime $L_{eq}$ (dBA) [Table Note 2]	Nighttime $L_{90}$ (dBA) [Table Note 3]
LT3/SR1	65	63	47
LT4/SR2	41	38	35

*Table Source:* SES 2008a: Appendix CC-3, Tables CC-3-1 through CC-3-3; SES 2009:Table DR68-1.

*Table Note 1:* Estimate average of 15 daytime hours.

*Table Note 2:* Estimate average of 9 nighttime hours.

*Table Note 3:* Estimate average of 4 consecutive quietest hours of the nighttime.

*Table Key:* dBA = A-weighted decibel;  $L_{eq}$  = equivalent continuous sound level;  $L_{90}$  = A-weighted sound level exceeded 90 percent of the time (considered ambient, or background, noise level); LT =long term (measurement locations); SR = sensitive receiver.

### 3.10.4.1 Sources of Noise

The existing sources of noise in the project vicinity consist of train traffic, highway traffic, aircraft traffic, wind, and wildlife. The nearest SR is a single residence, designated SR1, located approximately 1,200 feet from the project's southwest border. A second sensitive receiver, a residence designated SR2, is located approximately 7,800 feet east of the project boundaries (Figure A-10) (SES 2008a).

To describe noise environments and to assess impacts on noise-sensitive areas, a frequency weighting measure, which simulates human perception, is customarily used. An "A-weighting" of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the "annoying" aspects of noise.

### 3.10.4.2 Measurements of Noise

Noise environments and consequences of human activities are usually well represented by an equivalent continuous sound level ( $L_{eq}$ ) or by average day and night sound levels ( $L_{dn}$ ) with a

nighttime weighting of 10 dBA. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate when levels are between 45 to 60 dBA, and high when levels are above 60 dBA. Outdoor day-night sound levels vary by over 50 dBA, depending on the specific type of land use. Typical  $L_{dn}$  values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (for example, San Francisco), and 80 to 85 dBA near a freeway or airport.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected more in rural or suburban areas than in commercial or industrial zones. Nighttime ambient levels in urban environments are about 7 decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Nighttime noise levels above 45 dBA can interfere with sleep. At 70 dBA, sleep interference is considerable (EPA 1971).

**Table 3-27 Typical Environmental and Industry Sound Levels**

Noise Source (distance)	Sound Level (dBA)	Noise Environment Example/Equivalent	Subjective Impression
Civil defense siren (100 ft)	140–130	Shotgun at shooter's ear	Pain threshold
Jet takeoff (200 ft)	120	Power saw at 3 ft	Very loud Threshold of pain
Very loud music	110	Rock music concert	—
Pile driver (50 ft)	100	Snowmobile (3 ft)	Very loud
Ambulance siren (100 ft)	90	Boiler room	—
Freight cars (50 ft)	85	Noisy restaurant	—
Pneumatic drill (50 ft)	80	Printing press; kitchen with garbage disposal running	Loud
Freeway (100 ft)	70	Hair dryer	Moderately loud
Vacuum cleaner (100 ft)	60	Data processing center; department store/office	—
Light traffic (100 ft)	50	Private business office	—
Large transformer (200 ft)	40	Bird calls or average living room	Quiet
Soft whisper (5 ft)	30	Quiet bedroom	—
Quiet breathing	20	Recording studio	—
No noise	10	—	Threshold of hearing

Table Source: Adapted from Peterson 1980.

Table Key: dBA = A-weighted decibel; ft = feet.

### 3.10.4.3 Subjective Response to Noise

The adverse effects of noise on people are categorized as follows:

- (1) Subjective effects of annoyance, nuisance, and dissatisfaction
- (2) Interference with activities such as speech, sleep, and learning
- (3) Physiological effects such as anxiety or hearing loss

Sound levels associated with environmental noise, in almost every case, produce effects related to the first two categories only. Sound levels associated with industrial noise can produce effects related to the third category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation of an individual's tolerance to noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing background or ambient noise level, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

The following principles are helpful in understanding the relationship between increases in dBA noise levels and human exposure to noise (Kryter 1970):

- Except under special conditions, a change in sound level of 1 decibel cannot be perceived.
- Outside of the laboratory, a 3-decibel change is considered a barely noticeable difference.
- A change in level of at least 5 decibel is required before any noticeable change in community response would be expected.
- A 10-decibel change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

### 3.10.4.4 Combination of Sound Levels

People perceive both the level and frequency of sound in a nonlinear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-decibel increase (that is, the resultant sound level is the sound level from a single passing automobile

plus 3 decibels). Table 3-28 indicates the rules for decibel addition used in environmental noise prediction.

**Table 3-28 Addition of Decibel Values**

Difference Between Two Decibel Values	Amount Added to Larger Value
0 to 1	3
2 to 3	2
4 to 9	1
10 or more	0

*Table Source:* Egan 1988.

*Table General Note:* Numerical values in this table are accurate to  $\pm 1$  decibel.

## Sound and Distance

The distance between the noise source and noise receiver affects the noise level at the receiver. Doubling the distance from a noise source reduces the sound pressure level by 6 decibels. Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 decibels.

## 3.11 Public Health and Safety and Hazardous Materials

This section describes the site-specific hazardous materials that would be used during construction or operation, waste management, and emergency response resources and anticipated response times. It was developed from Section C.6, Public Health and Safety, and Section C.5, Hazardous Materials Management, of the SA/DEIS. Additional resources related to public health and safety, such as air quality, water quality, noise and vibration, fire and fuels, and seismic activity are addressed in those respective sections of this document.

### 3.11.1 Definition of Resource

Public health and safety pertains to efforts and procedures for identifying hazards, reducing accidents and minimizing exposure to harmful situations and substances. It also includes training, accident prevention, accident response, emergency preparedness, and use of protective clothing and equipment.

A hazardous material is any item or agent (biological, chemical, physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

Waste management refers to wastes generated during construction and operation. The technical scope of this analysis encompasses solid and liquid wastes existing on-site and wastes that would likely be generated during facility construction and operation. Waste management analysis is to ensure that the management of project wastes would be in compliance with all applicable laws, regulations, plans and policies to ensure the waste from construction and operation is managed in an environmentally safe manner and waste constituents do not pose a risk to humans or the environment.

### 3.11.2 Applicable Laws, Regulations, Plans, and Policies

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials and waste management (Table 3-29).

**Table 3-29 Public Safety and Hazardous Materials Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Occupational Safety and Health Act of 1970 (29 USC 651 et seq.)	This Act mandates safety requirements in the workplace, with the purpose of “[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources” (29 USC 651).
<b>Federal:</b> The Clean Air Act of 1990 (42 USC 7401 et seq., as amended)	Establishes a nationwide emergency planning and response program, and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
<b>Federal:</b> Occupational Safety and Health Administration Safety and Health Regulations (29 CFR 1910.1–1910.1500)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
<b>Federal:</b> The Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
<b>Federal:</b> 29 CFR 1952.170–1952.175	These sections provide federal approval of California’s plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR1910.1–1910.1500.
<b>Federal:</b> The Clean Air Act Section on Risk Management Plans (42 USC 112[r])	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the Clean Air Act are reflected in the California HSC, Section 25531 et seq.

Law, Regulation, Plan, or Policy	Description
<p><b>Federal:</b> Comprehensive Environmental Response, Compensation and Liability Act (42 USC 9601 et seq.)</p>	<p>CERCLA, also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses:</p> <ol style="list-style-type: none"> <li>1. Reporting requirements for releases of hazardous substances</li> <li>2. Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields</li> <li>3. Liability of persons responsible for releases of hazardous substances or waste</li> <li>4. Requirements for property owners/potential buyers to conduct “all appropriate inquiries” into previous ownership and uses of the property to (1) determine if hazardous substances have been or may have been released at the site, and (2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA “all appropriate inquiries” requirements.</li> </ol>
<p><b>Federal:</b> Solid Waste Disposal Act of 1965 (as amended and revised by the RCRA of 1976 et al.) (42 USC 6901 et seq.)</p>	<p>The Solid Waste Disposal Act, as amended and revised by the RCRA et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions.</p> <p>RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing:</p> <ol style="list-style-type: none"> <li>1. Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition;</li> <li>2. Waste labeling practices and use of appropriate containers;</li> <li>3. Use of a manifest when transporting wastes;</li> <li>4. Submission of periodic reports to the EPA or other authorized agency; and</li> <li>5. Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities.</li> </ol> <p>RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills.</p> <p>RCRA is administered at the federal level by EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements EPA programs in California, Nevada, Arizona, and Hawaii.</p>
<p><b>Federal:</b> 49 CFR 172.800</p>	<p>Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with DOT regulations.</p>
<p><b>Federal:</b> 49 CFR Part 1572, Subparts A and B</p>	<p>Requires that suppliers of hazardous materials ensure that their hazardous material drivers comply with personnel background security checks.</p>

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> The Clean Water Act (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures plan to be prepared for facilities that store oil that could leak into navigable waters.
<b>Federal:</b> 49 CFR 190	Outlines gas pipeline safety program procedures.
<b>Federal:</b> 49 CFR 191	Addresses the transportation of natural and other gases by pipeline. Requires preparation of annual reports, incident reports, and safety-related condition reports. Also requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and submit a follow-up written report within 30 days.
<b>Federal:</b> Clean Air Act Section 112 (42 USC 7412)	This act requires new sources that emit more than 10 tons per year of any specified hazardous air pollutant or more than 25 tons per year of any combination of hazardous air pollutants to apply maximum achievable control technology.
<b>Federal:</b> 49 CFR 192	Addresses transportation of natural and other gases by pipeline: Requires minimum federal safety standards, specifies minimum safety requirements for pipelines, and includes material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction, which must be followed for Class 2 and Class 3 pipelines, and requirements for preparing a pipeline integrity management program.
<b>Federal:</b> 6 CFR 27	The Chemical Facility Anti-Terrorism Standard regulation of the United States Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the Department of Homeland Security so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
<b>Federal:</b> The Clean Air Act, Section on Risk Management Plans (42 USC 112[r])	Requires states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the Clean Air Act are reflected in the California HSC, Section 25531 et seq.
<b>Federal:</b> 49 CFR 172.800	Requires that the suppliers of hazardous materials prepare and implement security plans in accordance with DOT regulations.
<b>Federal:</b> Clean Air Act, Section 112 (42 USC 7412)	This act requires new sources that emit more than 10 tons per year of any specified hazardous air pollutant or more than 25 tons per year of any combination of hazardous air pollutants to apply maximum achievable control technology.

Law, Regulation, Plan, or Policy	Description
<p><b>Federal:</b> 40 CFR Subchapter I (Solid Wastes)</p>	<p>These regulations were established by the EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes.</p> <p>Part 257 addresses the criteria for classification of solid waste disposal facilities and practices.</p> <p>Part 258 addresses the criteria for municipal solid waste landfills.</p> <p>Parts 260–279 address management of hazardous wastes, used oil, and universal wastes (that is, batteries, mercury-containing equipment, and lamps).</p> <p>The EPA implements the regulations at the federal level. However, California is an RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of the EPA.</p>
<p><b>Federal:</b> Hazardous Materials Regulations (49 CFR 172 and 173),</p>	<p>These regulations address the DOT established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with 40 CFR 262.20.</p>
<p><b>Federal:</b> Clean Water Act (33 USC 1251 et seq.)</p>	<p>The Clean Water Act controls discharge of wastewater to the surface waters of the United States.</p>
<p><b>Federal:</b> 40 CFR 112</p>	<p>This establishes procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974.</p> <p>Subpart B, The Spill Prevention, Control and Countermeasures Plan, includes procedures, methods, and equipment at the facility to prevent discharges of petroleum from reaching navigable waters.</p>
<p><b>State:</b> California HSC (Sections 25531–25543.4)</p>	<p>The California Accidental Release Program requires the preparation of a risk management plan and off-site consequence analysis and submittal to the local CUPA for approval.</p>
<p><b>State:</b> California HSC, Proposition 65 (Sections 25249.5 et seq.)</p>	<p>These sections establish thresholds of exposure to carcinogenic substances above which Proposition 65 exposure warnings are required.</p>

Law, Regulation, Plan, or Policy	Description
<b>State:</b> California Public Resource Code Section 25523(a); 20 CCR 1752.5 and 2300–2309 and Division 2, Chapter 5, Article 1, Appendix B, Part 1; and California Clean Air Act (HSC 39650 et seq.)	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants.
<b>State:</b> California HSC (Section 41700)	This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
<b>State:</b> Cal/OSHA regulations (8 CCR, all applicable sections)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during the construction, commissioning, and operation of power plants, as well as safety around electrical components, fire safety, and hazardous materials usage, storage, and handling.
<b>State:</b> California HSC (Sections 25500–25541)	Requires a Hazardous Materials Business plan detailing emergency response plans for hazardous materials emergencies at a facility.
<b>State:</b> 8 CCR 5189	These regulations contain requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable or explosive chemicals. The establishment of process safety management regulations is intended to eliminate, to a substantial degree, the risks to which employees are exposed in petroleum refineries, chemical plants and other facilities.
<b>State:</b> California HSC (Section 41700)	Requires that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
<b>State:</b> California HSC (Sections 25270–25270.13)	Requires the preparation of a spill prevention, control, and countermeasures plan if 10,000 gallons or more of petroleum is stored on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the CUPA.
<b>State:</b> California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.

Law, Regulation, Plan, or Policy	Description
<p><b>State:</b> Hazardous Waste Control Act of 1972, as amended (California HSC, Chapter 6.5, Section 25100 et seq.)</p>	<p>This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements.</p> <p>The California Environmental Protection Agency, Department of Toxic Substances Control administers and implements the provisions of the law at the state level. CUPAs implement some elements of the law at the local level.</p>
<p><b>State:</b> Environmental Health Standards for the Management of Hazardous Waste (CCR, Title 22, Division 4.5)</p>	<p>These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers; prepare manifests before transporting the waste off site; and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters.</p> <p>The following standards are addressed in Title 22 of the CCR:</p> <ol style="list-style-type: none"> <li>1. Identification and Listing of Hazardous Waste (Chapter 11, Section 66261.1 et seq.)</li> <li>2. Standards Applicable to Generator of Hazardous Waste (Chapter 12, Section 66262.10 et seq.)</li> <li>3. Standards Applicable to Transporters of Hazardous Waste (Chapter 13, Section 66263.10 et seq.)</li> <li>4. Standards for Universal Waste Management (Chapter 23, Section 66273.1 et seq.)</li> <li>5. Standards for the Management of Used Oil (Chapter 29, Section 66279.1 et seq.)</li> <li>6. Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, Section 67450.1 et seq.)</li> </ol> <p>The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.</p>

Law, Regulation, Plan, or Policy	Description
<p><b>State:</b> Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) (California HSC, Chapter 6.11 Sections 25404–25404.9)</p>	<p>The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the following six environmental and emergency response programs:</p> <ol style="list-style-type: none"> <li>1. Aboveground Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure Plans</li> <li>2. Hazardous Materials Release and Response Plans and Inventories (Business Plans)</li> <li>3. California Accidental Release Prevention Program</li> <li>4. Hazardous Materials Management Plan/Hazardous Materials Inventory Statements</li> <li>5. Hazardous Waste Generator/Tiered Permitting Program.</li> <li>6. Underground Storage Tank Program</li> </ol> <p>The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. The DTSC's Calexico Field Office is the CUPA for the Calico Solar Project.</p> <p>Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.</p>
<p><b>State:</b> Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (CCR, Title 27, Division 1, Subdivision 4, Chapter 1, Section 15100 et seq.)</p>	<p>While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses.</p> <p>Article 9—Unified Program Standardized Forms and Formats (§§ 15400–15410).</p> <p>Article 10—Business Reporting to CUPAs (Sections 15600–15620).</p>
<p><b>State:</b> California Integrated Waste Management Act of 1989 (Public Resources Code, Division 30, Section 40000 et seq.)</p>	<p>The CIWMA establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.</p>
<p><b>State:</b> California Integrated Waste Management Board (CCR, Title 14, Division 7, Section 17200 et seq.)</p>	<p>These regulations implement the provisions of the CIWMA and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions:</p> <ol style="list-style-type: none"> <li>1. Chapter 3, Minimum Standards for Solid Waste Handling and Disposal</li> <li>2. Chapter 3.5, Standards for Handling and Disposal of Asbestos Containing Waste</li> <li>3. Chapter 7, Special Waste Standards</li> <li>4. Chapter 8, Used Oil Recycling Program</li> <li>5. Chapter 8.2, Electronic Waste Recovery and Recycling</li> </ol>

Law, Regulation, Plan, or Policy	Description
<b>State:</b> Hazardous Waste Source Reduction and Management Review Act of 1989 (California HSC, Division 20, Chapter 6.5, Article 11.9, Section 25244.12 et seq.)	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a 4-year cycle, with a summary progress report due to DTSC every fourth year.
<b>State:</b> Hazardous Waste Source Reduction and Management Review (CCR, Title 22, Section 67100.1 et seq.)	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
<b>State:</b> CCR, Title 23, Division 3, Chapters 16 and 18	These regulations relate to hazardous material storage and petroleum UST cleanup, as well as hazardous waste generator permitting, handling, and storage. The DTSC San Bernardino County CUPA is responsible for local enforcement.
<b>Local:</b> 2007 California Fire Code (Title 24, Part 9)	Adopts the California Fire Code, 2007 edition, into San Bernardino County regulations.
<b>Local:</b> San Bernardino County Code, Fire and Hazardous Materials (Title 2, Division 3, Chapter 1 et seq.)	Includes California Fire Code and specific codes to regulate permits activities and administrative penalties. Adopts the 2007 California Fire Code and adopts State requirements and guidelines as governing hazardous materials release response plans and inventories.
<b>Local:</b> San Bernardino County Code, Health and Safety (Title 3, Division 1 et seq.)	Includes specific codes to regulate permits, activities (for example, solid waste management), and administrative penalties.
<b>Local:</b> San Bernardino County Code, Building and Construction (Title 6, Division 3, Chapter 1 et seq.)	Adopts national standards such as Uniform Building Code and National Electrical Code.
<b>Local:</b> Mojave Desert Air Quality Management District Rule 1302	New source review for toxic air contaminants.
<b>Local:</b> San Bernardino County General Plan	The General Plan ensures all new development complies with applicable provisions of the County Integrated Solid Waste Management Plan.
<b>Local:</b> San Bernardino Countywide Integrated Waste Management Plan	This document sets forth the county's goals, policies, and programs for reducing dependence on landfilling solid wastes and increasing source reduction, recycling, and reuse of products and waste, in compliance with the CIWMA. The plan also addresses the siting and development of recycling and disposal facilities and programs within the county.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* CFR = Code of Federal Regulations; Cal/OSHA = California Occupational Safety and Health Act; CERCLA = Comprehensive Environmental Response, Compensation and Liability Act; CCR = California Code of Regulations; CIWMA = Control California Integrated Waste Management Act; CUPA = Certified Unified Program Agencies; DOT; United States Department of Transportation; DTSC = Department of Toxic Substances Control; EPA = United States Environmental Protection Agency; HSC = Health and Safety Code; RCRA = Resource

Conservation and Recovery Act; SES = Sterling Energy Systems; SARA = Superfund Amendments and Reauthorization Act; USC = United States Code.

### **3.11.3 Current CDCA Plan**

The CDCA Plan includes guidelines that pertain to waste disposal. The guidelines vary by Multiple-Use Class L and Class M lands. Hazardous waste disposal and new hazardous waste sites are not allowed on Class L land. Concerning Class M land, the disposal of hazardous and non-hazardous waste is not allowed. Where locations suitable for waste disposal are found on BLM Class M land, consideration will be given to transfer of such sites to other landownership. This guideline applies to waste normally handled through landfills or other waste management facilities. It does not apply to mining waste, including tailings and chemicals used to process ore (BLM 1999).

### **3.11.4 Hazardous Materials**

Activities on BLM-administered lands, including solar projects, are required by BLM policy to provide a comprehensive list of the hazardous and/or extremely hazardous materials that will be produced, used, stored, transported, or disposed of during management activities.

A Phase I Environmental Site Assessment was prepared in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 to assess whether hazardous materials could exist in the soil or underlying groundwater as a result of prior use or mitigation of pollutants from an adjacent site. The Phase I Environmental Site Assessment, dated November 14, 2008, addressed conditions on the project site and is included as Appendix T of the AFC (SES 2008). The Environmental Site Assessment did not identify any Recognized Environmental Conditions (RECs) in connection with historic or current site operations. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property (BLM and CEC 2010).

### **3.11.5 Waste Management**

Waste management includes the existing conditions and the potential for contamination associated with prior activities on or near the project site. There is currently no waste management on the project site due to the undeveloped nature of the area. Additional information related to waste management is also discussed in the POD.

### 3.11.6 Emergency Response

San Bernardino County coordinates all emergency services for the project vicinity. San Bernardino County Fire Department (SBCFD) provides response for fire and emergency medical services (EMS) for the project vicinity. Fire station locations are established utilizing emergency response plans. These plans identify response times to predetermined locations based on proximity of the fire station and the resources needs of a particular area. SBCFD operates under the California Fire Service and Rescue Emergency Mutual Aid Plan. A component of this plan assists in facilitating expedient mobilization and response of available fire and rescue resources on a local, area, regional and statewide basis.

Emergency services for the project vicinity are coordinated with the nearby fire department of Newberry Springs, California, and a hospital in Barstow, California. The city of Barstow and the county of San Bernardino Hazardous Materials Units respond to any hazardous material calls from the project site as part of the countywide San Bernardino County Intra-Agency Hazardous Materials Response Team. The Hazardous Materials Response Team consists of approximately 150 members and is classified as Level A, which is capable of handling chemical, biological, radiological and nuclear responses. Response times from the city of Barstow hazardous materials response unit are approximately 35 minutes. The closest County hazardous materials response unit is located at Station 322 in Adelanto, and the response time to the project site is estimated to be approximately 90 minutes (SES 2008).

The Barstow Community Hospital is the closest hospital to the project site. The hospital has an emergency room on-site; however, it does not provide trauma-level emergency services. An ambulance would take approximately 20 to 30 minutes from project site to the Barstow Community Hospital. Loma Linda University Medical Center treats all major life threatening injuries. A helicopter flight from the project site to Loma Linda University Medical Center would take approximately 20 to 30 minutes. The medical center is a full service hospital with a Level 1 trauma center that is capable of treating almost any injury (SES 2008).

The project site falls within the jurisdiction of the San Bernardino County Sheriff's Department. The closest sheriff's office is located in Barstow. Response time to the project site would take approximately 20 minutes (SES 2008).

The California Highway Patrol is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation and the management of hazardous material spill incidents. The nearest California Highway Patrol office is located approximately 37 miles from the project site in Barstow, California.

## 3.12 Recreation

This section was developed from Section C.8 (Land Use, Recreation and Wilderness) of the SA/DEIS.

### 3.12.1 Definition of Resource

Recreation resources are described as those features in a setting that define a person's experience, such as the natural and cultural resources, special values attached to an area, facilities, infrastructure, personnel, and management regulations and actions. Recreational settings are managed to provide opportunities for recreation experiences and the benefits those experiences produce for individuals and society.

### 3.12.2 Applicable Laws, Regulations, Plans, and Policies

BLM manages recreation in the project vicinity under the CDCA Plan and WEMO as described below.

### 3.12.3 Current CDCA Plan

The CDCA Plan contains guidelines for recreation resources that vary according to the Multiple-Use class.

For Multiple-Use Class L lands, the guidelines include the following:

- Recreation which generally involves low to moderate user densities.
- Recreation opportunities include those permitted in Class C (backpacking; primitive unimproved site camping; hiking; horseback riding; rockhounding; nature study and observation; photography and painting; rockclimbing), and land-sailing on dry lakes, and non-competitive vehicle touring; and events only on approved routes of travel.
- All organized vehicle events, competitive or not, require a permit specifying the conditions of use. These conditions include, but are not limited to, the approved routes, and no pitting, start, finish or spectator areas.
- Permanent or temporary facilities for resource protection and public health and safety are allowed.
- Trails are open for non-vehicle use and new trails for non-motorized access may be allowed.

For Multiple-Use Class M lands, the guidelines include the following:

- This class is suitable for a wide range of recreational activities which may involve moderate to high user densities.
- Recreation opportunities include those permitted in Class L; those competitive motorized vehicle events are limited to existing routes of travel and must be approved by the Authorized Officer. Pit, start and finish areas must be designated by the Authorized Officer. All competitive events and organized events having 50 or more vehicles require permits.
- Permanent or temporary facilities for resource protection and public health and safety are allowed.
- Trails are open for non-vehicle use and new trails for non-motorized access may be allowed.
- Motorized-vehicle use will be allowed on 'existing' routes of travel unless closed or limited by the authorized officer. New routes may be allowed upon approval of the authorized officer.
- Vehicle use on some significant dunes and dry lakebeds is allowed.
- Periodic or seasonal routes of travel may be required.
- Access will be provided for mineral exploration and development.

The Recreation Element of the CDCA plan provides more specific application of the multiple-use guidelines towards recreation resources. The goals of the element include:

- (1) Provide for a wide range of quality recreation opportunities and experiences emphasizing dispersed undeveloped use.
- (2) Provide a minimum of recreation facilities. Those facilities should emphasize resource protection and visitor safety.
- (3) Manage recreation use to minimize user conflicts, provide a safe recreation environment, and protect desert resources.
- (4) Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources.
- (5) Adjust management approach to accommodate changing visitor use patterns and preferences.

- (6) Encourage the use and enjoyment of desert recreation opportunities by special populations, and provide facilities to meet the needs of those groups.

### 3.12.4 Recreation Management

Recreational opportunities within the project vicinity are managed by the BLM under the CDCA Plan and WEMO. The recreational goals of the CDCA Plan provide for a wide range of opportunities and experiences, with an emphasis on dispersed undeveloped use. There are minimal recreational facilities, and those that are provided emphasize resource sensitivity, protection, and safety. Uses are managed to minimize user conflicts, provide a safe recreation environment, and protect desert resources. The BLM administers these public lands to assist in meeting the demands for recreational uses adjacent to nearby communities.

The project site is not within a Special Recreation Management Area (SRMA), and is therefore managed based on the designated Multiple-Use Classes in the CDCA Plan. The Multiple-Use Classes are based on sensitivity of resources and types of uses for differing geographic areas. The project site includes two Multiple-Use Classes (Figure 2-3). The majority of the project site is currently designated as Multiple-Use Class M (Moderate Use), which is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Recreation includes activities such as backpacking, primitive camping, hiking, horseback riding, rockhounding, photography and rock climbing. Vehicle travel is permitted and competitive events can occur on existing routes. Permanent or temporary facilities can be provided for resource protection. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

Approximately three percent (208 acres) of the project site is designated as Multiple-Use Class L (limited use), which protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that scenic values are not significantly diminished (BLM 1999). The Multiple-Use Class L area is near the Cady Mountains WSA and management under this class is consistent with management of the WSA.

The flat, open terrain of the project site is conducive to many recreational opportunities. However, there are no developed recreation facilities within the project site. There are a number of BLM-designated open routes that traverse the project site providing access for recreational uses. For additional information on BLM routes, see Section 3.15, Traffic and Transportation, in this FEIS.

In 2003 BLM adopted the route network as identified in the Western Mojave Desert Off-Road Vehicle Designation Project and amended the CDCA Plan. This decision designated “routes on public lands managed by the BLM as open or closed to motorized vehicle access, or as open on a limited basis”, effectively limiting all routes on BLM land to specific, designated uses (BLM et al. 2005). The WEMO Plan subsequently incorporated minor revisions to the designated route network.

Lands within the CDCA provide the resources necessary for a variety of recreational experiences. The BLM uses the Recreation Opportunity Spectrum (ROS) classifications to set recreation objectives for recreation management areas. Objectives are established to provide opportunities for desired recreation activities and to guide management of the setting needed to support those activities and the desired recreation experience. No ROS classifications have been designated for the project site.

Recreational opportunities in the CDCA range from active to passive, and solitary to sociable. Activities identified in the CDCA Plan include, but are not limited to hiking, camping, sightseeing, bird watching, painting, photography, target shooting, soaring, hang gliding, model rocket and airplane flying, land sailing and motorized vehicle play. Rockhounding, hobby prospecting, railroad viewing, photography, scientific research, and educational opportunities are also recognized.

A number of special designation areas are in the vicinity of the project site (Figure A-9), some of which are associated with specific recreational opportunities (see Section 3.14, Special Designations, in this FEIS for additional information):

- Cady Mountains WSA is primarily associated with camping, rockhounding, hiking, and hunting (SES 2008).
- Rodman Mountains Wilderness provides opportunities for camping, hunting, fishing, and horseback riding.
- Bristol Mountains Wilderness provides ample space for hiking, horseback riding, hunting, camping, rockhounding, and photography (BLM 2009a, 2009b).
- Newberry Mountains Wilderness is noted for camping, hunting, fishing, and horseback-riding opportunities (BLM 2009c).

The Pisgah Crater ACEC and Rodman Mountains Cultural Area ACEC are also within the project vicinity, and were designated for protection of specific resources. The ACECs are managed under Multiple Use Class L and are open to recreational activities identified under that management such as hiking, hunting and camping. The Johnson Valley to Parker OHV race takes place on a specified route in the Pisgah Crater ACEC. The Proposed Mohave Trails

National Monument would encompass an extensive area of BLM land both within specially managed recreation areas as well as lands open to a variety of recreation activities. The proposed monument is in the federal legislative process and specific management has not been identified.

Scenic values are considered to be an important factor in the recreational experience. The CDCA Plan states that “Scenic values are often cited by the public as the Desert’s most important resource” (BLM 1999). Scenic resources are managed through the BLM’s Visual Resource Management system (See Section 4.16, Visual Resources, for additional information).

The project site is also within the management boundaries of the WEMO Plan, a habitat conservation plan amendment to the CDCA Plan. The WEMO Plan provides management strategies to conserve more than 100 sensitive plant and animal species in the western Mojave Desert. This plan includes route designations aimed at controlling recreational use in sensitive areas.

### **3.12.5 Wilderness and Recreation**

Wilderness and recreation resources are closely related to one another. See Section 3.14, Special Designations, in this FEIS for more information regarding wilderness areas.

## **3.13 Socioeconomics and Environmental Justice**

This section describes the existing socioeconomic conditions and environmental justice populations within the project vicinity and was developed from Section C.10, Socioeconomics and Environmental Justice, of the SA/DEIS. These conditions focus on population and employment, demographics, housing supply, social and public services, and recreation opportunities. General population and employment conditions were obtained from September 2008 data in the Calico AFC (SES 2008). Demographic data was obtained from the U.S. Census Bureau (USCB 2000).

### **3.13.1 Definition of Resource**

A socioeconomic analysis looks at beneficial impacts on local finances from property and sales taxes as well as potential adverse impacts on public services. Environmental justice looks at whether federal programs, policies, and activities have a disproportionately high and adverse impact on minority and/or low-income populations. For the purposes of environmental justice, minority refers to anyone who is racially classified as African American, Asian American, Native American or Alaskan Native, or Pacific Islander; anyone who self-classifies as “other” race, or

two or more races; or anyone classified as Hispanic. Hispanic is considered an ethnicity, not a separate race; Hispanics are considered minorities regardless of their racial self-affiliation. A minority population is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis. Low income is determined by a set of money-income thresholds that varies by family size and composition. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as low- income, or “below the poverty level,” at the time of the census.

### 3.13.2 Applicable Laws, Regulations, Plans, and Policies

Table 3-30 lists the laws, regulations, plans and policies applicable to socioeconomic and environmental justice.

**Table 3-30 Socioeconomic and Environmental Justice Management Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”	Requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.
Title VI of the Civil Rights Act of 1964 (Public Law 88-352, 78 Stat. 241; codified as amended in scattered sections of 42 United States Code)	Prohibits discrimination on the basis of race, color, or nationality in all programs or activities receiving federal financial assistance.
Emergency Economic Stabilization Act of 2008, Business Solar Investment Tax Credit (Public Law 110 343; Internal Revenue Code)	Extends the 30 percent ITC for solar energy property for eight years through December 31, 2016. The bill allows the ITC to be used to offset both regular and alternative minimum tax and waives the public utility exception of current law (i.e., allows utilities to directly invest in solar facilities and claim the ITC). The 5-year accelerated depreciation allowance for solar property is permanent and unaffected by passage of the eight-year extension of the solar ITC.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* ITC = Investment Tax Credit.

### 3.13.3 Current CDCA Plan

The CDCA Plan does not contain guidelines or a specific plan element pertaining to socioeconomics and environmental justice (BLM 1999).

### 3.13.4 Population and Employment

The nearest incorporated communities to the project site include Barstow, Victorville, and Adelanto. The 2008 population of Barstow was 23,952; Victorville was 107,408; and Adelanto was 28,181. San Bernardino had a total population of 1,710,139 in 2000 and 2,055,766 in 2008 (SES 2008). The September 2008 unemployment rate for San Bernardino County and the incorporated communities in the vicinity of the project site ranged from a low of 8.5 percent in San Bernardino County as a whole to 13 percent in the city of Adelanto. The State of California unemployment rate was 7.5 percent in September 2008 (SES 2008).

### 3.13.5 Environmental Justice

EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” focuses federal attention on the environment and human health conditions of minority communities and calls on agencies to make achieving environmental justice part of their mission. The order requires the EPA and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

Reference areas were identified to compare larger geographic areas with census blocks groups for the project vicinity to determine whether populations residing in the affected area constitute a potential environmental justice population. The reference areas are San Bernardino County and the State of California. The most current data available at the census block level were from 2000. Data for the census tract block groups were compared with the data for San Bernardino County, the State of California, and the nation to assess whether minority, elderly, low-income, disabled, or female head-of-household populations are disproportionately represented in the project vicinity. Table 3-31 summarizes the racial/ethnic population, and Table 3-32 summarizes the low-income population.

**Table 3-31 2000 Ethnicity Percentages for Potential Environmental Justice Populations**

Population	United States	California	San Bernardino County	CT 103, BG 1	CT 103, BG 5	CT 103, BG 7	CT 103, BG 8
White (%)	69.13	46.70	44.00	78.85	76.98	76.19	73.43
Black or African American (%)	12.06	6.44	8.79	0.30	1.76	2.65	3.08
American Indian and Alaska Native (%)	0.74	0.53	0.57	0.44	1.58	2.12	1.72
Asian (%)	3.60	10.77	4.57	1.48	0.79	5.82	1.11

Population	United States	California	San Bernardino County	CT 103, BG 1	CT 103, BG 5	CT 103, BG 7	CT 103, BG 8
Native Hawaiian and Other Pacific Islander (%)	0.13	0.31	0.26	0.15	0.26	0.00	0.74
Some other race (%)	0.17	0.21	0.18	1.33	0.44	0.00	0.62
Two or more races (%)	1.64	2.67	2.47	2.51	2.72	6.35	3.20
Hispanic or Latino (%)	12.55	32.38	39.16	14.94	15.47	6.88	16.11
Total population	281,421,906	33,871,648	1,709,434	676	1,138	189	813

Table Source: UCSB 2000.

Table Key: % = percent; BG = Block Group; CT = census tract.

**Table 3-32 2000 Low-Income Percentages for Potential Environmental Justice Populations**

Population	United States	California	San Bernardino County	CT 103, BG 1	CT 103, BG 5	CT 103, BG 7	CT 103, BG 8
Low income (%)	12.38	14.22	15.84	20.55	18.31	33.53	15.76
Total population	281,421,906	33,871,648	1,709,434	676	1,138	189	813

Table Source: UCSB 2000.

Table Key: % = percent; BG = Block Group; CT = census tract.

As summarized in Table 3-31, the racial and ethnic makeup of the project vicinity is predominantly White. The census tract block groups representing the project vicinity generally have a lower population of minorities than the county, state, and nation. The percentage of the American Indian or Alaska Native population within the project vicinity is higher than those for the county, state and nation. The Asian population for census tract 103 block group 7 is higher than those for the rest of the census tract block groups, county, and the nation, but lower than the state. The Native Hawaiian and Other Pacific Islander population for census tract 103 block group 7 is higher than the county, state, and national populations.

As summarized in Table 3-32, the low-income demographics of the project vicinity are generally higher than the county, state, and national populations. The low-income population within census tract 103 block group 7 in particular is over twice that of the county, state and nation.

### 3.13.6 Housing Supply

In 2008, Approximately 1,000 housing units were available in the Barstow vicinity, including single-family homes, apartments, and mobile homes available for rent. Additionally, approximately 1,050 housing units were available for rent in Victorville.

In terms of temporary lodging, 49 motels are located in Barstow with a total of approximately 4,000 rooms. A total of 321 hotels and approximately 21,500 hotel rooms was identified within a two-hour drive of the project site (SES 2008). Based on the average annual motel and hotel occupancy rate in San Bernardino and Riverside counties in 2008, on average, approximately 500 unoccupied motel and hotel rooms are available in Barstow, with an additional 400 unoccupied motel and hotel rooms available elsewhere within a one-hour drive of the site (primarily Victorville) (SES 2008).

### **3.13.7 Social and Public Services**

Police and emergency services are discussed in Section 3.11, Public Health and Safety, and Hazardous Materials.

### **3.13.8 Education**

There are two school districts located within the vicinity of the project site; Barstow Unified School District and the Silver Valley Unified School District. The project site is located within the Silver Valley Unified School District boundary. Silver Valley District serves the smaller communities located east of Barstow, including Yermo and Newberry Springs. The closest school to the project site is Newberry Springs Elementary, approximately 14 miles west of the project site. The closest high school is located in Yermo, approximately 33 miles west of the project site.

The school districts and schools within the project area currently have capacity for new student enrollment: Barstow Unified would be able to accommodate up to approximately 150 new students without requiring additional resources and the Silver Valley Unified School District is not currently at capacity and could accommodate approximately 300 new students without additional resources (SES 2008).

The Barstow Unified School District has 13 schools—9 elementary schools, 1 junior high school, 1 high school, 1 continuation school, and 1 community day school. Student enrollment in the Barstow Unified School District has declined with approximately five percent fewer students enrolled in the 2007–2008 school year than two years before (SES 2008).

The Silver Valley Unified School District has eight schools—4 elementary schools, 1 middle school, 1 high school, 1 alternative school, and 1 continuation school. Enrollment has increased in recent years with approximately two percent more students enrolled in the 2007–2008 school year (SES 2008).

## 3.14 Special Designations

This section was developed from Section C.8 Land Use, Recreation and Wilderness, of the SA/DEIS.

### 3.14.1 Definition of Resource

The Special Designations section includes areas managed under the BLM National Landscape Conservation System (NLCS), DWMA, ACECs, prime and unique farmlands, and lands donated to or acquired by the BLM that have potential restrictions on land use. The BLM manages several types of special designation areas under the NLCS as a way to comprehensively manage and promote the use and protection of unique landscapes throughout the West. Designations under this program include national monuments, national conservation areas, wilderness areas (WAs), WSAs, wild and scenic rivers (WSRs), and national scenic and historic trails. These areas may require a more intensive management emphasis than is applied to surrounding public lands and the individual policies developed for each program guide the specific management for each type of special designation.

There are no designated, suitable, or eligible WSRs in the project vicinity. Likewise, there are no National Scenic or Historic Trails or National Monuments in the project vicinity. The Mojave Trails National Monument is included as part of the proposed 2010 California Desert Protection Act legislation. The proposed monument would extend from the project site's east boundary to near Needles, CA. Much of the Cady Mountain WSA and all of the Pisgah Crater ACEC would be within the Mojave Trails National Monument. While the monument designation is proposed to protect a wide variety of resources in the Mohave Desert, specific management of the proposed monument has not been identified.

Prime farmlands, as defined by the USDA NRCS, are lands that have the best combination of physical and chemical characteristics to produce food, feed, forage, fiber, and oilseed crops and are available for these uses (7 USC 4201[c][1][A]). Unique farmlands are lands other than prime farmlands whose values are derived from their particular advantage for specialty crops because of climate, soil, and water conditions.

Land that was donated to the BLM or acquired through the LWCF is often restricted to a potential land use and resource development. Current policy on use of these lands is guided by a May 27, 2009, BLM Interim Policy Memorandum (No. CA-2009-020) on donated and acquired lands (BLM 2009a).

### 3.14.2 Applicable Laws, Regulations, Plans, and Policies

Wilderness is subject to management that includes strict guidelines for development within WAs or WSAs. These guidelines prohibit activities that degrade the quality, character, and integrity of these protected lands and developments proposed follow the guidance contained in:

- 43 CFR 6300.
- Management of Designated Wilderness Areas Handbook H-8560-1 (BLM 1983).
- Management Policy for Lands under Wilderness Review BLM Manual H-8550-1 (BLM 1978).
- Wilderness Inventory and Study Procedures Handbook H-6310-1 (BLM 2001).

### 3.14.3 Current CDCA Plan

The Wilderness Element of the CDCA identified the goal of providing a representative wilderness system. In this plan, the BLM developed three specific objectives to support the goal (BLM 1999):

- Provide protection of wilderness values so those values are not degraded to a point that significantly constrains the recommendation with respect to an area's suitability or non-suitability for preservation as wilderness.
- Provide a wilderness system possessing a variety of opportunities for primitive and unconfined types of recreation, involving a diversity of ecosystems and landforms, geographically distributed throughout the desert.
- Manage a wilderness system in an unimpaired state, preserving wilderness values and primitive recreation opportunities while providing for acceptable use.

The CDCA identifies the goals of the ACEC Program as follows (BLM 1999):

- Identify and protect the significant natural and cultural resources requiring special management attention found on the BLM-administered lands in the CDCA.
- Provide for other uses in the designated areas, compatible with the protection and enhancement of the significant natural and cultural resources.
- Systematically monitor the preservation of the significant natural and cultural resources on the BLM-administered lands, and the compatibility of other allowed uses with these resources.

### 3.14.4 Wilderness Areas and Wilderness Study Areas

As stated in the federal Wilderness Act, a designated wilderness area is defined as having four primary characteristics:

- (1) Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable
- (2) Has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- (3) Has at least five thousand contiguous acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition
- (4) May also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

WSAs are areas that have been found to have the above characteristics but have not been designated as Wilderness by Congress. The BLM is required to maintain the wilderness characteristics of a WSA until Congress makes the designation or releases the land from consideration.

Four WAs and one WSA are located in the project vicinity (Figure A-9). The WSA has been documented by a wilderness study report that shows the location of the individual WSA, a description of its wilderness values, and BLM's recommendation for its future suitability as wilderness as proposed by the Secretary of Interior on June 12, 1991 (BLM 2009b). To the extent the BLM is amending the land use plan to accommodate this site location, a statement should be made that the LUP amendment will not affect the wilderness characteristic values of the WSA since the site is not located within the WSA area.

There is also a FLPMA WSA that pre-dates the Cady Mountains WSA and was released from WSA status, as discussed below.

#### 3.14.4.1 The FLPMA Wilderness Study Area

The Proposed Action would be partially on Public Land which was determined to possess wilderness characteristics in the Wilderness Inventory mandated by the FLPMA (BLM 1979). Those public lands were inventoried as part of CDCA Wilderness Inventory Unit 251 (known as the "FLPMA WSA"), which is approximately bounded by the BNSF railroad line paralleling I-40 on the south and the Union Pacific railroad line approximately 15 miles to the north.

The lands with wilderness characteristics were identified as the Cady Mountains WSA. The attributes of the WSA are summarized in the 1990 Wilderness Study Report 2. Specifically,

portions of sections 31-33 T.9N. R.6E. San Bernardino Base and Meridian are within that FLPMA WSA and overlap the proposed project. In the California Desert Protections Act of 1994, the FLPMA WSA was released, and the current Cady Mountains WSA was designated. The boundary of the current Cady Mountains WSA is slightly different from the released FLPMA WSA, and no part of the Proposed Action or any of the action alternatives is within the current statutory Cady Mountains WSA.

The FLPMA WSA boundary included approximately 108,000 acres, of which 77,015 acres was Public Land. After 1999 and subsequent to identification of the WSA, a considerable amount of non-federal lands were acquired by the United States as part of the Catellus effort. The WSA consists of the Cady Mountains which are a low, dark series of detached ridges and several intervening valleys. Washes which bisect the ridges are broad and contain wind-deposited sand. Elevations range from 1200 feet on the northeast bajada which is within the Mojave River Valley, to 4627 feet at the top of Cady Peak. Within the center of the WSA, and completely surrounded by the mountains, is the large, broad area known as Hidden Valley, which is two to three miles wide and six miles long. The area contains the typical creosote bush scrub vegetative assemblage that exhibits some variability based upon elevation. The south boundary was delineated to exclude roads and mining impacts.

The lands south of the FLPMA WSA are characterized by a transition from the mountainous area to the north to a bajada extending south to the railroad and I-15. Sections 31–33 Township 9 North, Range 6 East San Bernardino Base and Meridian within that area are characterized by lightly vegetated and dissected bajadas interspersed with small isolated rock formations approximately 30' high. Section 33 was acquired by the United States on March 22, 2000. The approximately 250 acres within Sections 31–33 Township 9 North, Range 6 East San Bernardino Base and Meridian within the FLPMA WSA are untrammelled by man and therefore have the wilderness characteristic of naturalness. The WSA has outstanding opportunities for solitude and primitive and unconfined recreation, which this portion has only in conjunction with the WSA as a whole. After identifying changes in conditions since 1979 as part of inventory maintenance pursuant to section 201(a) of the FLPMA, the finding is that the 1979 decision that wilderness characteristics were present in the FLPMA WSA, including portions of Sections 31–33 Township 9 North, Range 6 East San Bernardino Base and Meridian, does not warrant reversal.

#### **3.14.4.2 Rodman Mountains Wilderness Area**

The Rodman Mountains WA is located approximately three miles southwest of the site, across I-40. This WA is a series of ridges and valleys climbing from an elevation of about 2,000 feet to almost 5,000 feet and is the result of faults which cross the area (BLM 2010). The WA is approximately 34,000 acres in size. A lava flow slices this area in two from northwest to southeast, forming a sloping mesa. Colorful escarpments, calico-colored mountains, mazelike

canyons and broad, majestic bajadas come together here. Steep canyons and cliff-like walls form dry falls along deep drainage channels, creating cascades during heavy rain storms. One of only seven core raptor breeding areas in the desert is within this wilderness, where prairie falcons and golden eagles are prominent. The mountains themselves are part of the historical range of the desert bighorn sheep. While sheep have not been spotted here, this wildlife species has been seen in the nearby Newberry Mountains. Hunting, fishing, camping and horseback riding are common recreation activities and non-commercial trapping is allowed subject to state and local laws.

#### **3.14.4.3 Kelso Dunes Wilderness Area**

The Kelso Dunes WA is approximately 10 miles east of the site. This WA is approximately 154,175-acres in size and derives its name from the large sand dunes complex located outside of its eastern boundary in the Mojave National Preserve (BLM 2009d). From the flat Broadwell dry lake bed in the west, the area slopes into the northern most end of the gentle rounded granite Bristol Mountains. Mixed in this central area are flat topped, volcanic mountains, such as Broadwell Mesa, and an extensive desert wash system. The eastern portion of the area drops into the broad Budweiser Wash, which drains into the sea of sand known as the Devils Playground (located mostly outside wilderness boundaries). Vegetation is sparse and is predominantly creosote bush desert scrub, desert wash scrub, and sand dune plant associations. Wildlife is typical for the Mojave Desert; including a small herd of bighorn sheep, coyote, black-tailed jackrabbits, ground squirrels, kangaroo rats, roadrunners, rattlesnakes, and several species of lizards.

#### **3.14.4.4 Bristol Mountains Wilderness Area**

The Bristol Mountains WA is also approximately 10 miles east of the project site, just south of the Kelso Dunes WA. This WA covers approximately 76,983 acres and contains the tilted and bisected old volcanic plain called Old Dad Mountains and the northern portion of the Bristol Mountains (BLM 2009c). The broad Budweiser Wash drains into the eastern portion of the wilderness. The vegetation type is predominantly creosote bush desert scrub and desert wash scrub. Wildlife is typical for the Mojave Desert; including coyote, black-tailed jackrabbits, ground squirrels, kangaroo rats, quail, roadrunners, rattlesnakes, and several species of lizards. The Bristol Mountains also provide habitat for migrating desert bighorn sheep.

#### **3.14.4.5 Newberry Mountains Wilderness Area**

The Newberry Mountains WA is located west of the Rodman Mountains WA approximately 10 miles from the site. This WA covers approximately 26,000 acres and is noted for its rugged

volcanic mountains and deep, maze-like canyons (BLM 2009e). The unique desert features are the result of ancient volcanic activity. Elevation ranges from approximately 2,200 feet in the north to 5,100 feet in the south. Desert bighorn sheep have historically traveled this area, and prairie falcons and golden eagles stop here to forage and rest.

#### **3.14.4.6 Cady Mountains Wilderness Study Area**

The Cady Mountain WSA borders the site on the north. This 84,400 acre WSA consists of the Cady Mountains which are a low, dark series of detached ridges and several intervening valleys. Broad washes bisect the ridges and contain wind-deposited sand. The WSA is located immediately north of the project site. Elevations range from 1,200 feet on the northeast bajada, to 4,627 feet at the top of Cady Peak. Hidden Valley is a two to three mile wide and six mile long valley in the center of the WSA, and completely surrounded by the mountains. The area contains the typical creosote bush scrub vegetative assemblage that exhibits some variability based upon elevation.

#### **3.14.5 Desert Wildlife Management Areas**

The Ord-Rodman and Superior-Cronese DWMA are located in the vicinity of the proposed Calico Solar Project. They include designated critical habitat for the desert tortoise and were established by the West Mojave Plan for tortoise conservation and recovery. The DWMA near the project site is primarily the bajada slopes of the Rodman Mountains, and vegetation consists of low creosote scrub.

#### **3.14.6 Areas of Critical Environmental Concern**

Areas of Critical Environmental Concern are identified in the FLPMA and are designated as a specific resource protective measure more so than a natural area protection or recreation use designation as those under NLCS. ACEC are areas where special management attention is required to protect historic, cultural, or wildlife resources or scenic values from irreparable damage or to protect the public from natural hazards.

There are two ACECs in the project area (Figure A-9). The Pisgah Crater ACEC is adjacent to the site's eastern/southeastern boundary. The Rodman Mountains Cultural Area ACEC is located southwest of the site, in the Rodman Mountains WA.

### **3.14.6.1 Pisgah Crater Area of Critical Environmental Concern**

The Pisgah Crater ACEC was designated to cover a portion of the Pisgah Crater and surrounding area. The crater and lava flow are uncommon landforms in the western Mojave Desert. It also contains lava tubes of several types, some of which are used as bat roosts. The Pisgah Crater area has a high genetic biodiversity within species of reptiles and small mammals. The ACEC includes areas where populations of crucifixion thorn, white-margined beardtongue, sand linanthus, and Mojave fringe-toed lizard occur. Desert tortoise also occurs in this area. Management of the ACEC allows the existing land uses at the time of designation, including mining, utility easements, rockhounding, and competitive recreation events to continue.

### **3.14.6.2 Rodman Mountains Cultural Area of Critical Environmental Concern**

The Rodman Mountains Cultural ACEC covers approximately 6,204 acres and was established to protect cultural resources. The ACEC is within the Newberry-Rodman DWMA, and most of it is within the Rodman Mountains WA. The site contains raptor nests and limited desert tortoise habitat. No management plan has been prepared for this area.

### **3.14.6.3 Ord-Rodman Area of Critical Environmental Concern**

The Ord-Rodman ACEC is located southwest of the project site, across I-40, and is located within the Ord-Rodman DWMA (Figure A-9). The DWMA was established in the WEMO specifically for the conservation of the desert tortoise, and it contains designated critical habitat for that species. The WEMO identifies that public lands within the DWMA are considered ACECs. However, for purposes of this analysis, the lands will be referenced as the DWMA only to avoid confusion with designated ACECs.

### **3.14.7 Prime and Unique Farmlands**

The project site is located within the desert region of central San Bernardino County, and there are no agricultural lands within the proposed project boundaries. The NRCS provides information on the designation of soils in areas with agricultural lands, including farmland classifications such as Prime Farmland and Farmland of Statewide Importance (NRCS 2009). A review of the NRCS Web Soil Survey (WSS) database indicated that soil surveys for the portion of San Bernardino County in which the project is located have not been completed and no Prime or Unique Farmlands have been identified in the project area.

### 3.14.8 Donated and Acquired Lands

There are approximately 1,180 acres of land within the project boundary that were donated to the BLM or that were acquired through the LWCF program (see Figure A-8). The 2009 BLM Interim Policy Memorandum on donated and acquired lands (BLM 2009a) identifies the management policy for donated and acquired lands and is summarized in Section 3.9, Land Use.

## 3.15 Traffic and Transportation

This section describes the existing condition of traffic and transportation in the project vicinity and was developed from Section C.11, Transportation and Traffic, of the SA/DEIS.

### 3.15.1 Definition of Resource

The BLM routes, public roads and highways system and improvements in the area of the project site, in and adjacent to the project site, are the resources discussed in this section.

### 3.15.2 Applicable Laws, Regulations, Plans and Policies

Table 3-33 lists the laws, regulations, policies, and plans relevant to traffic and transportation.

**Table 3-33 Traffic and Transportation Laws, Regulations, Plans and Policies**

Law, Regulation, Plan or Policy	Description
<b>Federal:</b> CFR, Title 14, Aeronautics and Space; Part 77, Objects Affecting Navigable Airspace (14 CFR 77)	Includes standards for determining physical obstructions to navigable airspace; information about requirements for notices, hearings, and requirements for aeronautical studies to determine the effect of physical obstructions to the safe and efficient use of airspace.
<b>Federal:</b> CFR, Title 49, Subtitle B, Sections 171-177; Sections 350-399; Appendices A-G Other Regulations Relating to Transportation	Includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and as well as safety measures for motor carriers and motor vehicles operating on public highways.
<b>Federal:</b> California Desert Conservation Area (CDCA) Plan (BLM 1999)	In accordance with legislation and policy, all public land in the California Desert is designated "open," "closed" or "limited" for vehicle use. The designations are made on the basis of multiple-use classes. The CDCA Plan designated a number of BLM routes in the proposed project site.
<b>Federal:</b> BLM West Mojave Plan (BLM et al. 2005)	The West Mojave Plan revised a number of route designations in the CDCA Plan area.

Law, Regulation, Plan or Policy	Description
<b>Federal:</b> BLM Instruction Memorandum No. 2008-014 (BLM 2007)	Clarifies policy and provides guidance on travel and transportation management decisions in the land use planning process.
<b>State:</b> California Vehicle Code, Division 2, Chapter 2.5, Div. 6; Chap. 7, Div. 13; Chap. 5, Div. 14.1; Chap. 1 and 2, Div. 14.8, Div. 15	Pertain to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and transporting hazardous materials.
<b>State:</b> California Streets and Highway Code, Section 117; Section 660-695; Section 700-711; Section 1450; 1460 et seq.; and 1480 et. Seq.	Pertains to regulating right-of-way encroachments and granting permits for encroachment on state highways and freeways and on county roads.
<b>State:</b> California Health and Safety Code; Section 25160 et seq.	Pertains to operators of vehicles transporting hazardous materials

*Table Source:* Modified from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; CFR = Code of Federal Regulations

### 3.15.3 Current CDCA Plan

The CDCA Plan General Guidelines address the use of BLM routes on public lands as follows:

- “The need for access across public lands to permit utilization of State and privately-owned lands and to permit authorized developments on public lands, including mining claims, is recognized. The routes of travel and construction standards are subject to such BLM control as is required to prevent unnecessary or undue degradation of the public lands and their resources or to afford environmental protection.” (BLM 1999)

The CDCA Plan Motorized Vehicle Access Element provides a system and set of rules governing access to the CDCA by motor vehicles. The Plan element establishes route designations as “open,” “closed” or “limited” for motor vehicle use. The route designations within the project area are shown in Table 3-34.

**Table 3-34 BLM Route Designations in the Project Area**

BLM Route ID	Length inside project boundary (miles)	Existing CDCA Plan Route Designation
AF045	3.23	Open
AF0450	2.65	Open
AF052	2.48	Open
AF053	2.64	Open
AF058	3.69	Open
AF132	0.58	Open

<b>BLM Route ID</b>	<b>Length inside project boundary (miles)</b>	<b>Existing CDCA Plan Route Designation</b>
AF133	0.49	Open
AF298	4.94	Open
0	1.03	Unknown

*Table Source:* Adapted from Tessera Solar 2010.

*Table Key:* BLM = Bureau of Land Management; ID = identification; CDCA = California Desert Conservation Area.

CDCA Plan Guideline 14 addresses Motorized Vehicle Access/Transportation. For Class L lands, Guideline 14 provides:

- “New roads and ways may be developed under right-of-way grants or approved plans of operation. Motorized vehicle use will be allowed on existing routes of travel until designation of routes is accomplished.” (BLM 1999)

Within the project site, portions of BLM routes AF0420K, AF134, AF132, and AF050 traverse lands designated Class L.

Guideline 14 for Class M lands provides:

- “Motorized vehicle use will be allowed on “existing” routes of travel unless closed or limited by the authorized officer. New routes may be allowed upon approval of the authorized officer.” (BLM 1999)

### **3.15.4 Local Highways and Roads**

Three highways and one local road are located in the vicinity of the project: I-40, U.S. Route 66, and Hector Road. Information about each road follows (Figure 2-2).

#### **3.15.4.1 Interstate 40 (I-40)**

I-40, an east-west interstate freeway, is located south of the project site. It begins at the I-15 interchange in Barstow, California and continues east towards Arizona. It is a four-lane highway, two lanes in each direction, with 6 feet of shoulder on both sides and a wide center median. It is posted at 70 miles per hour in the vicinity of the site. The existing average daily traffic (ADT) on I-40 near the vicinity of the project site is approximately 15,660 vehicles per day; 43 percent is truck traffic.

### **3.15.4.2 National Trails Highway (U.S. Route 66)**

The U.S. Route 66 parallels I-40 and is located south of both the Calico Solar Project site and I-40. The U.S. Route 66, a 2,448-mile roadway once known as the “Main Street of America,” runs west to east from Santa Monica, California to Chicago, Illinois, winding its way through Arizona, New Mexico, Texas, Oklahoma, Kansas and Missouri before ending in Chicago. U.S. Route 66 is a designated National Trails Highway and supports traffic volumes of approximately 10 ADT in the vicinity of the Hector Road interchange.

### **3.15.4.3 Hector Road**

Hector Road, a local road running north-south, is the primary access to the project site. Hector Road begins at U.S. Route 66 just south of the I-40 interchange, crosses under I-40, and continues north approximately 995 feet beyond the I-40 ROW, ending south of the BNSF railroad tracks and west of the gated crossing. The existing ADT on Hector Road near the vicinity of the project site is 31 vehicles per day.

The roadway segment north of the interchange is currently unpaved. Paved northbound and southbound approaches to the BNSF at-grade railroad crossing have been recently constructed at a point approximately 24 feet east of the intersection of Hector Road with the BNSF tracks. The crossing is currently gated and locked on both the northbound and southbound approaches. Access is controlled and determined by BNSF.

Hector Road within the I-40 interchange is paved and controlled by Caltrans. Hector Road north of the California Department of Transportation ROW is a 24-foot paved roadway maintained by San Bernardino County. BLM Route AF0410 extends approximately 24 feet from the end of the county road to the gated BNSF railroad crossing. BLM route AF0410 from its intersection with Hector Road to BLM route AFAF0420K and BLM route AF133 are sometimes referred to as “Hector Road”, although the County right of way ends south of the BNSF railroad tracks. A map depicting Hector Road is shown in Figure 2-2.

### **3.15.5 BLM Routes**

A number of BLM routes traverse the project site, and are shown in Figure A-29. The routes that are designated as open routes in the CDCA Plan are available to use for access to the project site as well as for recreation and access to adjoining and nearby areas. The open routes within the project area include AF045, AF050, AF052, AF053, AF058, AF298, AF132, AF133, AF0410, AF0450, and AF0451. Routes AF045, AF050, and AF058 have been used to gain access to privately-owned lands in Sections 8, 9, 13, 16 and 17, Township 8 North, Range 5 East that are not a part (NAP) of the project site. The BLM routes AF132, AF133, and AF0450 have been

used to gain access to privately owned properties in Section 1, Township 8 North, Range 5 East and Section 36, Township 9 North, Range 5 East that are NAP of the project site.

### **3.15.6 Rail Service**

The BNSF railway provides long-haul freight service throughout the U.S. over a 32,000-mile route. Near the project site, BNSF operates a double-track railroad line that runs from east to west through the middle of the project area (Figure 1-2). AMTRAK's Southwest Chief route from Los Angeles to Chicago travels on the BNSF rail line through the middle of the project site. The Southwest Chief passenger train only passes through the site at night.

## **3.16 Visual Resources**

This section was developed from Section C.13, Visual Resources, of the SA/DEIS.

### **3.16.1 Definition of Resource**

The existing visual resources of the project vicinity described below are based on views to and from the project site. According to the BLM's Visual Resource Management (VRM) Manual 8400, visual resources are the visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features) (BLM 2010). Existing or introduced visual resources may add or detract from the overall scenic quality or the visual appeal of a landscape. Visual or scenic quality is described by the BLM as the relative worth of a landscape from a visual point of view. Visual character describes the visual patterns of form, line, color, texture, dominance, scale, and diversity of elements in the landscape. Normally, landscapes with greater variety of these elements are considered more interesting and valued for their scenic qualities.

Visual resources refer to all objects (man-made and natural, moving and stationary) and features (such as landforms and water bodies) that are visible on a landscape. These resources contribute to the scenic or visual quality of the landscape, that is, the visual appeal of the landscape. A visual impact is the creation of an intrusion or perceptible contrast that affects the scenic quality of a landscape. A visual impact can be perceived by an individual or group as either positive or negative, depending on a variety of factors of conditions (such as personal experience, time of day, weather/seasonal conditions).

### **3.16.2 Applicable Laws, Regulations, Plans, and Policies**

#### **3.16.2.1 Visual Resource Management System**

The CDCA Plan states that “Scenic values are often cited by the public as the Desert’s most important resource” (BLM 1999). On federal lands, the management of scenic resources is required by many laws, including NEPA and FLPMA. NEPA states that the federal government must use “all practicable means to ensure all Americans safe, healthful, productive, and aesthetically (emphasis added) and culturally pleasing surroundings” (42 USC 4331[b][2]).

The BLM’s ongoing policy is to provide basic stewardship responsibility to identify and protect visual resources on all BLM lands. The BLM’s VRM System acknowledges that different levels of scenic value require different levels of management. The VRM System provides a framework for the following:

- Identifying and evaluating scenic values to determine the appropriate level of management
- Analyzing potential visual impacts and the application of visual design techniques to ensure that surface disturbances blend effectively into their surroundings

In the VRM process a visual resource inventory of the existing landscape is prepared and then management classes are assigned to BLM lands in Resource Management Plans. The CDCA Plan does not assign VRM classes and no current visual inventory information is available for the project site. Because there are no established VRM classes, there are also no set management objectives for the project site.

#### **3.16.3 Current CDCA Plan**

There are no guidelines or elements CDCA Plan pertaining to visual resources (BLM 1999).

#### **3.16.4 Regional Landscape Character**

The project is located in southern California, within the Basin and Range Physiographic Province. This province is characterized by linear, north and south trending valleys and normal fault-block mountain ranges. The site lies within the east-west trending Mojave Valley, a broad desert valley resting between several mountains: the Cady and Bristol Mountains lie to the north and northeast and the Bullion, Lava Bed, Rodman, and Newberry Mountains lie to the south and southwest (Figure A-17). The valley floor ranges from approximately 1,800 feet to 2,200 feet in elevation; the mountains rise to between 3,000 feet and 4,400 feet in elevation.

Barstow, Ludlow, Newberry Springs, and Afton are the communities in the region nearest the project site. While the latter communities are very small in population, the city of Barstow had a population of 21,119 according to the 2000 census. Barstow acts as a key transportation center in the area, with I-15 and I-40, and a major BNSF railway passing through the city. Both I-40 and the BNSF railway extend eastward from Barstow toward the project area; I-40 abuts the project to the south and the BNSF railway transects the project site. A portion of the National Trails Highway, also known as the National Old trails Road and Historic U.S. Route 66, also abuts the project site to the south. Several OHV roads are located in the vicinity of the project, some of which cross the project site.

### **3.16.5 Project Site Landscape Setting**

The project lies in a wide, relatively flat valley enclosed by rugged mountains. The project site occupies a band of bajadas, or alluvial fans typical of the Mojave Desert landscape. The bajadas slope gently, but noticeably, southward from the base of the Cady Mountains, immediately north of the site.

The project is within the Mojave Desertscrub biotic community, characterized by creosote bush, all-scale, brittlebush, desert holly, and white burrobush (Brown 1994). The project site is dominated by low-growing green-to-tan creosotebush. The vegetation is sparse and even, creating a medium visual texture in the foreground extending out to about one-quarter mile. Beyond this distance, the texture becomes fine because of the consistent pattern of the vegetation. As the vegetation rises up the foothills of the adjacent mountains, it takes on a stippled to gradational texture.

Although the project vicinity is largely undeveloped, numerous cultural modifications are visible. The most prominent features include I-40, the BNSF railway, and the adjacent transmission lines, towers, poles, and the Pisgah substation. Both I-40 and the BNSF railway introduce relatively straight parallel lines into the landscape. The transmission lines, poles, towers, and substation introduce thin vertical and horizontal lines into the landscape that are often silhouetted against the skyline. These structures are metallic grey and brown in color. No communities lie within the project vicinity and the nearest residence is located about 2 miles east of the site. Rectangular lines and forms of blue, yellow and white hues are introduced into the characteristic landscape by the residential structures.

The views to and from the project site are open and panoramic, with a weak to moderate sense of enclosure from the mountains to the north and south of the site. The adjacent mountains provide a natural scenic backdrop for the project site. Typical views of the landscape character of the site and surrounding area are shown in Figure 3-1 to Figure 3-6. Figure A-13 indicates the location of the character photos.



**Figure 3-1 Character Photo Location 1**



**Figure 3-2 Character Photo Location 2**



**Figure 3-3 Character Photo Location 3**



**Figure 3-4 Character Photo Location 4**



**Figure 3-5 Character Photo Location 5**



**Figure 3-6 Character Photo Location 6**

### 3.17 Hydrology and Water Resources

This section describes the existing condition of surface water and groundwater resources in the vicinity of the proposed Calico Solar Project. It was developed from Section C.7, Hydrology, Water Use, and Water Quality (Soil and Water Resources), of the SA/DEIS.

#### 3.17.1 Laws, Regulations, Plans, and Policies

Table 3-35 lists the federal, state, and local environmental regulations, plans, policies, and management goals for water resources that are applicable to the Calico Solar Project.

**Table 3-35 Hydrology and Water Resources Applicable Laws, Regulations, Plans, and Policies**

Law, Regulation, Plan, or Policy	Description
<b>Federal:</b> Clean Water Act (33 USC Section 1257 et seq.)	The CWA requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the CWA under the Porter-Cologne Water Quality Control Act of 1967.  The CWA also establishes protection of navigable waters through Section 401 and 404. Section 404 permitting and Section 401 certification through the Army Corps of Engineers and RWQCB is required if there are potential impacts to surface waters of the State and/or waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. The U.S. Army Corps of Engineers and RWQCB can require impacts to these waters to be quantified and mitigated.
<b>Federal:</b> Resource Conservation and Recovery Act; 40 CFR Part 260 et seq.	The RCRA is a comprehensive body of regulations that give EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. The RCRA also sets forth a framework for the management of non-hazardous solid wastes.
<b>Federal:</b> Federal Compliance With Pollution Control Standards, Executive order 12088, October 13, 1978	The head of each executive agency has responsibility to take all necessary actions for the prevention, control, and abatement of environmental pollution at facilities and activities under the control of the specific agency.
<b>State:</b> California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.

Law, Regulation, Plan, or Policy	Description
<b>State:</b> Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	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 California Department of Fish and Game 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.
<b>State:</b> California Water Code Section 13050	Defines “Waters of the State.”
<b>State:</b> California Water Code Section 13240, 13241, 13242, 13243, & Water Quality Control Plan for the Lahontan Region (Basin Plan)	The Basin Plan establishes water quality objectives that protect the beneficial uses of surface water and groundwater in the Region. The Basin Plan describes implementation plans and other control measures designed to ensure compliance with statewide plans and policies and provides comprehensive water quality planning. The following chapters are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Present and Potential Beneficial Uses; Chapter 3, Water Quality Objectives, and the sections of Chapter 4, Implementation, entitled “Requirements for Site Investigation and Remediation,” “Cleanup Levels,” “Risk Assessment,” “Stormwater Problems and Control Measures,” Erosion and Sedimentation,” “Solid and Liquid Waste Disposal to Land,” and “Groundwater Protection and Management.”
<b>State:</b> California Water Code Section 13260	Requires filing, with the appropriate RWQCB, a report of waste discharge that could affect the water quality of the state unless the requirement is waived pursuant to Water Code section 13269.
<b>State:</b> California Code of Regulations (Title 23, Division 3, Chapter 30)	This chapter requires the submission of analytical test results and other monitoring information electronically over the internet to the SWRCB’s Geotracker database.
<b>State:</b> California State Water Resources Control Board General Permit CAS000002	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. Under General Permit CAS000002, the SWRCB has issued a National Pollutant Discharge Elimination System General Permit for storm water discharges associated with construction activity. Projects can qualify under this permit if specific criteria are met and an acceptable Storm Water Pollution Prevention Plan is prepared and implemented after notifying the SWRCB with a Notice of Intent.
<b>State:</b> California State Water Resources Control Board 2003-003-DWQ	This general permit applies to the discharge of water to land that has a low threat to water quality. Categories of low threat discharges include piping hydrostatic test water.

Law, Regulation, Plan, or Policy	Description
<b>State:</b> California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15 specifies Primary and Secondary Drinking Water Standards in terms of MCLs. These MCLs include total dissolved solids ranging from a recommended level of 500 mg/l, an upper level of 1,000 mg/l and a short term level of 1,500 mg/l. Other water quality MCLs are also specified, in addition to MCLS specified for heavy metals and chemical compounds.
<b>State:</b> California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15 applies to waste discharges to land and requires the Regional Board issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
<b>State:</b> Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq.)	In the 2003 Integrated Energy Policy Report, consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be “environmentally undesirable” or “economically unsound.”
<b>State:</b> California State Water Resources Control Board Res. No. 68-16	The “Antidegradation Policy” mandates that: 1) existing high quality waters of the State are maintained until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonable affect present and anticipated beneficial uses, and will not result in waste quality less than adopted policies; and 2) requires that any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters, must meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that: a) a pollution or nuisance will not occur and b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.
<b>State:</b> California State Water Resources Control Board Res. 75-58	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound.
<b>State:</b> California State Water Resources Control Board Res. No. 88-63	States that all groundwater and surface water of the State are considered to be suitable for municipal or domestic water supply with the exception of those waters that meet specified conditions.
<b>State:</b> California State Water Resources Control Board Res. 2005-0006	Adopts the concept of sustainability as a core value for State Water Board programs and directs its incorporation in all future policies, guidelines, and regulatory actions.

Law, Regulation, Plan, or Policy	Description
<b>State:</b> California State Water Resources Control Board Res. 2008-0030	Requires sustainable water resources management such as low impact development and climate change considerations, in all future policies, guidelines, and regulatory actions. Directs Regional Water Boards to “aggressively promote measures such as recycled water, conservation and low impact development Best Management Practices where appropriate and work with Dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies.”
<b>State:</b> California Safe Drinking Water and Toxic Enforcement Act	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act.
<b>State and Local:</b> California Safe Drinking Water Act and San Bernardino County Code Title 3, Division 3, Chapter 6, Public Water Supply Systems	Requires public water systems to obtain a Domestic Water Supply Permit. The California Safe Drinking Water Act requires public water systems to obtain a Domestic Water Supply Permit. Public water systems are defined as a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out the year. California Department of Public Health administers the Domestic Water Supply Permit program, and has delegated issuance of Domestic Water Supply Permits for smaller public water systems in San Bernardino County to the County. Under the San Bernardino County Code Title 3, 5.15-6 Division 3, Chapter 6, Public Water Supply Systems, the County Department of Environmental Services monitors and enforces all applicable laws and orders for public water systems with less than 200 service connections. The proposed project would likely be considered a non-transient, non-community water system.
<b>Local:</b> County of San Bernardino General Plan and Development Code	Grading in San Bernardino County is subject to terms and conditions of San Bernardino County’s General Plan, Development Code and California Building Code, based upon the 2006 International Building Code. Although the proposed site is located on federal land, county regulations for public health and safety are considered to be applicable to the project. If a county grading permit is required, the grading plan would need to be completed in compliance with San Bernardino County’s General Plan and Development Code.

Law, Regulation, Plan, or Policy	Description
<b>Local:</b> San Bernardino County Title 3, Division 3, Chapter 6, Article 5, Desert Groundwater Management	To help protect water resources in unregulated portions of the desert while not precluding its use, the County adopted this article. This article requires a permit to locate, construct, operate, or maintain a new groundwater well within the unincorporated, unadjudicated desert region of San Bernardino County. California Environmental Quality Act compliance must be completed prior to issuance of a permit, and groundwater management, mitigation, and monitoring may be required as a condition of the permit. The ordinance states that it does not apply to “groundwater wells located on Federal lands unless otherwise specified by inter-agency agreement.” The BLM and County entered into a Memorandum of understanding that provides that the BLM will require conformance with this code for all projects proposing to use groundwater from beneath public lands.
<b>Local:</b> San Bernardino County Development Code Section 82.13.080, Soil Erosion and Sediment Control Plans/Permits	Section 82.13.080 establishes regulations and procedures to control human existing and potential induced accelerated erosion. Elements of this ordinance include project planning, preparation of Soil Erosion and Sediment Control Plans, runoff control, land clearing, and winter operations.
<b>Local:</b> San Bernardino County Municipal Stormwater Permit	The current Permit, Order No. R8-2010-0036 adopted January 29, 2010, outlines a schedule of monitoring requirements, best management practices, and conditions designed to promote the reduction of pollutants in stormwater discharges.
<b>Local:</b> San Bernardino County Ordinance Code, Title 3, Division 3, Chapter 8, Waste Management, Article 5, Liquid Waste Disposal	This ordinance requires the following compliance for all liquid waste disposal systems: (1) compliance with applicable portions of the Uniform Plumbing Code and the San Bernardino County Department of Environmental Health standards; (2) approval by the Department of Environmental Health standards and building authority with jurisdiction over the system; or (3) for alternative systems, approval by the Department of Environmental Health standards, the appropriate building official of this jurisdiction, and the appropriate California RWQCB.
<b>Local:</b> San Bernardino County Ordinance Code, Title 6, Division 3, Chapter 3, Uniform Plumbing Code	This ordinance describes the installation and inspection requirements for locating disposal/leach fields and seepage pits.

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CFR = Code of Federal Regulations; CWA = Clean Water Act; EPA = United States Environmental Protection Agency; MCLs = Maximum Contaminant Levels; mg/l = milligrams per liter; RCRA = Resource Conservation and Recovery Act; RWQCB = Regional Water Quality Control Board; SWRCB = California State Water Resources Control Board; USC = United States Code.

### 3.17.2 Definition of Resource

Water resources include the available quantity and quality of both surface waters and groundwater. The hydrologic function of the project site influences both the quality of surface waters, and the availability of surface water to support biological resources on the site. This section describes surface water and groundwater resources and the function of the hydrologic system.

### 3.17.3 Current CDCA Plan

The CDCA Plan contains guidelines for water quality. The guidelines address water quality for both Multiple-Use Class L and M land.

The Water Quality Guidelines for Class L lands provide (BLM 1999):

- Areas designated in this class will be managed to provide for the protection and enhancement of surface and groundwater resources, except for instances of short term degradation caused by water development projects. Best management practices, developed by the Bureau during the planning process outlined in the Clean Water Act Section 208, and subsequently, will be used to avoid degradation and to comply with Executive Order 12088.

The Water Quality Guidelines for Class M lands provide (BLM 1999):

- Areas designated in this class will be managed to minimize the degradation of water resources. Best management practices, developed by the Bureau during the planning process outlined in the Clean Water Act, Section 208, and subsequently, will be used to keep impacts on water quality minimal and to comply with Executive Order 12088.

### 3.17.4 Surface Water Resources

The proposed project is located in the southwest portion of the Mojave Desert, which is characterized by broad alluvial fans and fluvial terraces, playas and scattered mountains. The project site is situated within the Troy Valley Hydrologic Subarea, as defined by the Lahontan Region basin plan (RWQCB 2005). The overall landform is relatively flat with shallow slopes trending from the north to south and in some areas to the southwest. The ground generally slopes in a northeast-to-southwest direction, ranging from two percent to five percent across the site, except for the western portion where the slope reduces to one percent. There are occasional small hills (buttes) and sand dune areas on the project site. Off-site, the slopes in the mountainous area to the northeast of the project range from 5 to 10 percent.

The project site is located within the Newberry Springs watershed, which is approximately 90 square miles and lies within the 200,000-square mile Great Basin (Figure A-15). The project site occupies an insignificant proportion of the total watershed area (less than 0.01 percent). In general, surface flows originate in the Cady Mountains, north of the project site. The drainage patterns follow the gradient of higher elevations in the mountains north and east of the site towards lower elevations southerly and westerly across the site (Figure A-16). Several relatively undefined ephemeral washes traverse most of the project area. There are no well-defined channels on-site, although some discontinuous flood terraces occur in a few areas on-site. The drainage features on-site are not well-defined channels resulting from active flow but consist of discontinuous floodplains with areas that exhibit a mixed pattern of sheet flow or shallow concentrated flow across isolated, wide areas of land.

There are no perennial streams or surface water bodies within the project area. The nearest major ephemeral stream is the Mojave River which flows intermittently and is approximately 15 miles northwest of the site and is separated from the site by a watershed divide.

The project site is traversed by a number of ephemeral washes. Surface water flows do not occur on-site in most years. When they do occur, storm water runoff and flows from flash floods represent surface water in the form of storm water. Typically, surface water infiltrates the ground in washes on the alluvial fans and in the valley. During high flows, surface water runoff across the site and from the surrounding hills generally flows southwesterly toward Troy Lake. When water flows on-site, it is usually the result of precipitation occurring during 5- to 10-year storm events. These flows are ephemeral and occur only during periods of brief, intense rainfall. The average annual precipitation is approximately four to six inches. Table 3-36 provides a summary of anticipated precipitation and storm flows within the project area for pre-construction conditions.

**Table 3-36 Calico Solar Project Site Hydrology Summary**

<b>Storm Frequency</b>	<b>6-hour Storm Rainfall (inches)</b>	<b>24-hour Storm Rainfall (inches)</b>	<b>6-hour Storm Runoff (cubic feet per second)</b>	<b>24-hour Storm Runoff (cubic feet per second)</b>
2-year	0.70	0.94	0	0
5-year	1.06	1.41	0	0
10-year	1.33	1.73	1,458	4,145
25-year	1.70	2.15	3,904	7,939
50-year	1.99	2.47	6,435	11,150
100-year	2.31	2.80	22,049	28,772

*Table Source:* SES 2009. Data derived using United States Army Corps of Engineers HEC-1 computer hydrology model.

### 3.17.4.1 Defined Beneficial Uses of Surface Water

All minor surface water drainages are listed for the following beneficial uses within the Lahontan RWQCB: municipal and domestic supply, agricultural supply, groundwater recharge, water contact and noncontact recreation, warm freshwater habitat, cold freshwater habitat, and wildlife habitat uses.

### 3.17.5 Groundwater Resources

The project site lies within the Lavic Valley Groundwater Basin (Figure A-17). The basin is approximately 159 square miles and is bounded by non-water-bearing rocks of the Cady Mountains on the north and east, by the Bullion Mountains on the south and east, by the Lava Bed Mountains on the southwest, and by the Pisgah fault on the west. Parts of the eastern and northern boundaries are drainage divides. The southern part of this basin lies within the Twentynine Palms Marine Corps Base. In the northern part of the basin, surface drainage is toward the Hector Siding and in the southern part of the basin, surface drainage is toward Lavic (dry) Lake. Groundwater may flow eastward out of the basin beneath a surface drainage divide. Groundwater in the basin is found in Quaternary alluvial and lacustrine deposits.

Groundwater recharge is primarily derived from percolation of runoff from surrounding mountains through alluvial fans and washes. Subsurface flow from adjoining basins may also contribute to recharge (DWR 1967). Natural recharge into the basin is estimated to be about 300 acre-feet per year and the storage capacity of the aquifer has been estimated to be approximately 270,000 acre-feet.

#### 3.17.5.1 Existing Groundwater Well Information

Limited groundwater quality data are available within the Lavic Lake Groundwater Basin. Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with a TDS content of 1,680 milligrams per liter (mg/L) (DWR 1964; DWR 1967). Water from a well in the northeastern part of the basin sampled in the 1950s was sodium sulfate in character with a TDS content of 1,721 mg/L. Water from a well in the northwestern part of the basin near Hector Siding sampled in the 1950s was calcium-sodium bicarbonate in character with a TDS content of 278 mg/L.

Two inactive groundwater wells are present within the immediate vicinity of the project site (Figure A-18). One is in the central portion of the site in the NAP area of private land and the other (the “Crow Nest Well”) is about 1.5 miles north of the westernmost point of the project site. According to the BLM, the Crow Nest Well is approximately 170 feet deep and historically used to support livestock grazing. This well was associated with two 4,500-gallon above ground water tanks (Rotte 2008), however, recent measurements by the project Applicant indicate a depth to

water in this well to be about 130 feet and the total well depth to be approximately 138 feet. According to past exploration, the depth of the more central well to the site is 320 feet and the depth to water was measured to be 310 feet. Both wells are in relatively poor condition. Well completion reports for these wells were not available from the California Department of Water Resources (CDWR) or San Bernardino County. No other wells were found within approximately one mile of the site boundaries, however numerous wells were found in the general area.

An additional search of the USGS National Water Information System Web Interface resulted in no groundwater well information for an approximately 400-square mile area generally centered on the site. The existing and destroyed wells identified are also shown on Figure A-18. In general, the groundwater data supports the theory that groundwater depths increase further to the east across the various faults in the area. However, local conditions may control groundwater depths, with an increasing depth to groundwater further from the base of mountains, as well as shallow groundwater within the dry lakes. Other existing wells outside the Lavic Valley Groundwater Basin are separated from the proposed project site by the existing fault lines (Figure A-17).

### **3.17.5.2 Groundwater Well Installation and Development**

In the original filing of the AFC to the CEC, potential water sources for the proposed project included reclaimed water, surface water, groundwater, and water obtained from a service provider (SES 2008). The AFC described on-site groundwater provided by production well(s) as the preferred water supply. A January 2010 supplement to the AFC provided additional information on the reliability of the water supply from the Cadiz BNSF well located approximately 64 miles east of the proposed project site in the Cadiz Valley Groundwater Basin. After an in-depth evaluation of the various water supply options in terms of reliability, cost, and environmental impact was performed, the Applicant identified that the primary source of water for the project would be furnished by the BNSF well and this water supply option was evaluated in the SA/DEIS.

Subsequent to release of the SA/DEIS, the Applicant's groundwater exploratory program demonstrated that groundwater occupying the aquifer underlying the project site is a potentially viable water supply. Test wells have been installed for the purpose of evaluating the potential water supply. The evaluation also includes potential effects of groundwater pumping on water quality and on other potential groundwater users in the Lavic basin.

For more information regarding the Cadiz Valley Groundwater Basin and details concerning the Cadiz BNSF well supply and quality, refer to the SA/DEIS.

## Groundwater Wells 1 and 2

In December 2009, the Applicant began drilling groundwater test wells (Well 1 and Well 2) on private lands in the not a part (NAP) area immediately adjacent to the project site (Figure A-18). The test boring for Well 1 was completed in late January 2010, and water in Well 1 was measured to be approximately 350 feet deep.

The test boring for Well 2 was drilled to approximately 840 feet. Results of geophysical testing indicated a low probability of significant permeable zones, and so the well was not completed.

## Groundwater Well 3

Based on the results of aquifer testing of Well 1 and the geology observed in the test borings of Well 2, Well 3 was drilled to a total depth of approximately 1,147 feet between March 9 and 16, 2010, and was completed between March 26 and 28, 2010. Well 3 is located on lands NAP of the project, adjacent to the project site on private lands. Applicant has purchased and now owns the property. In April 2010, the depth to water in Well 3 was approximately 340 feet. Well 3 was pumped at approximately 10 to 22 gallons per minute and approximately 5,500 gallons were produced.

## Groundwater Quality

Groundwater sampling was conducted at Wells 1 and 3 (Tessera Solar 2010). Based on the test results, the groundwater from Well 1 has been determined to not be suitable for potable consumption without further treatment. Groundwater from Well 3 is not suitable for drinking or project operations use without treatment.

A compilation of the results of chemical analyses of the groundwater samples collected from Wells 1 and 3 is shown in Table 3-37.

**Table 3-37 Groundwater Analytical Results**

Analyte [Table Note 1]	Well 1	Well 3	Primary/ Secondary MCL
Date Sampled	February 22, 2010	April 6, 2010	
Lab Report ID	10-02-1824	10-04-0403	
<b>Title 22 Metals</b>			
Antimony	<0.0150 [Table Note 2]	<0.0150 [Table Note 2]	0.006
Arsenic [Table Note 5]	<b>0.0328</b> [Table Note 3]	<b>0.0811</b> [Table Note 3]	0.01
Barium	0.0374	0.0220	1.0

<b>Analyte [Table Note 1]</b>	<b>Well 1</b>	<b>Well 3</b>	<b>Primary/ Secondary MCL</b>
Beryllium	<0.0100 [Table Note 2]	<0.0100 [Table Note 2]	0.004
Cadmium	<0.0100 [Table Note 2]	<0.0100 [Table Note 2]	0.005
Chromium	0.0310	0.0172	0.05
Cobalt	<0.0100 [Table Note 2]	<0.0100 [Table Note 2]	NE
Copper	<0.0100 [Table Note 2]	<0.0100 [Table Note 2]	1.0* [Table Note 4]
Lead	<0.0100 [Table Note 2]	<0.0100 [Table Note 2]	0.015
Mercury	<0.000500 [Table Note 2]	<0.000500	0.002
Molybdenum	0.212	0.321	NE
Nickel	<0.0100 [Table Note 2]	<0.0100 [Table Note 2]	0.1
Selenium	<0.0150 [Table Note 2]	<0.0150 [Table Note 2]	0.05
Silver	<0.00500 [Table Note 2]	<0.00500 [Table Note 2]	0.1* [Table Note 4]
Thallium	<0.0150 [Table Note 2]	<0.0150 [Table Note 2]	0.002
Vanadium	0.0572	0.0329	NE
Zinc	1.11	0.19	5.0
<b>Base Cations</b>			
Calcium	45.4	25.1	NE
Magnesium	16.5	6.24	NE
Sodium	545	437	NE
Potassium	18	12.7	NE
<b>Other Metals</b>			
Aluminum	<0.0500 [Table Note 2]	<0.0500 [Table Note 2]	0.2* [Table Note 4]
Iron [Table Note 6]	<0.100 [Table Note 2]	<b>0.316</b> [Table Note 3]	0.3* [Table Note 4]
Manganese [Table Note 6]	<b>0.0822</b> [Table Note 3]	<b>0.0684</b> [Table Note 3]	0.05* [Table Note 4]
Silicon	23.5	33.8	NE
Silica	50.3	72.3	NE

Analyte [Table Note 1]	Well 1	Well 3	Primary/ Secondary MCL
<b>Anions</b>			
Fluoride [Table Note 5]	1.4	<b>3.8</b> [Table Note 3]	2.0
Chloride	190	78	250* [Table Note 4]
Nitrate (as N)	4.0	5.2	10
o-Phosphate (as P)	<0.10 [Table Note 2]	<0.10 [Table Note 2]	NE
Total Alkalinity (as CaCO <sub>3</sub> )	134	160	NE
Bicarbonate (as CaCO <sub>3</sub> )	134	160	NE
Carbonate (as CaCO <sub>3</sub> )	<1.0 [Table Note 2]	<1.0 [Table Note 2]	NE
Hydroxide (as CaCO <sub>3</sub> )	<1.0 [Table Note 2]	<1.0 [Table Note 2]	NE
Sulfate [Table Note 6]	<b>900</b> [Table Note 3]	<b>700</b> [Table Note 3]	250* [Table Note 4]
<b>General Water Quality Parameters</b>			
Turbidity (NTU)	27	4.6	NE
SC (umhos/cm)	<b>2600</b> [Table Note 3]	<b>1900</b> [Table Note 3]	900* [Table Note 4]
TDS [Table Notes 6 and 7]	<b>1800</b> [Table Note 3]	<b>1340</b> [Table Note 3]	500* [Table Note 4]
TSS	37	4.6	NE
pH (unitless)	7.85	7.83	NE
Total P	<0.10 [Table Note 2]	<0.10 [Table Note 2]	NE
Carbon Dioxide	2.5	5.6	NE
<b>Other Priority Pollutants</b>			
VOCs (ug/l): Toluene	8.5	5.9	150
Xylenes (total)	1.5	<1.0 [Table Note 2]	1750
SVOCs	ND	ND	Various
OCPs	ND	ND	Various
PCBs	ND	ND	0.0005
TPH (C6-C44) (ug/l)	<500 [Table Note 2]	<500 [Table Note 2]	NE
Total Cyanide	<0.050 [Table Note 2]	<0.050 [Table Note 2]	0.15

Analyte [Table Note 1]	Well 1	Well 3	Primary/ Secondary MCL
Asbestos (MFL)	<2.30 [Table Note 2]	<0.19 [Table Note 2]	7
<b>Radionuclides (pCi/L)</b>			
Gross Alpha	6.30	4.61	15
Gross Beta	4.85	5.79	50
Strontium 90	0.766	0.129	8
Radium 226	0.353	0	5
Tritium	381	3.44	20000
Uranium	0.267	3.33	20
Radium 228	0.263	0.357	5

Table Source: Tessera Solar 2010.

Table Note 1: Analytes reported in mg/l, unless noted otherwise.

Table Note 2: The symbol "<" (less than) indicates the constituent was not detected above the analytical detection limit specified.

Table Note 3: This concentration is above MCL.

Table Note 4: MCL is primary, unless indicated with an asterisk (\*).

Table Note 5: Arsenic and fluoride are present at concentrations above their respective primary MCLs. The water is not suitable for drinking without treatment.

Table Note 6: Iron, manganese, sulfate, specific conductance, and TDS are present at concentrations that are above their respective secondary MCLs, which is also indicative that the groundwater is not suitable for drinking without treatment.

Table Note 7: Based on the TDS concentration, the groundwater is considered fresh water; however it is not suitable for drinking without treatment.

Table Key: CaCO<sub>3</sub> = calcium carbonate; ID = identification; N = nitrogen; NA: not analyzed; NE: none established; ND: none detected; see lab report for detection limits for specific compounds; NTU = nephelometric turbidity units; MCL: maximum containment level; P = phosphate; TDS = total dissolved solids; TSS = total suspended solids; umhos/cm = micromhos per centimeter; VOCs = volatile organic compounds; ug/l = microgram per liter; SVOC = suspended volatile organic compounds; OCP = organochlorine pesticides; PCB = polychlorinated biphenyls; TPH = total petroleum hydrocarbons; MFL = million fibers per liter; pCi/L = picocuries per liter.

### 3.17.6 Jurisdictional Waters

Both the federal government and State of California have regulatory programs pertaining to surface water drainages. The jurisdictional determinations of each with respect to the proposed project are described below.

#### 3.17.6.1 Waters of the United States

Under Section 404 of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (USACE) regulates the discharge of dredge or fill of material into waters of the United States (Waters). An

on-site evaluation of the project site by the USACE concluded that no on-site drainages meet the definition of Waters, as defined by 33 CFR 328.3(e), and determined by the USACE's *Final Summary Report: Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest* (USACE 2001) and the USACE's *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008a).

The potential for federal wetlands was also evaluated based on the presence of wetland hydrology, wetland vegetation, and hydric soils pursuant to guidance from the Federal Manual for Delineating Wetlands (USACE 1987) as augmented by the USACE (2008b). The on-site evaluation also determined that the project area does not exhibit features demonstrative of wetland hydrology, wetland vegetation, and/or hydric soils.

On May 5, 2010, the USACE determined that the project site does not support water resources meeting the definition of Waters and that a CWA permit will not be required (Appendix F). In the absence of Waters, a CWA Section 401 Certification from the Lahontan RWQCB will not be required.

### **3.17.6.2 Waters of the State**

Under Sections 1600-1616 of the California Fish and Game Code, the CDFG prohibits activities that would “substantially divert or obstruct the natural flow of, or substantially change or use any material of the bed, channel, or bank of any river, stream and lake, or deposit or dispose of debris, waste or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream or lake” without consulting with CDFG. Notification is required prior to any such activities and the CDFG issues a Stream Alteration Agreement with any necessary mitigation measures to ensure protection of the state’s fish and wildlife resources.

An investigation of the project site identified a total of 1,099 acres of drainages characterized by well defined banks and vegetation consistent with desert washes (Figure A-16). Vegetation includes Catclaw acacia thorn scrub, smoke tree woodland, and big galleta shrub-steppe. The CDFG indicated that these drainages meet the criteria as a Water of the State and the CDFG has jurisdiction over these on-site drainages. Any disturbance to these drainages may need a Streambed Alteration Agreement.

### **3.17.7 Floodplains**

The Federal Emergency Management Agency’s (FEMA) Flood Insurance Rate Map has no panels for the project site. The project site is in an unmapped area; however, the area is designated as Zone D. FEMA provides the following definition for Zone D:

- “The Zone D designation is used for areas where there are possible but undetermined flood hazards. In areas designated as Zone D, no analysis of flood hazards has been conducted. Mandatory flood insurance purchase requirements do not apply, but coverage is available. The flood insurance rates for properties in Zone D are commensurate with the uncertainty of the flood risk.” (FEMA 2009)

# Chapter 4

## Environmental Consequences

### 4.1 Introduction

This chapter analyzes the environmental consequences or impacts expected to occur as a result of implementing the actions described for each alternative in Chapter 2. The scope of the impact analyses presented in this chapter is commensurate with the detail level of the actions presented in Chapter 2 and the availability and/or quality of data necessary to assess impacts. Current conditions in the project area, as described in Chapter 3, were used as the baseline for assessing expected impacts. Potential impacts considered in this chapter include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, and health impacts (40 CFR 1508.8).

Substantive comments that were received on the SA/DEIS have been incorporated into this FEIS. These comments and responses to the comments are located in Appendix G.

#### 4.1.1 Chapter Format

The analysis is organized by resource element and discloses the potential impacts on each resource element from implementing each of the alternatives. The impact analysis for Alternative 1, the Proposed Action, was prepared first to serve as the basis of comparison for the other alternatives. The introduction of each resource element establishes the methodology of analysis; and applicable laws, regulations, plans, and policies. Next, the impact analysis for each alternative is provided along with mitigation measures that are intended to reduce those impacts. Finally, a disclosure of cumulative impacts, potential irreversible and irretrievable commitment of resources, growth inducing impacts, short-term uses and long-term productivity of the environment, and unavoidable adverse impacts are discussed in this chapter.

This chapter also contains an analysis of the amendments that would be required to the CDCA Plan to approve the Proposed Action or any of the alternatives.

#### 4.1.2 Impact Analysis Methodology

The methodology for this assessment conforms with the guidance found in following sections of the CEQ regulations for implementing NEPA: 40 CFR 1502.24 (Methodology and Scientific Accuracy); 40 CFR 1508.7 (Cumulative Impact); and 40 CFR 1508.8 (Effects). The CEQ

regulations require that agencies “rigorously explore and objectively evaluate” the impact of the alternatives. This analysis considers the context, intensity, type, and duration of an impact. Context relates to environmental circumstances at the location of the impact and in the immediate vicinity, affected interests, and the locality. Intensity refers to the severity or extent of the impact or magnitude of change from existing conditions. Type refers to impacts that are beneficial, neutral, or adverse in nature. Duration refers to the permanence and longevity of the impacts, which is described as short-term or long-term. The definitions for terms used in this impact analysis include the following:

- *Direct*: The effect which is caused by the action and occurs at the same time and place.
- *Indirect*: The effect which is caused by the action and is later in time or farther removed in distance, but is still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on water and air and other natural systems, including ecosystems.
- *Adverse*: The effect is negative to a particular resource or a number of resources.
- *Beneficial*: The effect is positive to a particular resource or a number of resources.
- *Negligible*: The effect is at the lower level of detection; change would be difficult to measure.
- *Short term*: The effect occurs only for a short-time (first 5 years) after implementation of the action. For example, construction of the solar project would remove vegetation from the staging areas and other areas associated with construction activities. After the construction is completed these areas would be reclaimed.
- *Long term*: The effect occurs for an extended period (more than 5 years) after implementation of the action. Loss of vegetation from construction of the solar project, roads, and other facilities would be considered a long-term impact. Also, noise associated with the project would be a long-term impact as it would last as long as it is in operation.

### **4.1.3 Incomplete or Unavailable Information**

Impacts are quantified where possible. Impacts are sometimes described using ranges of potential impacts or in qualitative terms. In the absence of quantitative data, impacts are described based on professional judgment using the best available information. Impact analyses

based on incomplete or unavailable information are identified in this chapter where applicable. Incomplete or unavailable information that is not essential to the decision making will be identified and described why that material it is not necessary. If the information cannot be obtained because of overall costs of obtaining it are exorbitant or the means to obtain it are not known, the FEIS will; indicate that the material is incomplete or unavailable and provide a statement of the relevance of the material; provide a summary of existing credible scientific evidence which is relevant; and the impacts will be based upon theoretical approaches or research methods generally accepted in the scientific community.

#### 4.1.4 Supplemental Authorities to be Considered

The BLM's NEPA Handbook (H-1790-1) requires that all EIS address certain topics, which the BLM addresses as Supplemental Authorities to be Considered (BLM 2008). The list of topics governed by supplemental authorities in the BLM Handbook has been expanded by BLM IM and by EOs. These topics are presented in Table 4-1, followed by corresponding relevant authorities and the status of the topic in this document.

**Table 4-1 Supplemental Authorities**

Topic	Relevant Authority	Status
Air quality	Clean Air Act, as amended (42 USC 7401 et seq.)	Addressed in the Air Quality section
Areas of critical environmental concern	Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.)	Addressed in the Special Designations section
Cultural resources	National Historic Preservation Act, as amended (16 USC 1531) Archaeological Resources Protection Act (16 USC 470)	Addressed in the Cultural Resources and Paleontology section
Farmlands (prime or unique)	Farmland Protection Policy Act (PL 97-98; 7 USC 4201 et seq.)	Addressed in Special Designations section
Floodplains	EO 11988, Floodplain Management	Addressed in the Hydrology and Water Resources section (The project would not be located on active floodplains of major rivers)
Invasive and nonnative species	Federal Noxious Weed Act of 1974, as amended Endangered Species Act of 1973, as Amended EO 13112, Invasive Species	Addressed in the Biological Resources section
Native American religions concerns	American Indian Religious Freedom Act of 1978 (42 USC 1996) EO 13007, Indian Sacred Sites	Addressed in Cultural Resources and Paleontology section

Topic	Relevant Authority	Status
Native Americans	Archaeological Resources Protection Act of 1979 (16 USC 470aa-470mm; PL 96-95, as amended)	Addressed in the Cultural Resources and Paleontology section
Threatened or endangered species	Endangered Species Act of 1973 as amended (16 USC 1531)	Addressed in the Biological Resources section
Wastes (hazardous or solid)	Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.) Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 USC 9615)	Addressed in the Public Health and Safety and Hazardous Materials section
Water quality (drinking/ground)	Safe Drinking Water Act, as amended (42 USC 300f et seq.) Clean Water Act of 1977 (33 USC. 1251 et seq.)	Addressed in the Hydrology and Water Resources section
Wetlands/riparian zones	EO 11990, Protection of Wetlands	Addressed in the Vegetation section
Wild and scenic rivers	Wild and Scenic Rivers Act as amended (16 USC 1271)	None are located within the project area
Wilderness	Federal Land Policy and Management Act and Wilderness Act of 1964 (16 USC 1131 et seq.)	Addressed in the Special Designations section

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* EO = executive order; PL = Public Law; USC = United States Code.

#### 4.1.5 Assumptions

Several general assumptions were made to facilitate the analysis of potential impacts. The assumptions listed below are common to all resources. Other assumptions specific to a particular resource are listed under that resource:

- The Calico Solar Project would have a functional lifespan of 30 years.
- The Calico Solar Project ROW grant would have a term of 20 years and could be renewed.
- When an alternative is constructed in phases the analysis is based on the completed project.
- Construction of the Calico Solar Project would last approximately 52 months.

### **4.1.6 Cumulative Impacts**

This section was developed from information originally presented in Section B.3, Cumulative Scenario, of the SA/DEIS. It also includes reasonable foreseeable future transmission line projects identified in Section D.5-7, Transmission System Engineering, of the SA/DEIS.

NEPA requires a cumulative impact analysis as part of an EIS. Cumulative impacts are the impacts on the environment that result from the incremental impact of an action when considered with other past, present, and reasonably foreseeable future actions regardless of the agency (federal or nonfederal) or person undertaking such other actions (40 CFR 1508.7). Cumulative impacts are discussed for each resource.

#### **4.1.6.1 Methodology**

NEPA states that cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). When assessing cumulative impacts both context and intensity are considered.

This FEIS evaluates cumulative impacts within the analysis of each resource using these steps:

- (1) Define the geographic scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the Calico Solar Project could combine with those of other projects.
- (2) Evaluate the effects of the Calico Solar Project in combination with past and present (existing) projects within the area of geographic effect defined for each discipline.
- (3) Evaluate the effects of the Calico Solar Project with reasonably foreseeable future projects that occur within the area of geographic effect defined for each discipline.

The intensity, or severity, of the cumulative effects considers the magnitude, geographic extent, duration and frequency of the effects. The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent, or chronic.

Each resource element analysis the cumulative impacts of the proposed project on top of the current baseline; the past, present (existing) and reasonably foreseeable or probable future projects in the Calico Solar Project vicinity.

#### **4.1.6.2 SCE Transmission System Upgrades**

Transmission line system upgrades would be needed to transfer power from the Calico Solar Project to the SCE transmission grid. The CPUC is the lead agency for CEQA compliance, and the BLM is the lead agency for NEPA compliance on these SCE transmission line system upgrades. The SCE would need a Certificate of Public Convenience and Necessity from the CPUC for these network upgrades in addition to an approved ROW grant application from the BLM.

As of the date of this FEIS, SCE has not developed complete proposals for upgrades to its transmission system for submittal to the BLM as separate ROW grant applications. Therefore, the SCE transmission system upgrades are not considered connected actions as described by NEPA. The BLM addresses the system upgrades as reasonably foreseeable future actions in this FEIS since the SCE upgrades would require their own NEPA review. These upgrades are described briefly below.

#### **4.1.6.3 Proposed SCE Upgrades for up to 275 MW of Solar Energy Generation**

As described in the SA/DEIS, construction of the 275 MW Phase I of Alternative 1, Proposed Action, would require an upgrade of the existing Pisgah Substation to a 500/220 kV substation designed for four 500/220 kV transformer banks and installation of fiber-optic connections between the Pisgah and Gale Substations and between the Pisgah and Lugo Substations. This upgrade would also be required to implement Alternative 1a, Agency Preferred Alternative, Alternative 2, Reduced Acreage Alternative, and Phase I of Alternative 3, Avoidance of Donated and Acquired Lands Alternative.

#### **4.1.6.4 Proposed SCE Upgrades for more than 275 MW of Solar Energy Generation**

Delivery of renewable power above 275 MW to the SCE system would require the construction of additional transmission line upgrades by SCE. These upgrades would be required for transmission of power generated from Phase II of the Proposed Action Alternative, Phase II of the Agency Preferred Alternative, and Phase II of the Avoidance of Donated and Acquired Lands Alternative.

The upgrades required for interconnection to the grid beyond generation of 275 MW consists of expansion of the Pisgah Substation or construction of a new substation and the installation of new power transmission facilities. The major components include the following:

- Extending the existing Lugo 500-kV Substation East and West Buses to provide for a new 500-kV transmission line position.
- Removing 65 miles of the existing Lugo-Pisgah No. 2 (220-kV) transmission line between Lugo Substation and Pisgah Substation.
- Constructing approximately 65 miles of new 500-kV transmission line between the Lugo and Pisgah Substations. Approximately 55 miles of the new transmission line would use the ROW vacated by the removal of the existing 220-kV line, and approximately 10 miles would require new ROW.
- Looping the existing Eldorado-Lugo 500-kV transmission line into the expanded Pisgah 500-kV Substation to form the Eldorado-Pisgah 500-kV transmission line and the Lugo-Pisgah No. 1 (500-kV) transmission line.
- Obtaining required ROW as follows:
  - New ROW to accommodate new 500/220-kV Pisgah Substation, estimated to require 0.6 acre adjacent to the existing substation location.
  - Update existing ROW to support construction of the new Lugo-Pisgah No. 2 (500-kV) transmission line within the existing ROW.
  - Approximately 10 miles of new ROW (near Lugo, California) to support construction of the new Lugo-Pisgah No. 2 (500-kV) transmission line when use of the existing ROW is not feasible.

#### **4.1.6.5 Other Transmission System Upgrades**

In addition to the SCE upgrades described above, six other transmission system upgrades were identified in Section D.5.7, Transmission System Engineering, of the SA/DEIS that would be required to mitigate reliability violations caused by projects that are placed ahead of the Calico Solar Project in the generator interconnection queue and are expected to be implemented by those higher-queued projects. However, in the event that any of these higher-queued projects withdraw their application, the Calico Solar Project may become responsible for any or all of these additional facilities. These reasonably foreseeable future actions include:

- Upgrade of the Inyo 115-kV phase-shift transformer: The upgrade involves replacement of the phase-shift transformer at Inyo with a new one that has greater phase-shift capability.

- Inyokern Substation conversion to 230 kV: The facility upgrades involve a new Inyokern 230-kV substation and utilization of existing 230-kV transmission facilities.
- New Lugo-Kramer Transmission Line project: The facility involves the construction of a new Kramer-Lugo 230-kV transmission line.
- Construction of a third Lugo 500/230-kV transformer bank.
- Mountain Pass–El Dorado 115-kV line reconductor.
- El Dorado 230/115-kV transformer bank: The facility upgrade involves replacing existing 230/115-kV transformer bank with a larger size.

These future actions, while reasonable foreseeable, were not included in the cumulative impacts analysis as they are geographically removed from the Calico Solar Project area. If the Calico Solar Project were to become responsible for any or all of these actions, additional NEPA review would be initiated by BLM to ensure consideration of all direct, indirect, and cumulative impacts.

#### **4.1.6.6 Renewable Resources in California**

A large number of renewable projects have been proposed on BLM-managed land, state land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California that were in various stages of the environmental review process or under construction. As of December 2009, 49 of these projects, representing approximately 10,500 MW, were planning on requesting ARRA funds from the federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately 1 million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects.

Figures A-19 and A-20 show the locations of applications in the California Desert and West Mojave Areas, and Table 4-2 and Table 4-3) illustrate the numerous proposed renewable projects on BLM Desert Lands and state-wide on state and private land in California.

Figure A-21 and Table 4-4 and Table 4-5 define the projects in the immediate vicinity of the project site. The area included in this analysis consists of a radius approximately 15 to 20 miles around the project site. Table 4-4 presents existing projects and Table 4-5 presents reasonably foreseeable future projects. Both tables list project name, type, location and status. These data are presented for consideration within each resource specific impact analysis.

**Table 4-2 Renewable Energy Project Status on BLM Land in the California Desert**

BLM Field Office	Project Total and Acreage	Total MW
<b>Solar Energy</b>		
Barstow Field Office	18 projects; 132,560 acres	12,875 MW
El Centro Field Office	7 projects; 50,707 acres	3,950 MW
Needles Field Office	17 projects; 230,480 acres	15,700 MW
Palm Springs Field Office	17 projects; 123,592 acres	11,873 MW
Ridgecrest Field Office	4 projects; 30,543 acres	2,835 MW
California Desert District (total solar projects)	63 projects; 567,882 acres	47,233 MW
<b>Wind Energy</b>		
Barstow Field Office	25 projects; 171,560 acres	Not applicable
El Centro Field Office	9 projects; 48,001 acres (acreage not available for 3 of the projects)	Not applicable
Needles Field Office	8 projects; 115,233 acres	Not applicable
Palm Springs Field Office	4 projects; 5,851 acres	Not applicable
Ridgecrest Field Office	16 projects; 123,379 acres	Not applicable
California Desert District (total wind projects)	62 projects; 433,721 acres	Not applicable

Table Source: BLM 2009.

Table Key: BLM = Bureau of Land Management; MW = megawatts.

**Table 4-3 Renewable Energy Project Status on State and Private Lands**

Project Name	Location	Status
<b>Solar Energy</b>		
Solargen Panoche Valley Solar Farm (400 MW Solar PV)	San Benito County	Environmental Impact Review in progress
Maricopa Sun Solar Complex (350 MW Solar PV)	Kern County	Information not available
Panoche Ranch Solar Farm (250 MW Solar PV)	Kern County	Information not available
Gray Butte Solar PV (150 MW Solar PV)	Los Angeles County	Information not available
Monte Vista (126 MW Solar PV)	Kern County	Information not available
San Joaquin Solar 1 and 2 (107 MW Solar hybrid)	Fresno	Under environmental review
NRG Alpine Suntower (40 MW solar PV and 46 MW solar thermal)	Los Angeles	Information not available
Palmdale Hybrid Power Project Unit 1 (50 MW solar thermal, part of a hybrid project)	City of Palmdale	Under environmental review

<b>Project Name</b>	<b>Location</b>	<b>Status</b>
Lucerne Valley Solar (50 MW solar PV)	San Bernardino	Under environmental review
Lost Hills (32.5 solar PV)	Kern County	Information not available
Tehachapi Photovoltaic Project (20 MW solar PV)	Kern County	Information not available
Sun City Project Phase 1 (20 MW solar PV)	Kings County	Information not available
Boulevard Associates (20 MW solar PV)	San Bernardino County	Information not available
Stanislaus Solar Project I (20 MW solar PV)	Stanislaus County	Information not available
Stanislaus Solar Project II (20 MW solar PV)	Stanislaus County	Information not available
Synapse Solar 2 (20 MW solar PV/solar thermal)	Kings	Information not available
T, squared, Inc. (19 MW solar PV)	Kern County	Information not available
Rancho Seco Solar Thermal (15-17 MW solar trough)	Sacramento County	Information not available
Global Real Estate Investment Partners, LLC (solar PV)	Kern County	Information not available
Recurrent Energy (solar PV)	Kern County	Information not available
Man-Wei Solar (solar PV)	Kern County	Information not available
Regenesis Power for Kern County Airports Department	Kern County	Information not available
Abengoa Mojave Solar Project (250 MW solar thermal)	San Bernardino County, Harper Lake	Under environmental review
Rice Solar Energy Project (150 MW solar thermal)	Riverside County, north of Blythe	Under environmental review
3 MW solar PV energy generating facility	San Bernardino County, Newberry Springs	MND published for public review
Blythe Airport Solar 1 Project (100 MW solar PV)	Blythe, California	MND published for public review
First Solar's Blythe (21 MW solar PV)	Blythe, California	Under construction
California Valley Solar Ranch (SunPower) (250 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review

<b>Project Name</b>	<b>Location</b>	<b>Status</b>
LADWP and OptiSolar Power Plant (68 MW solar PV)	Imperial County, State Route 111	Under environmental review
Topaz Solar Farm (First Solar) (550 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
AV Solar Ranch One (230 MW solar PV)	Antelope Valley, Los Angeles County	Under environmental review
Bethel Solar Hybrid Power Plant (49.4 MW hybrid solar thermal and biomass)	Seeley, Imperial County	Under environmental review
Mt. Signal Solar Power Station (49.4 MW hybrid solar thermal and biomass)	8 miles southwest of El Centro, Imperial County	Under environmental review
<b>Wind Projects</b>		
Alta-Oak Creek Mojave Project (up to 800 MW)	Kern County, west of Mojave	Under environmental review
PdV Wind Energy Project (up to 300 MW)	Kern County, Tehachapi Mountains	Approved
City of Vernon Wind Energy Project (300 MW)	City of Vernon	Information not available
Manzana Wind Project (246 MW)	Kern County	Information not available
Iberdrola Tule Wind (200 MW)	San Diego County, McCain Valley	EIR/EIS in progress
Padoma Wind Energy (175 MW)	Shasta County	Information not available
Pine Canyon (150 MW)	Kern County	Information not available
Shiloh III (200 MW)	Montezuma Hills, Solano County	Information not available
AES Daggett Ridge (84 MW)	San Bernardino	EIS in progress
Granite Wind, LLC (81 MW)	San Bernardino	EIR/EIS in progress
Bear River Ridge (70 MW)	Humboldt County	Information not available
Aero Tehachapi (65 MW)	Kern County	Information not available
Montezuma Wind II (52-60)	Montezuma Hills, Solano County	Information not available
Tres Vaqueros (42 MW wind repower)	Contra Costa County	Information not available
Montezuma Hills Wind Project (34-37 MW)	Solano County	Information not available

Project Name	Location	Status
Solano Wind Project Phase 3 (up to 128 MW)	Montezuma Hills, Solano County	Under environmental review
Hatchet Ridge Wind Project	Shasta County, Burney	Under construction
Lompoc Wind Energy Project	Lompoc, Santa Barbara County	Approved
Pacific Wind (Iberdrola)	McCain Valley, San Diego County	Under environmental review
TelStar Energies, LLC (300 MW)	Ocotillo Wells, Imperial County	Under environmental review
<b>Geothermal Energy</b>		
Buckeye Development Project	Geyserville, Sonoma	Under environmental review
Orni 18, LLC Geothermal Power Plant (49.9 MW)	Brawley, Imperial County	Information not available
Black Rock Geothermal 1, 2, and 3	Imperial County	Information not available

*Table Source:* List compiled from projects on CEQAnet as of November 2009 (CEQAnet 2009)

*Table Key:* ARRA = American Recovery and Reinvestment Act; LLC = limited liability company; MW = megawatts; PV = photovoltaic.

**Table 4-4 Existing Projects in the Newberry Springs/Ludlow Area**

ID	Project Name	Location Column Needs Updates	Agency/ Owner	Status	Project Description
1	Twentynine Palms Marine Corps Air Ground Combat Center	Morongo Basin (to the southwest of project site)	U.S. Marine Corps	Existing	The Marine Corps' service-level facility for Marine Air Ground Task Force training. It covers 596,000 acres to the south of the Calico Solar Project site and north of the city of Twentynine Palms
2	SEGS I and II	Near Daggett (to the west of project site)	Sunray Energy, Inc.	Existing	Solar parabolic trough facilities generating 13.8 MW and 30 MW, respectively.
3	CACTUS (formerly Solar One and Solar Two)	Near Daggett (to the west of project site)	UC Davis	Existing	A nonworking 10-MW solar power tower plant converted by UC Davis into an Air Cherenkov Telescope to measure gamma rays hitting the atmosphere. The site is comprised of 144 heliostats. This project had its last observational run in 2005. Southern California Edison has requested funds from the California Public Utilities Commission to decommission the Solar Two project. (UC Davis 2009)

ID	Project Name	Location Column Needs Updates	Agency/ Owner	Status	Project Description
4	Mine	West of project site along I-40		Existing	Small-scale aggregate operation (AFC p. 5.3-12)
5	Mine	West of project site along I-40		Existing	Larger aggregate mining operation that produced less than 500,000 tons per year in 2005 (AFC p. 5.3-12)

Table Source: BLM and CEC 2010.

Table General Note: The Ludlow area was identified because it encompasses the cumulative analysis area for many resource elements.

Table Key: AFC = Application for Certification; ID = identification; Inc. = incorporated; MW = megawatts; UC = University of California.

**Table 4-5 Reasonably Foreseeable Future Actions in the Newberry Springs/Ludlow Area**

ID	Project Name	Location Column	Agency/ Owner	Status	Project Description
A	SES Solar Three (CACA 47702)	T8N and T9N, R5E	SES Solar Three, LLC	BLM received completed amended application June 2007. SES withdrew the application for Solar Three in December 2009. As there was a second-in-line application, this application becomes the project proposed at this location.	914 MW Stirling solar plant on 6,779-acre site.
B	Broadwell BrightSource (CACA 48875)	Broadwell Valley (T8N and T9N, R7E), approximately 5 miles northeast of project	BrightSource Energy, Inc.	Application filed with BLM. Potential conflict with proposed National Monument. Plans withdrawn/put on hold in September 2009.	5,130-acre solar thermal facility using power tower technology.
C	SCE Pisgah Substation expansion	Immediately southeast of project site	Southern California Edison	Pending filing of ROW applications with BLM	Substation upgrade from 220 kV to 500 kV

ID	Project Name	Location Column	Agency/ Owner	Status	Project Description
D	Pisgah-Lugo transmission upgrade	Pisgah Substation (southeast side of project site) to Lugo Substation (near Hesperia)	Southern California Edison	Pending filing of ROW applications with BLM	<p>The proposed 850-MW Calico Solar Project would require removal of 65 miles of existing 220-kV transmission line and installation with a 500-kV line.</p> <p>The Reduced Acreage Alternative (275 MW) would require an upgrade of the telecommunication facilities serving the existing 200-kV Pisgah-Lugo transmission line. Specifically, it would require:</p> <p>Replacement of a portion of existing Eldorado-Lugo 500-kV overhead ground wire with new optical ground wire between the Lugo and Pisgah Substations</p> <p>Installation of a new fiber-optic line between the Pisgah Substation and Cool Water Substation (new fiber to be installed on approximately 20 miles of existing electric distribution poles).</p>
E	Twentynine Palms Expansion	Morongo Basin (south of project site)	U.S. Marine Corps	Notice of Intent to prepare EIS to study alternatives published in October 2009. Draft Environmental Impact Statement expected September 2010.	400,000-acre expansion on the east, west, and south of the existing 596,000-acre Twentynine Palms Marine Corps base. In June 2009, approximately 60,000 acres in all study areas were removed from further study, leaving 360,000 acres under study (USMC 2009).

<b>ID</b>	<b>Project Name</b>	<b>Location Column</b>	<b>Agency/ Owner</b>	<b>Status</b>	<b>Project Description</b>
F	Solel, Inc. (CACA 049424)	Southeast of proposed site, immediately north of Twentynine Palms MCAGCC	Solel, Inc.	BLM received application in July 2007, plan of development is under review.	600 MW solar thermal plant proposed on 7,453 acres.
G	Wind project (CACA 48629)	Approximately 25 miles east of project site. Black Lava T2N, R5E, T1N, R5E	Oak Creek Energy	BLM received application December 2006. Issues with partial location in ACEC.	Wind project on 17,920 acres
H	Wind Project (CACA 48667)	South Ludlow T6N, R6E T7N, R6E T6N, R7E T7N, R7E T6N, R8E T7N, R8E (approximately 20 miles southeast of project site)	Oak Creek Energy	Pending	Wind project on 25,600 acres
I	Wind project (CACA 48472)	Troy Lake T9N and T10N, R4E (approximately 5 miles west of project site)	Power Partners SW (enXco)	Pending review of Environmental Assessment	Wind project on 10,240 acres
J	Twin Mountain Rock Venture	10 miles west of Ludlow and 1 mile south of I-40; APN 0552-011-10-0000	Rinker Materials	Permit granted to extend permit to 2018	Plan to re-permit a cinder quarry on approximately 72 acres of leased land. No development activity has occurred on project site.
K	Solar thermal (CACA 49429)	Stedman (approximately 7 miles west of project site)	Solel, Inc.	Application filed with BLM.	600 MW solar project on 14,080 acres. POD under review.

ID	Project Name	Location Column	Agency/ Owner	Status	Project Description
L	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve	U.S. Congress	In December 2009, Senator Feinstein introduced bill S.2921 that would designate 2 new national monuments including the Mojave Trails National Monument.	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding. Although it is not a project that would contribute to potential cumulative impacts, its designation could increase the impacts severity to lands with special designations judged to result from both individual projects and cumulatively considered projects in the region.
M	BLM Renewable Energy Study Areas	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed, under environmental review	The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.

Table Source: BLM and CEC 2010

Table Key: ACEC = area of critical environmental concern; BLM = Bureau of Land Management; DOE = Department of Energy; kV = kilovolt; E = east; I-10 = Interstate 10; ID = identification; Inc. = incorporated; LLC = limited liability

company; MCAGCC = Marine Corps Air Ground Combat Center; MW = megawatt; N = north; PEIS = programmatic environmental impact statement; POD = plan of development; R = range; SCE = Southern California Edison; SES = Sterling Energy Systems; T = township; USMC = U.S. States Marine Corps.

### 4.1.7 Mitigation

For impacts identified in the following resource sections, mitigation measures have been developed that would be implemented during all appropriate phases of the project from initial ground breaking, to operations, and through closure and decommissioning. The mitigation measures include a combination of the following:

- Measures that have been proposed by the applicant
- Conditions of Certification (COCs) proposed by the CEC
- Regulatory requirements of other federal, state, and local agencies
- USFWS terms and conditions identified in the Biological Opinion
- Additional BLM-proposed mitigation measures, standard ROW grant terms and conditions, and best management practices

These requirements are generically referred to as “Mitigation Measures” throughout this FEIS. Because these Mitigation Measures are derived from a variety of sources, they also are required, and their implementation regulated, by the various agencies. For instance, the mitigation measures proposed by the Applicant have been accepted by the BLM and the CEC and have been incorporated into the project description. This, in turn, is the project description that has been presented to the USFWS for consultation and is the project description upon which the terms and conditions of the Biological Opinion are based. The project Applicant is required to comply with the terms and conditions of the Biological Opinion.

Many of the other mitigation measures are required by agencies other than the BLM and their implementation will be enforced by those other agencies against the project applicant. The project Applicant will be required by the ROD and the ROW grant to comply with the requirements of those other agencies (see, e.g., 43 CFR 2805.12(a) (Federal and state laws and regulations), (i)(6) (more stringent state standards for public health and safety, environmental protection and siting, constructing, operating, and maintaining any facilities and improvements on the ROW). Any noncompliance with implementation of these other Federal or state requirements may impact the approval status of the ROD and ROW grant.

As noted above, the BLM recognizes that the CEC COCs are not generally within the enforcement authority of the BLM since the CEC COCs are requirements originating in State law and regulation. While the project applicant must comply with these measures, they are not

directly enforceable by the BLM except in the general sense referred to above. For those COCs that are also within the enforcement authority of the BLM because of overlapping authorities, the BLM incorporates those COCs into its ROW grant as its own terms and conditions subject to its enforcement authority. Appendix D contains a list of COCs and denotes those measures that will be monitored and managed by the CEC, and those that will be BLM mitigation measures.

In some instances, the BLM identified potential impacts to public land resources that would not be and have not been identified as mitigation measures required by these other agencies. In these instances, individual mitigation measures will be developed by the BLM and incorporated into the ROW grant, and will be monitored and managed solely by the BLM. In addition, standard terms and conditions for approval of the use of public land will be identified in the ROD and incorporated into the proposed ROW grant and therefore will be enforced by the BLM as part of any ROW grant approved for the project.

If approved, the solar energy right-of-way authorization will include diligent development terms and conditions, consistent with the requirements of 43 CFR 2805.12(i)(5). Failure of the holder to comply with the diligent development terms and conditions provides the BLM authorized officer the authority to suspend or terminate the authorization (43 CFR 2807.17).

If approved, the solar energy right-of-way authorization will include a required ~~Performance and Reclamation~~ bond to ensure compliance with the terms and conditions of the right-of-way authorization, consistent with the requirements of 43 CFR 2805.12(g). The ~~Performance and Reclamation~~ bond will consist of three components. The first component will be hazardous materials, the second component will be the decommissioning and removal of improvements and facilities and the third component will address reclamation, revegetation, restoration and soil stabilization.

#### **4.1.8 Terms and Conditions Found in FLPMA and BLM ROW Regulations**

Title V of the FLPMA of 1976 addresses the issuance of ROW authorizations on public land. The BLM has identified all the lands that will be occupied by facilities associated with the Calico Solar Project that are needed for construction, operation, and maintenance of the project. The general terms and conditions for all public land ROWs are described in FLPMA section 505, and include measures to minimize damage and otherwise protect the environment, require compliance with air and water quality standards, and compliance with more stringent state standards for public health and safety, environmental protection, siting, construction, operation, and maintenance of ROWs. The Secretary may prescribe additional terms and conditions as s/he deems necessary to protect Federal property, provide for efficient management, and among other things, generally protect the public interest in the public lands subject to or lands adjacent thereto.

For this project, terms and conditions will be incorporated into the ROW grant that are necessary to protect public safety, including security fencing and on-site personnel. The environmental consequences analysis in this FEIS identifies impacts and mitigation measures to reduce/eliminate impacts. The mitigation measures identified by the BLM and incorporated as a terms and conditions of the ROW grant will provide those actions necessary to prevent unnecessary or undue degradation of the public lands as required by FLPMA section 302. The additional mitigation measures that are identified and described in this FEIS and that would be enforced by the other agencies, as noted above, provide additional protection to public land resources.

Specifically, the FEIS identifies recommended mitigation measures that would:

- Require compliance with MDAQMD State regulations, reduce carbon emissions, and minimize dust.
- Require planning and compliance with Federal, State and local agency requirements for Drainage, Erosion and Sediment Control, wastewater management, groundwater use and monitoring, and stormwater control and monitoring.
- Require measures to protect public health and safety including traffic control, transmission line standards, and worker safety plans.
- Require biological resource mitigation and cultural resources mitigation to protect sensitive environmental resources and cause the least damage to the environment and protect the public interest, while allowing the project to be constructed.

Finally, all BLM ROW grants are approved subject to regulations contained in 43 CFR 2800. Those regulations specify that the BLM may, at any time, change the terms and conditions of a ROW grant –as a result of changes in legislation, regulations, or as otherwise necessary to protect public health or safety or the environment” (43 CFR 2805.15[e]).

The BLM will monitor conditions and review any ROW grant issued for the Calico Solar Project to evaluate if future changes to the grant terms and conditions are necessary or justified under this provision of the regulations to further minimize or reduce impacts resulting from the project.

## **4.2 Air Quality and Climate**

This section describes the impacts on air quality associated with the construction and operation of the proposed Calico Solar Project and was developed from Section C.1, Air Quality, of the SA/DEIS. The purpose of the air quality and climate impacts analysis is to evaluate whether criteria pollutant emissions resulting from the Proposed Action or alternatives, would cause or

contribute significantly to a violation of a state or federal AAQS. Potential effects of toxic air contaminant emissions from the Proposed Action and alternatives are discussed in Section 4.11, Public Health and Safety and Hazardous Materials, of this document.

### **4.2.1 Methodology**

The EPA guideline ARMS/EPA Regulatory Model (AERMOD) is a mathematical model that estimates the maximum expected effects of project emissions for comparison with the state and federal AAQS for criteria pollutants. As stated in Chapter 3, the criteria pollutants include O<sub>3</sub>, CO, NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>. The AERMOD air-dispersion modeling was completed for the Proposed Action since it has the largest footprint of all alternatives and reflects the maximum expected effects of construction and operation emissions. For the remaining alternatives, a qualitative analysis was conducted to compare the results of the air-dispersion modeling with the smaller footprints.

The AERMOD dispersion model predicts emissions based on background concentrations (non-project-related concentrations) and project contributions for the criteria pollutants. Separate criteria pollutant modeling analyses were conducted to address the air quality effects of emissions from construction activities and operations because these activities would occur at different times. Effects from construction activities include fugitive dust from grading and excavation of disturbed areas and exhaust combustion products from diesel- and gasoline-fueled construction equipment and vehicles. The effects from stationary sources during operations would be associated with diesel combustion in the backup diesel generator. The results of the air-dispersion modeling are described in Chapter C.1, Air Quality, of the SA/DEIS, and Section 5.2, Air Quality, of the AFC (SES 2008). This section summarizes the results of the modeling and focuses on evaluation of whether the alternatives contribute to violations of the state and federal AAQS.

### **4.2.2 Direct and Indirect Impacts**

The results of the air-dispersion modeling indicate that the Proposed Action would have short-term construction and operation impacts on air quality. The Proposed Action and the alternatives are not anticipated to result in any long-term direct or indirect impacts on air quality. The results of the air-dispersion modeling are presented for the Proposed Action and compared with each subsequent alternative to identify the magnitude of impacts from each.

### 4.2.2.1 Alternative 1: Proposed Action

#### Project Construction

Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structure, substation, transmission line, bridge, roads, and water/polymeric sealant trucks used to control construction dust emissions. Fuel combustion emissions would result from on-road construction vehicle exhaust, including pickup trucks and diesel trucks used to transport workers and materials around the construction site, and from commuter vehicle exhaust. Fugitive dust would also result from site grading/excavation activities, installation of new transmission lines, onsite water distribution lines, and construction of SunCatcher foundations, power plant facilities, roads, and substation, and vehicle travel on paved/unpaved roads. Project construction emissions calculations are based on 7 construction days per week, a 12-hour workday from 7 a.m. to 7 p.m., and 26 construction days per month.

As reflected in the construction modeling results presented in Table 4-6, construction of the Proposed Action would contribute minimally to the overall predicted concentrations of criteria pollutants. According to Table 4-6, total concentrations for PM<sub>10</sub> would exceed the most stringent AAQS. Total concentrations for NO<sub>2</sub>, PM<sub>2.5</sub>, CO, and SO<sub>2</sub> would be below the most stringent AAQS. Predicted emissions from construction of the Proposed Action would be below NAAQS thresholds; thus, no future Federal Conformity analysis or determination would be required.

PM<sub>10</sub> concentrations above the California (and occasionally the federal) 24-hour standard have been recorded on multiple occasions at the nearest monitoring stations during recent years (see Chapter C.1 of the SA/DEIS). Because of the undeveloped land within this area, these conditions are attributed to high wind episodes, agricultural burning or tilling activities or other soil disturbances. The primary source of PM<sub>10</sub> emissions from construction of the Proposed Action would be fugitive dust from grading and earth moving (MDAQMD 2010). As indicated in Table 4-6, construction of the Proposed Action would contribute minimally to background concentrations of PM<sub>10</sub>.

**Table 4-6 Maximum Construction Impacts, Calico Solar Project**

Pollutants	Average Period	Construction Impacts (µg/m <sup>3</sup> )	Background (µg/m <sup>3</sup> )	Total Impact (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )	Standard (µg/m <sup>3</sup> )
NO <sub>2</sub>	1 hour	68.1	154.4	222.5	Not applicable	339
NO <sub>2</sub>	Annual	3.9	41.8	45.7	100	57
PM <sub>10</sub>	24 hours	26.5	80	106.5	150	50
PM <sub>10</sub>	Annual	3.2	29.8	33.0	Not applicable	20

Pollutants	Average Period	Construction Impacts ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total Impact ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Standard ( $\mu\text{g}/\text{m}^3$ )
PM <sub>2.5</sub>	24 hours	4.1	28	32.1	35	Not applicable
PM <sub>2.5</sub>	Annual	0.6	10.3	10.9	15	12
CO	1 hour	61	4,025	4,086	40,000	23,000
CO	8 hour	32	1,367	1,399	10,000	10,000
SO <sub>2</sub>	1 hour	0.07	47.2	47.3	Not applicable	665
SO <sub>2</sub>	3 hour	0.05	42.4	42.5	1300	Not applicable
SO <sub>2</sub>	24 hours	0.02	13.1	13.1	365	105
SO <sub>2</sub>	Annual	0.004	2.7	2.7	80	Not applicable

Table Source: SES 2009, Table 5.2-20 Revised.

Table Key:  $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; CO = carbon monoxide; NAAQS = National Ambient Air Quality Standards; NO<sub>2</sub> = nitrogen dioxide; PM<sub>10</sub> = inhalable particulate matter; PM<sub>2.5</sub> = fine particulate matter; SO<sub>2</sub> = sulfur dioxide.

## Project Operation

For the Proposed Action, sources of emissions during facility operation would include an above ground gasoline dispensing tank, emergency generator, and vehicles. Emissions from the above ground tank and emergency generator would be minimal and far below thresholds for emission offsets (MDAQMD 2010). Vehicular traffic on unpaved roads for maintenance activities would generate fugitive dust and combustion emissions.

The estimated emissions used in the AERMOD air-dispersion model for operation of the Proposed Action are based on the assumption of weekly testing of the emergency generator engine, the only stationary source of air pollutants for the operational Calico Solar Project facility. The maximum predicted operational effects of the Proposed Action are presented in Table 4-7. Supporting calculations can be found in Chapter C.1, Air Quality, of the SA/DEIS and Section 5.2, Air Quality, and Appendix V, Air Quality Data, of the AFC.

Table 4-7 shows that the modeled effects due to the emissions from operation of the Proposed Action, in combination with conservative background concentrations, would contribute minimally to the overall predicted concentrations of criteria pollutants. Total concentrations for PM<sub>10</sub> would exceed the most stringent AAQS. Total concentrations for NO<sub>2</sub>, PM<sub>2.5</sub>, CO, and SO<sub>2</sub> would be below the most stringent AAQS. Predicted emissions from operation of the Proposed Action development would be below NAAQS thresholds; thus, no future Federal Conformity analysis or determination would be required.

**Table 4-7 Operation Emission Impacts, Calico Solar Project**

Pollutants	Average Period	Operation Impacts ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total Impact ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	CAAQS ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	1 hour	47.8	154.4	202.2	Not applicable	339
NO <sub>2</sub>	Annual	0.3	41.8	42.1	100	57
PM <sub>10</sub>	24 hours	2.8	80	82.8	150	50
PM <sub>10</sub>	Annual	0.6	29.8	30.4	Not applicable	20
PM <sub>2.5</sub>	24 hours	0.4	28	28.4	35	Not applicable
PM <sub>2.5</sub>	Annual	0.1	10.3	10.4	15	12
CO	1 hour	166	4,025	4,191	40,000	23,000
CO	8 hours	72	1,367	1,439	10,000	10,000
SO <sub>2</sub>	1 hour	0.62	47.2	47.8	Not applicable	665
SO <sub>2</sub>	3 hours	0.22	42.4	42.6	1300	Not applicable
SO <sub>2</sub>	24 hours	0.07	13.1	13.2	365	105
SO <sub>2</sub>	Annual	0.001	2.7	2.7	80	Not applicable

Table Source: SES 2009, Table 5.2-20 Revised.

Table Key: NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards;  $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; NO<sub>2</sub> = nitrogen dioxide; PM<sub>10</sub> = inhalable particulate matter; PM<sub>2.5</sub> = fine particulate matter; CO = carbon monoxide; SO<sub>2</sub> = sulfur dioxide.

## CDCA Plan Amendment

The Proposed Action is consistent with the CDCA Plan air quality guidelines.

### 4.2.2.2 Alternative 1a: Agency Preferred Alternative

The maximum construction emissions for the Agency Preferred Alternative would be similar to the Proposed Action. The construction vehicular emissions would be the same, but PM<sub>10</sub> emissions would likely be lower because there would be approximately 100 fewer miles of SunCatcher maintenance roads. Similar to the Proposed Action, the Agency Preferred Alternative is expected to minimally contribute to violations of the most stringent PM<sub>10</sub> standards during construction and operation.

## CDCA Plan Amendment

The Agency Preferred Alternative is consistent with the CDCA Plan air quality guidelines.

### **4.2.2.3 Alternative 2: Reduced Acreage Alternative**

The maximum construction emissions for the Reduced Acreage Alternative would be similar to those identified under the Proposed Action. However, the construction period would be reduced to approximately 23 months rather than 52 months for the Proposed Action. Because there would be 300 fewer miles of SunCatcher maintenance roads under the Reduced Acreage Alternative there would be fewer fugitive dust emissions during operation. Similar to the Proposed Action, the Reduced Acreage Alternative is expected to minimally contribute to violations of the most stringent PM<sub>10</sub> standards during construction and operation.

#### **CDCA Plan Amendment**

The Reduced Acreage Alternative is consistent with the CDCA Plan air quality guidelines.

### **4.2.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The maximum construction emissions for the Avoidance of Donated and Acquired Lands Alternative would be similar to those estimated for the Proposed Action. Operations emissions would be less than the Proposed Action due to the smaller footprint (7,050 acres) and less area of disturbance. Although emissions are predicted to be less than the Proposed Action, background concentrations for PM<sub>10</sub> contribute to violations of the most stringent AAQS. Similar to the Proposed Action, the Avoidance of Donated and Acquired Lands Alternative is expected to minimally contribute to violations of the most stringent PM<sub>10</sub> standards during construction and operation.

#### **CDCA Plan Amendment**

The Avoidance of Donated and Acquired Lands Alternative is consistent with the CDCA Plan air quality guidelines.

### **4.2.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality (43 USC 1781 [b]) in conformance with applicable statutes, regulations, policy and land use plan.

Construction and operation air quality impacts of the Proposed Action would not occur. Background concentrations for PM<sub>10</sub> are still anticipated to contribute to violations of the most stringent AAQS. 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.

If the proposed project is not approved, renewable projects would likely be developed on other sites in San Bernardino County, the Mojave Desert, or in adjacent states. For example, there are several pending solar and wind projects in the Newberry Springs/Ludlow Area that would be located within a few miles of the Calico Solar Project site, and there are dozens of other wind and solar projects that have applications pending with BLM in the California Desert District.

#### **4.2.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the CDCA Plan would be amended so that the site could be developed with the solar technology of the proposed project, or another type of solar technology. Therefore, emissions would result from the construction and operation of any solar technology and would likely be similar to the emissions from the proposed project. Different solar technologies require different amounts of construction and operations maintenance. Similar to the Proposed Action, this No Project/No Action Alternative could result in minimal contributions to violations of the most stringent PM<sub>10</sub> AAQS during construction and operation of the alternative solar technology.

#### **CDCA Plan Amendment**

Alternative 5 is consistent with the CDCA Plan air quality guidelines.

#### **4.2.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

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, air quality is not expected to change noticeably from existing conditions under this LUP amendment alternative.

In the absence of this project, however, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations. Background concentrations for PM<sub>10</sub> are still anticipated to contribute to violations of

the most stringent AAQS. Background concentrations are not anticipated to contribute to violations of the most stringent AAQS for any criteria pollutants.

### **CDCA Plan Amendment**

Alternative 6 is consistent with the CDCA Plan air quality guidelines.

#### **4.2.2.8 Environmentally Preferred Alternative**

The BLM has determined that the Environmentally Preferred Alternative would be the same as the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

### **4.2.3 Cumulative Impacts**

#### **4.2.3.1 Alternative 1: Proposed Action**

The MDAQMD and San Bernardino County Land Use Service Department confirmed that there are no projects within a 6-mile radius from the 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 6-mile radius of the proposed project site.

Several pending solar and wind projects are located within the Newberry Springs/Ludlow Area within a few miles of the Calico Solar project site and others are located in the California Desert District. This potential for substantial additional development within the air basin and corresponding increase in air basin emissions would result in cumulative short-term construction and operation impacts on air quality.

#### **4.2.3.2 Alternative 1a: Agency Preferred Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action.

#### **4.2.3.3 Alternative 2: Reduced Acreage Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action

#### **4.2.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action

#### **4.2.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

There would be no cumulative impacts associated with the No Action Alternative.

#### **4.2.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site**

Cumulative impacts would be similar to those identified under the Proposed Action if another solar energy project is developed on the project site.

#### **4.2.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit other Solar Energy Projects on the Project Site**

There would be no cumulative impacts associated with this LUP amendment alternative.

#### **4.2.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.2.4 Mitigation, Project Design Features, BMPs, and Other Measures**

The following mitigation measures are proposed to control exhaust emissions from the diesel heavy equipment used during construction of the proposed Calico Solar Project:

- Require the contractor to shut down equipment when idling for more than minimum periods.

- Conduct regular maintenance to prevent equipment engine emission increases due to inefficient fuel combustion.
- Use low-sulfur and low-aromatic fuel meeting state and federal standards for motor vehicle diesel fuel.
- Use low-emitting gas and diesel engines meeting state and federal emissions standards (Tiers I, II, and III) for construction equipment, including but not limited to catalytic converter systems and particulate filter systems.
- 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 for dust control.
- All unpaved construction roads and unpaved operational site roads, as they are being constructed, shall be stabilized with a nontoxic soil stabilizer or soil weighting agent.
- All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading; and after active construction activities shall be stabilized with a nontoxic soil stabilizer or soil weighting agent. The frequency of watering can be reduced or eliminated during periods of precipitation.
- 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.

Mitigation measures for operation of the Proposed Action include the use of best available control technology to minimize emissions from the proposed emergency diesel generator. Specifics on the best available control technology are outlined in the POD. Mitigation measures listed under construction are proposed for use of diesel fueled vehicles during operation and maintenance of the facility.

When developing the ROD for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional COCs from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## 4.3 Biological Resources

This section provides an analysis of potential effects to biological resources from the construction, operation, and eventual decommissioning of the proposed Calico Solar Project. It was developed from Section C.2 Biological Resources of the SA/DEIS. Specific resources addressed in this section include vegetation, wildlife, and special-status species, as well as potential impacts on these resources from the introduction or spread of invasive, nonnative, and noxious weeds.

### 4.3.1 Methodology

Potential impacts on biological resources were evaluated by determining the sensitivity or rarity of each resource that would be adversely affected by the action and no action alternatives. Factors considered in determining whether an alternative would have an effect on biological resources include the extent or degree to which its implementation would do any of the following:

- Result in the “take” of a threatened or endangered species, or adversely affect critical habitat that has been designated or proposed under the ESA
- Reduce the population of a special status species, as designated by federal and state agencies, or a species with regional and local significance by reducing numbers, altering behavior, reproduction, or survival, or by destroying or disturbing habitat
- Introduce or increase the prevalence of invasive or predatory species
- Cause long-term loss of or impact to a substantial portion of a plant community or species’ habitat.
- Interfere substantially 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.

### 4.3.2 Direct and Indirect Impacts

The anticipated and potential direct and indirect impacts on vegetation, wildlife, and special-status species are described for each project alternative in the following sections. The full text of the mitigation measures that are summarized in each of these sections can be found in Section 4.3.4, Mitigation, Project Design Features, BMPs, and Other Measures.

### 4.3.2.1 Alternative 1: Proposed Action

#### Impacts on Vegetation

The vegetation present on the project site currently supports a diversity of wildlife that is highly adapted to the environmental conditions in the Mojave Desert. The Applicant mapped the vegetation on the project site and identified approximately 7,889 acres of Mojave creosote bush scrub (92 acres of this is previously disturbed) and 242 acres of desert saltbush scrub within the proposed project footprint. In addition, approximately 68 acres of unvegetated habitat consisting of sparsely-vegetated rock outcrops and 31 acres of developed areas were mapped on the project site (Table 4-8).

**Table 4-8 Summary of Impacts on Vegetation**

Vegetation Type	Acres of Loss [Table Note 1]
Mojave creosote bush scrub (including 3.3 acres of microphyll woodland)	7,797
Disturbed Mojave creosote bush scrub	92
Desert saltbush scrub	242
Unvegetated habitat (rock outcrop)	68
Developed lands	31

*Table Note 1:* Rounded to the nearest acre.

Construction of the Calico Solar Project would result in the loss of approximately 8,230 acres of native vegetation from the construction of access roads, SunCatcher footings, stormwater and electrical transmission facilities, and various on-site buildings. Other construction-related impacts would include soil compaction; loss of the native seed bank through removal of topsoil during grading; loss of biotic soil crusts and desert pavement that control erosion; increased levels of dust, which inhibits photosynthesis by plants; disruption of the existing sediment transport system across the site; and the introduction or spread of invasive or noxious weed species. These impacts would result in reduced habitat quality for plants on the project site, and could potentially result in erosion, increased dust, or weed invasion that could impact vegetation in adjacent areas.

While the entire project site would not be cleared of vegetation during its initial development, ongoing operations would likely result in long-term direct adverse impacts on the remaining vegetation from maintenance activities such as mowing, mirror washing, and weed management activities during the operation of the facility. For example, regular mowing would likely result in a conversion from creosote bush scrub to more herbaceous vegetation, and would alter the suitability of the site for all but the most disturbance-tolerant species. Site

reclamation activities following the decommissioning of the proposed solar field would restore existing conditions for some plant species, but the alteration of existing habitat conditions (e.g., soil chemistry) would likely preclude the full restoration of the site to pre-project vegetation conditions.

It is BLM policy to salvage yucca and cacti (excluding cholla [*Cylindropuntia* spp.]) and transplant them to undisturbed sites within project rights-of-way or to provide for the off-site salvage of the plants. The San Bernardino County Plant Ordinance regulates the following plant species with stems 2 inches or greater in diameter or 6 feet or greater in height where they occur on private and county-owned lands: *Psoralea* [*Dalea*] *spinosa* (smoke tree), *Prosopis* spp. (mesquites), all species of the family *Agavaceae* (century plants, nolin, yuccas), creosote rings 10 feet or greater in diameter, all Joshua trees; and any part of any of the following species, whether living or dead: *Olneya tesota* (desert ironwood), all species of the genus *Prosopis* (mesquites), and all species of the genus *Cercidium* (palo verdes). These species would be salvaged and transplanted on the project site.

Impacts on vegetation communities would be minimized through the implementation of mitigation measures that would include avoiding special-status plants in specially-designated Environmentally Sensitive Areas, limiting disturbance, implementing erosion and dust control measures, conducting habitat restoration in disturbed areas, and managing noxious and invasive weeds. Compensatory mitigation would also serve to offset project impacts on vegetation through the enhancement and long-term preservation of native plant communities within the Mojave Desert. The full text of these mitigation measures can be found in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures.

Adverse impacts on vegetation and plant communities would be localized, occurring on the project site and extending a short distance from the project boundary. These impacts would include both adverse short-term impacts during construction and adverse long-term impacts due to the removal of existing native vegetation and a persisting change in the composition of the plant communities on the project site. Avoidance and mitigation measures would minimize these impacts on the extent possible; however, there would be unavoidable short- and long-term impacts on vegetation.

### **Impacts from Invasive, Nonnative, and Noxious Weeds**

Undisturbed desert habitats are less vulnerable to invasion by weed species and only a limited suite of invasive nonnative plant species are capable of invading natural desert areas. The hot and arid environment, undependable timing and amount of annual precipitation, and often saline or alkaline soils limit the range of invasive species capable of naturalization in desert areas (Mack 2002). However, construction and operation of the Calico Solar facility would alter those conditions, creating an environment that is more suitable to a wider variety of invasive plants

and likely to result in a greater abundance of the invasive species already present in the area. If uncontrolled, the spread of invasive, nonnative, and/or noxious weeds would result in direct long-term adverse impacts on vegetation and wildlife on the project site and indirect impacts in areas extending away from the project boundary. Even with the implementation of project-specific BMPs and control measures to minimize the spread of weeds, there could still be localized, direct and indirect adverse long-term impacts in these areas.

Construction activities and soil disturbance tend to introduce nonnative, invasive plant species into new areas and to facilitate their proliferation and spread; many invasive nonnative species are adapted to and promoted by soil disturbance (Lathrop & Archibald 1980). New introductions occur when weed seeds are inadvertently introduced to a site, most often with mulch, hay bales, or wattles used for erosion control, or when they are transported on construction equipment or their tires from off-site areas. Once introduced, they can out-compete native species because of minimal water requirements, high germination potential and high seed production (Beatley 1966); can outcompete native annuals where nitrogen deposition and precipitation rates are higher than normal, leading to higher risk of wildfire (Allen et al. 2010); and can become locally dominant and threaten native desert ecosystems (Abella et al. 2008). Without the use of construction BMPs and control measures, weeds that are already present in the area would increase their abundance in soils disturbed by project construction, and construction equipment or materials such as sediment wattles could accidentally import new invasive species from off-site.

Initial construction disturbance, the use of water for dust control during construction, and activities such as mowing would result in soil conditions that are favorable for colonization by weed species. Studies conducted in the Sonoran and Mojave Deserts have demonstrated that shading resulted in a cooler, moister microhabitat below and near structures (Smith 1984; Smith et al. 1987). Shading and wind deflection caused by the presence of the SunCatchers would decrease soil temperature extremes and decrease evaporation from soil surfaces underneath them. The addition of water from regular mirror washing would also increase the humidity of the microhabitat around the SunCatchers. This change from the existing arid desert environment would not favor the native arid-adapted species and would support colonization by nonnative, invasive species (Smith 1984).

Noxious weeds and other invasive plants species on BLM lands would be prevented, controlled, and treated through an Integrated Pest Management approach per the *Vegetation Treatment Using Herbicides on Bureau of Land Management Lands in 17 Western States EIS* and the National Invasive Species Management Plan (National Invasive Species Council 2008). The implementation of mitigation measures would result in the avoidance or minimization of potential impacts from the introduction and spread of invasive, nonnative, and noxious weeds on the project site. The full text of these mitigation measures can be found in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures.

The Applicant has drafted a Weed Management Plan (as part of the POD) that includes a discussion of weeds targeted for eradication or control and identifies a variety of BMPs to be implemented during construction and operation of the facility, such as limiting ground disturbance on the project site, establishing weed wash stations for construction vehicles, using weed-free materials during construction, conducting weed monitoring and reporting the results to the BLM, rapidly implementing weed control measures when necessary, and re-vegetating disturbed areas using a native seed mix (SES 2009).

Even with the implementation of a weed management plan and its associated BMPs and control measures, there would likely be adverse short- and long-term impacts from invasive, nonnative, and noxious weeds. Most of the direct impacts would occur on disturbed areas and would be restricted to the project site; however, weeds that become established on the project site would provide a seed source for off-site weed invasion would create indirect impacts. There could be unavoidable short-term and long-term impacts from invasive, nonnative, and noxious weeds because some species become so pervasive on the landscape that they are unable to be controlled or eradicated once they are introduced. Enforceable measures would be in place to address potential impacts, and it is anticipated that these measures would be effective in controlling the introduction or spread of invasive, nonnative, and noxious weeds.

## **Impacts on Wildlife**

Construction of the Proposed Action would result in direct and indirect impacts on wildlife occurring on the project site and in the immediate project vicinity. These impacts would include mortality from trampling or crushing; increased predation when wildlife is flushed from cover; increased numbers of predators and levels of predation resulting from the increased availability of perches, food, or water; disturbance from increased noise levels associated with construction, operation, and maintenance of the facility; light impacts from construction and maintenance activities that are conducted during low-light periods and at night; disturbance from increased vehicular and human presence on the project site; habitat loss; habitat degradation; habitat fragmentation (which is further discussed in the Impacts on Wildlife Movement Corridors section below); and displacement due to habitat modifications which would include vegetation removal, alterations of existing soil conditions, and a modified hydrologic and sediment transport regime resulting from the construction of the onsite storm water management system. Most of these impacts would be localized and would be restricted to the project site; however, some of the indirect impacts such as noise and visual disturbance from the construction and operation of the facility would extend away from the project boundary.

Direct impacts on small mammals; reptiles; eggs and nestlings of bird species with small, well-hidden nests; and other less mobile or burrowing species could occur as a result of construction and maintenance activities. Activities that are likely to result in direct impacts include vegetation clearing and mowing, road construction, earth removal, grading, excavation of the retention

basins and storm water management systems, facility construction and maintenance activities, vehicle use on the site and vehicle travel to and from the project site, and off-road movement of heavy equipment. Some species may take shelter under parked vehicles or equipment and could be killed, injured, or harassed when the vehicle or piece of equipment is moved. Potential impacts on nesting birds and mitigation measures to specifically address those impacts are discussed below in the Impacts on Migratory Birds and Impacts on Special-Status Birds sections. More mobile species like birds and larger mammals are expected to flee the project site and disperse into nearby habitats during construction; however, the dispersal of terrestrial wildlife from active construction zones would be hindered by the perimeter fencing that would enclose the project site (i.e., a chain link fence and a tortoise exclusion fence). Wildlife that would be displaced from the project site may be able to establish territories off-site, although some individuals would be expected to succumb to predation or to the lack of food or shelter during this period.

Noise disturbance is an important factor related to the project's impacts on wildlife. High noise levels can cause behavioral and physiological reactions in wildlife that vary by the species and individual. Noise disturbance resulting from construction and operation of the facility could disrupt the foraging, breeding, and sheltering activities of wildlife on the project site. For example, each of the SunCatcher units generates noise during their operation; noise levels from each unit (in dBA) would be approximately 84 dBA at a distance of 50 feet, which is equivalent to the sound of heavy equipment such as a back hoe or excavator. Construction-related and ongoing noise disturbance from operation of the SunCatchers could also impact wildlife in adjacent habitats by interfering with foraging, breeding, and wildlife movement, and could cause animals to avoid using suitable habitats in the immediate project vicinity. Individuals that choose to remain in marginal habitats on the project site or in the immediate project vicinity could suffer from reduced productivity and survivorship as a result of construction-related and ongoing noise disturbance. Noise contours that illustrate the expected noise levels in the project vicinity are shown on Figure A-10. Noise levels of 60 dBA or more are generally identified as being associated with adverse impacts on wildlife (bird species in particular); approximately 4,572 acres occur within the 60 dBA noise contour surrounding the project site where noise levels would be at 60 dBA or greater.

Birds are especially vulnerable to disturbance during nesting. Depending on the level of disturbance, birds may temporarily flush from or permanently abandon a nest due to disturbance. Even temporary absence from a nest can result in higher-than-average rates of nestling mortality. Noise disturbance can also cause birds to abandon nests that are otherwise suitable; raise the level of stress hormones, interfering with sleep and other activities; cause permanent injury to the auditory system; and interfere with acoustic communication by masking important sounds or sound components (Dooling 2006). Many bird species rely on vocalizations during the breeding season to attract a mate within their territory, and noise from construction could disturb nesting birds and other wildlife and adversely affect nesting and other activities. As

previously mentioned, potential impacts on nesting birds and mitigation measures to specifically address those impacts are discussed below in Impacts on Migratory Birds and Impacts on Special-Status Birds.

As previously mentioned, the Calico Solar facility would be surrounded by perimeter fencing to prevent desert tortoise, bighorn sheep, and other wildlife from entering the project site. Prior to construction, clearance surveys would be conducted and tortoises that are located within the fenced project site would be captured and relocated outside of the perimeter fencing or translocated to suitable receptor sites that are located further away (see the discussion of impacts on desert tortoise below for a detailed discussion of desert tortoise translocation activities). The barriers created by temporary tortoise exclusion fencing and the perimeter fencing that would enclose the project site (i.e., a chain link fence and a tortoise exclusion fence) would serve to exclude some species from entering the project site, but would also result in entrapment of wildlife that is unable to negotiate (i.e., fly over, jump over, pass through, or dig under) the fence. While many species of wildlife can tolerate or become habituated to some degree human disturbance, implementation of the proposed project would result in ongoing impacts on wildlife that remains on the project site. Any individuals that are trapped on the project site by the perimeter fence would be subjected to repeated disturbance from construction and maintenance activities, and could be injured or killed by construction equipment, maintenance activities such as mowing, or vehicles traveling on roadways. As construction progresses across the project site, the loss of food resources or shelter sites could also result in adverse impacts on wildlife that remains on the project site.

A combination of access roads, arterial roads, and perimeter roads would be constructed to allow for the construction and operation of the facility, and the ecological effects of roads have been widely studied (Hoff and Marlow 2002; Trombulak and Frissell 2000; Findlay and Bourdages 2000; Jones et al. 2000; Parendes and Jones 2000; Haskell 2000; and Vistnes and Nellemann 2001). These studies have identified some general effects from roads that include: mortality from road construction and vehicle collisions; modification of animal behavior; changes to the physical and chemical environment; the spread of invasive species, and increased human access and use (Trombulak and Frissell 2000). For example, data indicate that desert tortoise numbers decline as vehicle use increases (Bury et al. 1977) and that tortoise sign increases with increased distance from roads (Nicholson 1978; Karl 1989; von Seckendorf and Marlow 1997, 2002). Vehicle travel associated with activities that are required to support the operation of the facility (e.g., mowing and routine SunCatcher maintenance) would be a source of ongoing disturbance and mortality to wildlife that remains on the project site.

The facility would be constructed with two 2,000,000-gallon evaporation ponds that would collect wastewater from an on-site reverse osmosis water treatment system (SES 2008). These evaporation ponds could provide a source of surface water in an otherwise arid region and potentially expose wildlife to lethal doses of hyper-saline water, but the ponds would be fenced

and covered to prevent access to the water by wildlife. Even with fencing and netting or some other covering, the evaporation ponds may still attract predators and other species, including waterfowl. Increased numbers of predators would increase the potential for indirect adverse effects to wildlife and to special-status species on the project site (e.g., desert tortoise, Mojave fringe-toed lizard).

The decommissioning of the solar field would include the removal of existing structures, restoration of the site's topography and hydrology to a relatively natural condition, and revegetation of disturbed areas. Many wildlife species would be able to return to their pre-project use of the project site following its decommissioning; however, persistent impacts such as changes in soil conditions or vegetation composition could preclude the return of some wildlife species.

The BLM would require the implementation of project mitigation measures by the Applicant to address potential impacts on wildlife occurring on the project site and in adjacent habitats. The full text of these mitigation measures can be found in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures.

Even with the implementation of these avoidance and mitigation measures, the project would have direct adverse short-term and long-term impacts on individuals that currently use the project site for foraging, breeding, and/or sheltering. Most of these impacts would be direct and short-term and would cease following construction of the project site; however, there would be indirect impacts on animals that would not be able to escape from the fenced project site or that would continue to use the project site after it is developed. While most of these indirect impacts would cease following the decommissioning of the solar field, the effects of habitat alteration would persist until there is substantial regrowth of native vegetation on the project site. These indirect impacts are not considered to be notable because the affected area comprises a very small percentage of the available habitat in the region.

### ***Impacts on Birds***

There is foraging, cover, and/or breeding habitat for a variety of resident and migratory birds on the project site and in adjacent habitats, including the Cady Mountains to the north of the site. The Applicant documented 36 avian species during pre-construction surveys on the project site (SES 2009; SES 2010c; SES 2010d).

Most bird species in the United States, with the exception of a few nonnative species such as the European starling (*Sturnus vulgaris*), are protected under the federal MBTA, which prevents the take of individual birds, young, eggs, or nests. Take is defined in the MBTA as "by any means or any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof." California Fish and Game Code Section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any

bird, and Section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird.

Construction of the access and arterial roadways, storm water management system, solar field, and various on-site facilities would result in the loss of potential foraging and nesting habitat for birds. Development of the Proposed Action would require ground-disturbance and vegetation clearing across most of the 8,230-acre project site. There would be 75-foot-wide swaths of native vegetation remaining between the rows of SunCatchers following construction; an adjacent 75-foot-wide swath of native vegetation would require regular mowing to a height of 3 inches, which would make it unsuitable for nesting by most species.

Direct and indirect impacts on birds would include mortality from collision with aboveground structures or vehicles on the project site; mortality from electrocution on power lines or power line transmission structures; the loss or alteration of vegetation that currently supports nesting, foraging, and cover habitats; adverse impacts from increased noise and visual disturbance during the construction and operation of the facility; and displacement due to habitat alteration or project-related disturbance. Impacts on birds would be similar to those described for other wildlife; more information regarding these potential direct and indirect impacts is provided in the section, above.

Noise, lighting, and glare resulting from construction and operation of the facility are important factors that could disrupt the foraging, breeding, and sheltering activities of birds on the project site and in the immediate project vicinity. Additional information regarding potential impacts from noise, lighting, and glare is provided under those subheadings below, along with a discussion of potential impacts from bird collisions and electrocution.

The BLM would require the implementation of project mitigation measures by the Applicant to address potential impacts on birds occurring on the project site and in the immediate project vicinity. In addition to the general minimization and avoidance measures, the BLM would require specific mitigation actions that would address impacts on birds. The BLM considers it highly unlikely that nesting birds could be completely avoided since construction and maintenance activities would occur during the breeding season for many bird species. The construction and maintenance activities associated with the project are expected to exclude some species of birds that are less tolerant of human disturbance. However, some species would still nest in the project area during both construction and operation of the facility.

Depending on the species, birds may actively nest on the ground, within the open metal framework of the SunCatchers, on other aboveground structures on the project site, or on idle construction equipment. For example, nesting activity has been recently observed at several large electrical transmission line projects currently under way in the western Mojave Desert. In these locations, birds nested on vehicles, foundations, construction trailers, and other

equipment left overnight or during a long weekend. In areas where construction was phased (e.g., footings, tower structures), birds quickly utilized these features as nest sites. While many of the birds consisted of common ravens, house finches, and doves, these species are protected by the MBTA and relevant sections of the California Fish and Game Code, and removal of these species' active nests would require permits from the USFWS and CDFG.

While the implementation of mitigation measure would avoid direct impacts on bird nests, eggs, and young, and would reduce the impacts of construction disturbance to nesting birds, the scale of the project and the known nesting behaviors of some native species would increase the likelihood that the removal or relocation of active nests would be required in order to proceed with construction and during the operation of the facility. To comply with the legal requirements under the MBTA and Section 3503 of the California Fish and Game Code, the Applicant would be required to coordinate with the BLM, CEC, CDFG, and USFWS to be certain that this work would be conducted properly. Certain construction activities (determined at the discretion of the BLM, CEC, CDFG, and USFWS) may be permitted to occur closer than 500 feet from an active nest; this would be handled on a case-by-case basis and would depend on the species, stage of development of chicks within the nest, proposed construction activity, and biological response of the animal.

Resident and wintering raptors that use the project site for foraging but not nesting would not be directly affected, except by the loss of foraging habitat on the project site. Burrowing owls and other species that nest on the site would be directly affected. Additional mitigation measures have been developed to address potential impacts on special-status bird species such as the golden eagle and burrowing owl; the full text of these mitigation measures can be found in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures.

### Noise

Noise disturbance resulting from construction and operation of the facility could disrupt the foraging, breeding, and sheltering activities of wildlife on the project site, including birds. Noise disturbance can cause birds to abandon nests that are otherwise suitable; raise the level of stress hormones, interfering with sleep and other activities; cause permanent injury to the auditory system; and interfere with acoustic communication by masking important sounds or sound components (Dooling 2006). In general, 60 dBA is considered the threshold for disturbance for bird species, although some species are less sensitive to this type of disturbance. Current ambient noise levels near the project site vary from the mid 40s to nearly 80 dBA (SES 2008).

Construction activities could affect birds on the project site and in adjacent habitats as well by interfering with breeding or foraging activities and movement patterns, causing birds to temporarily avoid areas in proximity to the construction zone. Depending on the type of

equipment used, the noise produced during construction can vary from 77 dBA to 90 dBA at a distance of 50 feet.

Operational noise is expected to be an ongoing source of disturbance to birds occurring on the project site and would likely preclude the use of adjacent habitats by some species. Each of the SunCatcher units generates noise during their operation and noise levels from each unit would be approximately 84 dBA at a distance of 50 feet. Daily operation of the SunCatchers would result in noise levels that are generally considered to exceed the levels acceptable to most bird species, although noise levels would attenuate to 60 dBA at a distance of 850 feet.

Mitigation measures would address potential noise impacts on nesting birds by requiring the Applicant to conduct pre-construction nest surveys for activities conducted during the breeding season (from February 1 through August 15) and to establish 500 foot no-activity buffers around any active nests until nestlings have fledged and dispersed.

### Lighting

Lighting may affect essential behavioral activities, physiology, population ecology, and ecosystems of diurnal, crepuscular, and nocturnal wildlife, and light pollution may affect competition and predation for some species (Longcore and Rich 2004). Lighting can aid predators and increase the risk of predation for some prey species because they may be more detectable to nocturnal predators in artificially-lighted areas (USACE and CDFG 2009). Studies have indicated that many small species, such as rodents, rabbits, snakes, and bats, actually forage at lower rates at high illumination levels (Longcore and Rich 2004), which may be a biological adaptation to avoid predation during high levels of ambient moonlight. Overall, chronic light pollution may favor light-tolerant species over those that are dark-adapted (Longcore and Rich 2004).

For avian species, lighting is a major factor in collision risk with tall towers because lights can attract nocturnal migrant songbirds, and major bird kill events have been reported at lighted communications towers (Manville 2001), with most kills from towers higher than 300 to 500 feet (Kerlinger 2004). Increased lighting during low-light periods can disrupt foraging, breeding, and other activities, and can cause some species to avoid the use of nearby suitable habitats. Lighting may disturb the nighttime rest and sleep periods of diurnal species, including most passerine birds; in this sense, lighting can have the same effects as noise, including disturbing individuals and causing them to abandon nests in otherwise suitable locations (USACE and CDFG 2009). Nest site selection by some birds may also be affected by light, with nests being established farther from light sources (Longcore and Rich 2004).

The operation of the Calico Solar facility would require nighttime lighting for safety and security. Exterior lights would be hooded, and lights would be directed on site so that light pollution or glare would be minimized. To reduce off-site lighting impacts, exterior lighting would be

restricted to areas required for safety, security, and operation. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time. Maintenance activities would also require vehicle and equipment lighting in order to safely clean and service the SunCatchers at night.

Permanent exterior lighting and lighting used to facilitate nighttime construction and maintenance activities could disrupt the activities and behavior of wildlife on the project site and in the immediate project vicinity. As discussed in Section 4.16 Visual Resources, construction lighting would be consistent with worker safety codes, directed toward the center of the construction site, shielded to prevent light from straying offsite, and task-specific. Mitigation measures would identify the temporary lighting measures during construction activities and identify guidelines for permanent exterior lighting.

### Glare

Glare from the reflection of sunlight off the SunCatcher units is another factor that may contribute to the risk of avian collision on the project site. Little is currently known regarding avian responses to glare from solar technology; however, it is likely that glare would affect birds on the project site or flying over the project site to some degree. In the same way that large mirrored buildings can be perceived by birds as open sky, the mirrors used on the SunCatchers would reflect light and take on the color of the image being reflected. This may result in birds confusing the SunCatchers as either open sky or water and could increase the risk of collision with these structures.

The proposed solar mirrors and heat collection elements would also be sources of bright light caused from the diffuse reflection of the sun, and exposure to high intensity light or glare can damage vision or impair foraging in some species. The AFC indicated that studies of military overflights did not detect substantial glare from existing solar facilities (SES 2008). The SunCatchers are designed so that reflected sunlight from the mirrors would be reflected directly at the receiver and not at surrounding viewers or overhead (SES 2008). However, glint and glare studies of solar trough technology found that pedestrians standing within 60 feet (20 meters) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see a light intensity equal to or greater than levels considered safe for the human retina (URS 2008). At this time, the BLM considers it appropriate to assume that any wildlife at a distance of 60 feet (20 meters) or closer could experience similar hazards from unsafe light intensities.

Bird response to glare from the proposed SunCatcher technology is not well understood. Because of the potential for project-related impacts, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed. An Avian Protection Plan would be developed by the Applicant that would include

adaptive management strategies such as the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with SunCatchers or other aboveground structures on the project site.

### Bird Collisions

Collision with communications towers, transmission lines, and other elevated utility structures is a known threat to avian species. Estimates of the number of bird fatalities specifically attributable to interactions with utility structures vary considerably. Nationwide, it is estimated that hundreds of thousands to as many as 175 million birds are lost annually to fatal collisions with electrical transmission and distribution lines (Erickson et al. 2001). In California, even general estimates are unavailable, although it is plausible that such collisions result in the deaths of hundreds of thousands of birds each year (Hunting 2002).

Solar facilities, including large scale complexes such as the proposed Calico Solar facility, present a new and relatively un-researched risk for bird collisions and other injuries to avian species. The primary threats to collision on the project site include the main SunCatcher assembly building (78 feet in height), main services complex (44 feet in height), SunCatcher units (40 feet in height), and required transmission line facilities (90 to 110 feet in height). Depending on the time of day, use of the site by various species, and presence of glare, there would be at least some threat of collision posed by these structures. Bird fatality studies conducted at the existing Solar One facility near Daggett, west of the Calico Solar project site, 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 (McCrary et al. 1986). While the proposed Calico Solar facility would not be located adjacent to agricultural fields the use of evaporation ponds and the reflection of the SunCatchers could attract various species of birds. The Calico Solar Project would also require the construction of approximately 12 to 15 new 220-kV transmission line structures which are approximately 90 to 110 feet tall (SES 2008).

Avian interactions with transmission lines and structures and the risks those interactions impose vary greatly by location within the proposed project. Bird collisions with power lines generally occur when a power line or other aerial structure intersects a daily flight path used by a concentration of birds, or when migrants are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collisions are more probable near wetlands, valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths. Passerines (e.g., songbirds) and waterfowl (e.g., ducks) are known to collide with wires (Avian Power Line Interaction Committee [APLIC] 2006), particularly during nocturnal migrations or poor weather conditions (Avery et al. 1978). The risk of such direct impacts on the project site would probably be low based on environmental conditions in the project vicinity

(e.g., the lack of nearby wetlands); however, very little research has been conducted on the risks of bird collisions at solar facilities.

The collision risk to resident or migratory birds at the project site with mirrors and other structures within the project disturbance area would not be considered likely. However, there is insufficient information available to conclude with certainty that the Calico Solar project would not be an ongoing source of mortality to birds for the life of the project. Because of the potential for project-related impacts, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they could be documented and addressed. Mitigation measures would also include adaptive management strategies such as the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with SunCatchers or other aboveground structures on the project site.

### Electrocution

Power line electrocutions result in the losses of tens to hundreds of thousands of birds annually in the U.S. (Erickson et al. 2001). Electrocution occurs when a bird simultaneously contacts two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower/pole with insufficient clearance between these elements. Electrocution can occur when horizontal separation is less than the wrist-to-wrist (flesh-to-flesh) distance of a bird's wingspan or where vertical separation is less than a bird's length from head-to-foot. Electrocution can also occur when birds perched side-by-side span the distance between these elements (APLIC 2006). In the project vicinity, golden eagles, red-tailed hawks, and other large raptors are susceptible to electrocution on power lines because of their large size and proclivity to perch on tall structures that offer views of potential prey.

The proposed transmission line from the on-site energy collection facilities to the Pisgah Substation would be energized at 220 kV, which poses a low risk for most avian electrocutions because of the conductor separation distance associated with this size of transmission line. The majority of raptor electrocutions are caused by lines that are energized at voltage levels between 1 kV and 69 kV (because of the conductor separation distance), and "the likelihood of electrocutions occurring at voltages greater than 69 kV is extremely low" (APLIC 2006). The Applicant would be required to design, install, and maintain transmission lines and all electrical components in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of bird electrocution on the project site.

Even with the implementation of the avoidance and mitigation measures described above, there would be impacts on birds as a result of the construction, operation, and decommissioning of the Proposed Action. Most of these impacts would be localized and would be restricted to the

project site; however, some impacts such as noise and visual disturbance from the construction and operation of the facility would extend beyond the project boundary. While most of these impacts would cease following the decommissioning of the solar field, the effects of habitat alteration would persist until there is substantial regrowth of native vegetation on the project site. The project would be considered to have direct and indirect adverse short- and long- term impacts on birds.

### ***Impacts on Wildlife Movement Corridors***

Wildlife movement corridors provide a variety of functions and can include habitat linkages between natural areas; greenbelts and refuge systems; and roadway underpasses and ramps that divert wildlife across permanent physical barriers to dispersal (Haas 2000, Simberloff et al. 1992). Generally, the accepted definition describes a wildlife corridor as a linear habitat, embedded in a dissimilar matrix that connects two or more larger blocks of habitat (Beier and Noss 1998). Noss (1987) suggests that there are several potential advantages to effective wildlife movement corridors including increased species richness and diversity; decreased probability of extinction; maintenance of genetic variation; a greater mix of habitat and successional stages; and alternative refugia from large disturbances. Conversely, habitat fragmentation and isolation of natural areas can ultimately result in the loss of native species within those communities (Soulé et al. 1988). Wildlife movement corridors provide critical connectivity, but do not provide live-in habitat for the species that use them. Habitat linkages on the other hand provide the same functions as movement corridors, except that they also provide live-in habitat for wildlife.

Some species require, and are often limited to, unique vegetation or terrain features for breeding, foraging, or sheltering. The size and distribution of suitable habitat blocks is an essential element to consider for the management of wildlife such as bighorn sheep, desert tortoises, and Mojave fringe-toed lizards. On BLM lands, the preservation of natural habitats occurs within ACECs, WAs, WSAs, and DWMAs; these conservation areas play an important regional role in maintaining large blocks of wildlands as diverse habitats for native plant, fish, and animal species and protecting areas as refugia for species imperiled by habitat loss or degradation.

The development of infrastructure in the project vicinity (i.e., I-40, the BNSF railroad, and utility corridors) has resulted in a moderately fragmented landscape that still supports large areas of open space and many opportunities for wildlife use and movement. Most of this land consists of creosote bush scrub and the underlying topography changes with distance from nearby mountain ranges. On the project site, the terrain near the foothills of the Cady Mountains is more varied and is characterized by numerous drainages, complex topography, and boulder-strewn areas; areas located further from the foothills slope more gently and support more sand-dominated soils.

The Applicant identified general movement patterns and potential movement corridors for desert tortoise and bighorn sheep in the immediate project vicinity (SES 2009). North-south movement of most terrestrial wildlife in the immediate project vicinity is currently hindered by the fencing and traffic associated with the I-40 and BNSF railroad corridors. The trestles and culverts that allow water to pass underneath the railroad and the interstate enhance their permeability for some species, but the small size of the culverts limits their use for most wildlife. While the area between the interstate and the railroad is already somewhat isolated, this area still provides suitable habitat for a variety of locally present species, including the desert tortoise and Mojave fringe-toed lizard. The area with the most opportunities for east-west movement is the land north of the railroad.

Construction of the Proposed Action would result in the land use conversion of approximately 8,230 acres of existing open space that provides for relatively uninhibited wildlife movement between suitable habitats in the project vicinity. This would include approximately 2,400 acres of open space between the BNSF railroad and I-40 and approximately 5,800 acres abutting the railroad corridor and extending north toward the Cady Mountains. To reduce potential adverse impacts on desert tortoise during the operation of the facility, the project site would be fenced to prohibit desert tortoises and other terrestrial wildlife from entering the site. This fencing would create a major barrier to east-west and north-south movement across the entire project site.

Under the Proposed Action, a corridor for east-west movement would remain available along the northern boundary of the project site; however, this area would likely act as a filter or barrier to wildlife movement, to some extent, because of its topography and the narrowness of the corridor. For example, while many of the desert tortoises observed by the Applicant were located in the northern portions of the project site, the topography of this area consists of small hillocks, rock strewn fields, and steep-walled drainages. While tortoises are able to navigate these terrain features, tortoise observations in this area may be a function of tortoise moving up and down the bajadas in a north-south direction to access foraging habitat; thus, this corridor could still act as a filter or barrier to east-west desert tortoise movements in the immediate project vicinity. For less mobile species such as the desert tortoise, construction of the Proposed Action would preclude north-south and east-west movement across the project site. However, an east-west genetic connection would be maintained. For other more wide-ranging and highly mobile species such as coyotes and foxes, the Proposed Action would also pose a barrier to north-south movement, but would not completely prevent their passage.

While little is known regarding the movements or specific habitat use of Nelson's bighorn sheep in the immediate project vicinity, sheep are known to move seasonally from the Cady Mountains to winter ranges in the Bristol Mountains to the east (SES 2009). Bighorn sheep in the Cady Mountains are known to forage in the bajadas near the foothills of the mountains and may occasionally move across the flatlands associated with the Calico Solar project. The physical barrier posed by the facility would be an impediment (in addition to I-40 and the BNSF railroad)

to any movement across the valley to the south of the Cady Mountains; noise or visual disturbance associated with the project could also affect the movement of bighorn sheep that might normally use the south side or foothills of the Cady Mountains to traverse to winter ranges in the Bristol Mountains.

The Proposed Action would have direct, adverse short- and long-term impacts on wildlife movement corridors and habitat linkages that are currently available on the project site because of the substantial barrier to wildlife movement that would be posed by the fenced solar field.

### **Impacts on Special-Status Species**

The project site supports a variety of special-status species including state and federally listed species; BLM Sensitive species; and other species of special concern. Table 3-9 (see Section 3.3, Biological Resources) lists the special-status species that are known to occur or have the potential to occur on the project site. Impacts on special-status species would be similar to those described for non-listed plants and wildlife, and are described in more detail in the following sections.

### ***Impacts on Special-Status Plants***

Four special-status plant species have been reported occurring on the project site and six additional special-status plant species have a low potential for occurrence, but have not been observed during pre-project surveys conducted on the project site and in adjacent areas (see Table 3-9 in Section 3.3, Biological Resources).

#### State or Federally Listed Plant Species

Lane Mountain milk-vetch is the only listed threatened or endangered plant species with any potential to occur in the project area. There is a low potential for it to occur on the project site, and Lane Mountain milk-vetch has not been detected during any of the pre-project surveys conducted in 2007, 2008, and 2010; therefore, the project would not result in any direct or indirect impacts on any state or federally listed plant species.

#### BLM Sensitive/CNPS List 1B Species

One BLM Sensitive/CNPS List 1B species, white-margined beardtongue (*Penstemon albomarginatus*), was documented on the project site, and five others could potentially occur there:

- Alkali mariposa lily (*Calochortus striatus*)
- Desert cymopterus (*Cymopterus deserticola*)

- Barstow woolly-sunflower (*Eriophyllum mohavense*)
- Mojave monkeyflower (*Mimulus mohavensis*)
- Creamy blazing-star (*Mentzelia tridentata*)

Direct and indirect impacts on these species could include the loss of plants and their habitat during construction, ongoing impacts during the operation of the facility, and on- and off-site habitat degradation. All on-site occurrences of white-margined beardtongue would be avoided with the establishment of specially-designated Environmentally Sensitive Areas on the project site (see mitigation measures in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures). The other five species were not detected during botanical surveys and are most likely not present on the project site. If occurrences are documented during future surveys, the BLM would determine the level of avoidance that is appropriate on a case-by-case basis.

The Applicant's site drainage plan calls for a series of debris basins that are designed to attenuate storm flows, but would also trap sediment that would otherwise be transported through the project site to drainages on the valley floor. Under existing conditions the fine sediment from the mountain ranges is redistributed to adjacent dunes by prevailing winds. The presence of the various erosion control structures and aboveground facilities on the project site (e.g., SunCatchers, perimeter fencing) would likely alter the wind-driven transport of sand across the site to downwind habitat within the adjacent Pisgah ACEC. Although available data are insufficient to quantify this potential impact, the blow-sand habitats within the ACEC are supported by sediment transport processes within the ACEC, so the Proposed Action is not considered likely to result in habitat degradation that would reduce the quality of white-margined beardtongue habitat farther east, where the majority of known occurrences are located. The CEC commissioned a geomorphic assessment of the Calico Solar project site (PWA Philip Williams & Associates, Ltd. 2010). In general this report concluded that water-borne sediment deposition was more important as a sand source than was wind borne deposition on the project site. Based on this conclusion and on the examination of aerial photographs, BLM concludes that this same general conclusion holds for the sand habitat in the Pisgah ACEC (which is downwind of the project site). More information regarding potential direct and indirect impacts is provided in the Impacts on Vegetation section above.

The BLM would require the implementation of project mitigation measures by the Applicant to address potential impacts on special-status plants occurring on the project site. As discussed in the SA/DEIS, the mitigation strategy developed by the BLM and CEC to address impacts on special-status plant species includes the avoidance and protection of special-status plant occurrences on either the project site or acquired lands off-site, or a combination of the two. The implementation of mitigation measures would reduce impacts on BLM Sensitive/CNPS List 1B species occurring on the project site and in the immediate project vicinity.

### CNPS List 2 Species

Two CNPS List 2 species have been documented on the project site, small-flowered androstephium (*Androstephium breviflorum*) and Emory's crucifixion thorn (*Castela emoryi*). All on-site occurrences of Emory's crucifixion thorn would be avoided during construction and protected in place. Project impacts on small-flowered androstephium would include the loss of plants and their habitat during construction, ongoing direct impacts during the operation of the facility, and on- and off-site habitat degradation. More information regarding potential direct and indirect impacts on vegetation is provided in the Impacts on Vegetation section, above.

As previously mentioned in Chapter 3, numerous occurrences of small-flowered androstephium have been discovered in recent years, including to the east and west of the project site, and this species is now known to be more common than was previously believed. While no specific measures would be implemented to address impacts on small-flowered androstephium under the Proposed Action Alternative, avoidance measures identified for other special-status plant species would likely also reduce impacts on this species due to its abundance on the project site.

### Unnamed Lupine Species

An unnamed lupine species was detected in six locations with the project footprint along the northern boundary of the project site and four locations within 250 feet of the site boundary. All on-site occurrences of this unnamed lupine would be avoided during construction and protected in place.

### Summary of Impacts on Special-Status Plants

Development of the project site would result in direct and indirect adverse short- and long-term impacts on special-status plants and would reduce, fragment, and degrade suitable habitats on the project site and in the immediate project vicinity. The Proposed Action Alternative would not impact white-margined beardtongue, Emory's crucifixion thorn, or the unnamed lupine species, but there would be direct and indirect impacts to the population of small-flowered androstephium occurring on the project site.

### ***Impacts on Special-Status Reptiles***

Two special-status reptiles, the state and federally listed (Threatened) Mojave population of desert tortoise (*Gopherus agassizii*) and the Mojave fringe-toed lizard (*Uma scoparia*; a BLM Sensitive species), have been documented on the project site during pre-project surveys conducted by the Applicant. The banded Gila monster (*Heloderma suspectum cinctum*; a BLM Sensitive species) is known to occur in isolated populations in portions of the Mojave Desert and could potentially occur on the project site, but has not been documented during any of the

pre-project surveys conducted by the Applicant. Potential impacts on these three special-status reptiles are discussed below.

### Banded Gila Monster

Banded Gila monsters occur in low densities, are difficult to detect, and may be overlooked during surveys. Gila monsters were not observed during pre-project surveys that were conducted by the Applicant in 2007, 2008, and 2010, and are generally not known from the area; however, there remains a low potential for this species to occur on the project site.

Construction of the Calico Solar facility under the Proposed Action Alternative would eliminate 8,230 acres of habitat that may provide cover, foraging, and breeding habitat for banded Gila monsters. If present, other direct impacts on this species could include mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment; disturbance from increased vehicular and human presence on the project site; and displacement due to habitat loss or alteration. The banded Gila monster is an example of a terrestrial species that could become trapped on the project site by the perimeter fencing and subjected to ongoing disturbance from operation of the facility and ongoing maintenance activities. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife section, above.

The BLM would require the implementation of mitigation measures by the Applicant to address potential impacts on banded Gila monsters. The implementation of avoidance and minimization measures that are incorporated would minimize impacts on Gila monsters. Impacts on banded Gila monsters are not likely to occur based on the low potential for this species to occur on the project site. If individuals are present, the potential impacts identified above would likely be unavoidable, but would be minimized and mitigated for through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect adverse short- and long-term impacts on banded Gila monsters, if they do occur on the project site.

### Desert Tortoise

Desert tortoises have been documented on the project site and within the adjacent desert areas both east and west of the site. Implementation of the proposed project would result in the loss of 8,230 acres of occupied desert tortoise habitat. The potential effects to desert tortoises would be similar to those described above for other wildlife and are described in more detail below.

To minimize the effects of the project, the Applicant would be required to monitor construction activities to prevent direct impacts on individual tortoises, translocate all of the desert tortoises that occur on the project site to suitable habitats off site, and provide funding for the acquisition and long-term conservation of desert tortoise habitat, among other measures that are described in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures.

A Biological Assessment (BA) that analyzed the potential effects of the project to the desert tortoise was prepared in April 2010 (BLM 2010b; Appendix H). The original BA was provided to the USFWS as an attachment to a Request to Initiate Formal Consultation Memorandum which the BLM sent to the USFWS on April 1, 2010. In response to the initiation request, the USFWS responded with an Insufficiency Memorandum (dated April 22, 2010) which outlined deficiencies in the original BA which made it inadequate to initiate formal consultation. After further discussion with USFWS, the BLM provided the USFWS with a revised BA on May 17, 2010 (BLM 2010c; Appendix H). In response to this submittal, the USFWS sent a Sufficiency Letter (dated June 21, 2010) which indicated that the revised BA was sufficient to initiate formal consultation. However, the Sufficiency Letter stated that there were clarifications that needed to be addressed in order for the USFWS to complete their Biological Opinion. Upon further discussions with the USFWS, the BLM addressed these clarification needs. In order to address the needs of the USFWS and to summarize all of the changes made since the original BA was issued, a Supplemental BA was issued by the BLM on July 19, 2010 (BLM 2010d; Appendix H). As of the writing of this FEIS, the Biological Opinion has not been issued by the USFWS. However, the Biological Opinion must be issued before the Record of Decision is executed by BLM and all Terms and Conditions of the Incidental Take Statement would be incorporated into the project mitigation measures (see Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures for a complete listing of project mitigation measures).

### *Desert Tortoise Distribution and Abundance on the Project Site*

The portion of the project site located north of the BNSF railroad is characterized by creosote bush scrub and has high connectivity to adjacent natural lands. The highest tortoise densities were observed in the northern portions of the project site where more complex topography provides for better foraging and soils for burrowing than found on the southern portions of the site. Although suitable habitat is present in the area between the BNSF railroad and I-40, this area provides lower quality habitat for tortoises because it is fragmented by the highway and railroad and has been subject to disturbance from pipeline development. Nonetheless tortoises and tortoise sign have been detected in this area. While the railroad poses a substantial barrier to movement, there remain corridors for dispersal under the many railroad trestles that span the drainages that flow across the site.

To determine the general distribution and abundance of tortoises within the project footprint, the Applicant implemented a modified survey protocol approved by the USFWS and BLM that was requested for use during preliminary surveys due to the size of the project area. These surveys were completed from May 15, 2007 through May 31, 2007 and from April 1, 2008 through May 7, 2008 (SES 2009). Information provided from the sampling method used during this survey determined that the expected tortoise abundance on the project site ranged from between 60 to 70 tortoises. The private lands adjacent to the Proposed Project footprint in the north part of the Project Area (surrounded on three sides by the Proposed Project) also

potentially may support a population of 18 to 33 individuals based on these surveys. While a 100 percent survey of the project area would have provided a more accurate estimation of the number of desert tortoises on the project site, the USFWS and BLM have discretion to modify survey methods, particularly for large projects and during project planning when surveys are more preliminary in nature.

The Applicant recently conducted a 100 percent survey of the 8,230-acre project site using the USFWS's *2010 Pre-project Field Survey Protocol for Potential Desert Tortoise Habitats*. The adjacent private property parcels were not surveyed as part of this effort due to a lack of access to the private lands. The survey, conducted March 29 through April 15, 2010, documented 104 individual tortoises on the project site (88 adults, 1 subadult, and 15 juveniles) (SES 2010a). As was established during the previous surveys, tortoises on the project site are concentrated in a band across the northern portion of the project site north of the BNSF railroad. Two tortoises were also documented in the portion of the project site between the BNSF railroad and I-40 during the 2010 survey, where only tortoise sign had been documented during previous surveys.

The USFWS's 2010 survey protocol takes into account the probability that tortoises would be present above ground based on the previous winter's rainfall and the fact that not all tortoises within the survey area are seen by surveyors, and provides a mathematical formula that is used to estimate the number of adult tortoises that are actually present. According to this method, an estimated 176 adult desert tortoises occur on the 8,230 acre project site. The USFWS formula also provides a confidence interval for the estimated number of tortoises provided by the formula, which indicates the reliability of the estimate (i.e., a wider confidence interval indicates that less certainty is associated with the estimate). The 95 percent confidence interval for this estimate is 92 to 337 adult individuals.

Juvenile desert tortoises are extremely difficult to detect because of their small size and their cryptic nature. Based on a four-year study of their population ecology, Turner et al. (1987) determined that juveniles accounted for 31.1 to 51.1 percent of the overall population. Using this range and the estimate of 176 adult desert tortoises on the proposed site, BLM estimates that the 8,230-acre project area may support from 55 to 90 juveniles.

To estimate the number of eggs that could be present on the project site, BLM used the average number of clutches per reproductive female in a given year (i.e., 1.6, see Turner et al. 1984) multiplied by the average number of eggs found in a clutch (i.e., 5.8, see USFWS 1994b). By approximating a 1:1 sex ratio, we assumed that 88 out of the 176 adult desert tortoises onsite are reproductive females and that, together, they could produce approximately 817 eggs in a given year. Fewer eggs are likely to be onsite at any given time because the territories of these female desert tortoises likely extend, at least in part, off of the project site and individuals may establish nests in these areas.

Refer to the Applicant's Biological Resources Technical Report (SES 2009) and the more recently published 2010 survey report (SES 2010a) for more information regarding the study area and results for the various pre-project desert tortoise surveys.

### Direct and Indirect Impacts

Construction of the Calico Solar facility would result in direct and indirect adverse short- and long-term impacts on desert tortoises occurring on the project site and in the immediate project vicinity, and may also impact tortoise populations at off-site translocation areas.

Construction of the Calico Solar facility would eliminate 8,230 acres of foraging, breeding, and sheltering habitat for desert tortoises on the project site; there would also be approximately 4.5 acres of temporary disturbance associated with the construction of a well and waterline in the NAP area north of the railroad and approximately 12.9 acres of temporary disturbance associated with the interconnection from the Calico Solar Substation to the Pisgah Substation (refer to Figure 1–2). Direct impacts on desert tortoises could include mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Burrows could be crushed or collapsed from equipment use or vibration during construction or maintenance activities, which could result in mortality to any occupant tortoises. Other direct impacts could include disturbance from increased vehicular and human presence on the project site and displacement due to habitat loss or alteration (for tortoises with home ranges that overlap the project site).

Activities that would be likely to result in direct impacts include vegetation clearing and mowing, road construction, earth removal, grading, trenching, excavation of the retention basins and storm water management systems, facility construction and maintenance activities, vehicle use on the site and vehicle travel to and from the project site, and off-road movement of heavy equipment. Their tendency to seek shelter in burrows increases the likelihood that tortoises could be injured or killed during ground-disturbing activities. During construction, desert tortoises could be attracted to construction areas by the application of water to control dust, which would result in a higher risk of injury or mortality for these tortoises. Tortoises are known to take shelter under parked vehicles or equipment and could be killed, injured, or harassed when a vehicle or piece of equipment is moved, although measures (discussed below) would be implemented to avoid this and other potential impacts. These direct impacts would be localized and would be restricted to the project site.

Some tortoises would remain in suitable habitats adjacent to the project site following construction; however, the alteration of habitat and the expected noise levels associated with the operation of the SunCatcher engines may preclude the use of otherwise suitable habitats in the immediate project vicinity. Desert tortoises that would be displaced from the project site may be able to establish territories off-site, although some individuals would be expected to succumb to predation or to the lack of food or shelter during this period.

The Supplemental BA identified potential indirect impacts to tortoises remaining in the NAP areas and tortoises occurring within 1,000 feet of the project site (to account for impacts to home ranges). The potential indirect effects to desert tortoises remaining in adjacent habitats include the loss of forage, burrowing sites, and cover sites; loss of dispersal areas and habitat connectivity to other areas; contracted home ranges; disturbance from increased noise levels associated with the construction, operation, and maintenance of the facility; light impacts from construction and maintenance activities that are conducted during low-light periods; and habitat degradation due to the introduction or spread of invasive or noxious weeds, the alteration of existing soil conditions, and a modified hydrologic and sediment transport regime resulting from the construction of the onsite storm water management system.

Another potential indirect impact to desert tortoises occurring in the immediate project vicinity is an increased risk of predation from predators that are attracted to the area by project features or increased human activity. The placement of fencing, transmission towers, and other aboveground structures (e.g., SunCatchers) would provide supplemental roosting and perching opportunities for avian predators that target tortoises, including common ravens. Human activities at the project site could potentially provide food or other attractants such as trash, litter, or water, which tend to attract and subsidize unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote.

Ravens in particular depend on human encroachment to 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 development. 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). In addition to ravens, feral dogs have emerged as major predators of the desert tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994b; Evans 2001).

Road kill along access roads would also provide food for opportunistic predators/scavengers such as ravens. Road-killed wildlife would be readily available with increased construction and operations traffic, further exacerbating the raven/predator attractions and potentially increasing desert tortoise predation levels. In addition, bird strikes that occur from collision with facility structures or transmission lines may also attract scavenging ravens. Any loss of juvenile tortoises due to the further addition of raven subsidies could have a long-term adverse effect on the tortoise population by reducing the recruitment of juvenile tortoises into the adult life stages (Boarman 2003). The effects of such a shortage may not be apparent for years because tortoises do not typically reach sexual maturity until approximately 15 to 20 years of age.

Critical habitat designated for the desert tortoise under the Endangered Species Act of 1973 does not occur on the project site, but is present to the southwest of the site within the Ord-Rodman DWMA. Critical habitat within the Ord-Rodman DWMA has been identified as a long-distance receiver site for use during desert tortoise translocation activities; impacts to desert tortoise critical habitat within the Ord-Rodman DWMA are discussed below under Tortoise Translocation.

More information regarding potential impacts on desert tortoises is provided in the Impacts on Wildlife section (above), in the BLM's revised Biological Assessment (BLM 2010c), and in the BLM's Supplemental Biological Assessment (BLM 2010d). Additional information regarding potential impacts from tortoise translocation activities is provided below. Mitigation measures are provided in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures.

### Tortoise Translocation

In order to prevent the direct impact of tortoises from the construction of the Proposed Project, a Desert Tortoise Translocation Plan is being developed by the Applicant through coordination with the resource agencies to move tortoises that occur on the project site out of harm's way. A draft Desert Tortoise Translocation Plan has been developed and is included in Appendix I.

Capturing, handling, and relocating desert tortoises from the project site after the installation of exclusion fencing could result in harassment, injury, or death to individual desert tortoises. Impacts to desert tortoises from translocation may include elevated stress hormone levels, changes in behavior and social structure dynamics, genetic mixing, increased movement (caused by conspecifics, avoidance of predators or anthropogenic influence, homing, or seeking out of preferred habitat), spread of disease, and increased predation. Furthermore, handling, holding, and transport protocols may compound with abiotic factors to affect the outcome for translocated individuals (Bertolero et al. 2007; Field et al. 2007; Rittenhouse et al. 2007; Teixeira et al. 2007), 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 than those that did not void. 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 tortoises located in the immediate project vicinity, removal of habitat within a tortoise's home range or segregating individuals from portions of 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 of their home ranges may 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. Mortality for translocated desert tortoise has been estimated at approximately 15 percent (Sullivan 2008), though recent evidence from the desert tortoise translocation effort conducted

in support of the Fort Irwin Land Expansion Project indicates that mortality rates may be closer to 25 percent per year (Gowan and Berry 2010).

Success rates of herpetofauna translocations range from 14 to 42 percent, suggesting that improved efforts are essential for the future recovery of many reptiles and amphibians (Dodd and Seigel 1991; Germano and Bishop 2009). A recent review of 91 herpetofauna translocation projects reported the primary causes of translocation failure were homing response by translocated individuals and poor habitat in translocated areas, followed by human collection, predation, food and nutrient limitation, and disease (Germano and Bishop 2009). 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:

- –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 trans-location 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.” (DTRO 2009:2)

To provide guidance to the Applicant in addressing these concerns and developing an adequate translocation plan, the USFWS prepared specific draft guidelines for clearance and translocation of desert tortoises from the project sites. This included the *Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance* (USFWS 2010). This document provided guidance including the timing of translocation, disease testing requirements, and other actions to minimize impacts on desert tortoise. Current CDFG standards require disease testing and quarantine for any tortoise translocated greater than 1,500 feet (500 meters); this is intended to limit the potential exposure risk to healthy tortoises in adjacent habitats.

The final Desert Tortoise Translocation Plan must be approved by BLM and the wildlife agencies, and be completed and approved by USFWS prior to their issuance of a Biological Opinion. The final Translocation Plan will include: a translocation protocol; health assessments

for all tortoises that are handled; disease testing of individuals that would be translocated greater than 1,500 feet (500 meters); translocation habitat assessment and suitability; and an assessment of desert tortoise population and health in the area receiving translocated tortoises. The Desert Tortoise Translocation Plan will be finalized prior to the Record of Decision on the FEIS.

The Proposed Action would be constructed in two phases, with the detention basins along the northern site boundary constructed during Phase One (refer to Figure 1–2). It is currently expected that desert tortoises that are translocated from the project site during Phase One would be held in temporary holding pens in the Pisgah Crater ACEC, approximately 942 acres of which has been identified as a short-distance translocation area. Tortoises found within 1,500 feet (500 meters) of the boundary of the detention basin area of Phase One would be moved into the desert tortoise habitat linkage area to the north of the project site; however, the number of tortoises that would be placed within the linkage area would be limited to avoid raising the tortoise density of the linkage area above 10 percent of its current density (4.5 tortoises per kilometer). Any additional individuals encountered during Phase One would be placed in temporary holding pens within the short-distance translocation area, and once they are found to be healthy they would be released.

Approximately 9,833 acres within the Ord-Rodman DWMA have been identified as a long-distance receiver site for tortoises that are removed from the project site during construction. There is some potential for the spread of disease from the long-distance translocation of desert tortoises into the DWMA, or for exceeding the carrying capacity of the habitat in the receiver site; however, tortoises that are moved greater than 500 meters (that is all animals being moved into the DWMA) would have to be tested for disease, and there is a restriction on the total density of tortoises which would be allowed to be moved into the DWMA – a maximum density of 6.5 animals per square kilometer would be allowed (this includes the current population plus any additional tortoises which would be moved). The threat of potential impacts from tortoise translocations is considered to extend up to 6.2 miles from the long-distance translocation sites based on the average distance desert tortoises range following a translocation.

The control area that has been identified for tortoise monitoring as part of the desert tortoise translocation activities is approximately 6,929 acres in size and is located to the northwest of the project site and to the south of I-15. A portion of the control area extends into the western portion of the Cady Mountains WSA. No desert tortoises would be relocated to the control area; tortoises within the control area would be monitored to provide information regarding tortoise populations in an unaffected area for comparison to information obtained at the translocation sites. The tortoise monitoring would entail finding tortoises within the control area, attaching radio transmitters to them, and tracking them over a period of time.

### Habitat Loss and Compensatory Mitigation

To fully mitigate for habitat loss and potential take of desert tortoises, the Applicant would provide compensatory mitigation for impacts to 8,230 acres of occupied desert tortoise habitat. Impacts to the area south of the BNSF railroad tracks would be mitigated at a 1:1 ratio. Impacts to the area north of the BNSF railroad tracks would be mitigated at a 3:1 ratio. The BLM's compensatory mitigation plan (fee based) would serve as the entire 1:1 mitigation ratio below the railroad tracks and one-third of the 3:1 mitigation ratio required to satisfy CESA above the railroad tracks. This fee would be used for habitat enhancement activities as outlined below.

The BLM, CDFG, and CEC would require the Applicant to compensate for the loss of tortoise habitat as outlined above. For the BLM's portion of the compensation, the Applicant would deposit funds based on the price to acquire land (i.e., funding sufficient to acquire 8,230 acres) into an account managed by the National Fish and Wildlife Foundation (NFWF); these funds would be used for enhancement of desert tortoise habitat within the Ord-Rodman DWMA. This 1:1 component of the total compensatory mitigation would be provided in fee to the BLM based on the July 23, 2010 Renewable Energy Action Team (REAT) fee Schedule (total \$28,845,586). The costs presented here are the REAT team's best estimates for costs. The REAT-NFWF Memorandum of Agreement allows for the REAT agencies to require additional funding to be deposited into the project-specific account if they find the money is not adequate to implement the required biological mitigation.

Habitat enhancement actions for this project would include but not be limited to construction of 40 miles of tortoise-proof fence along State Route 247 from Barstow to Lucerne Valley to prevent desert tortoises from entering the roadway, with the primary focus area being Barstow to Stoddard Ridge, and installation of 60 miles of barrier fencing (post and cable) along Camp Rock road to prevent unauthorized vehicular use of important tortoise habitat within the desert wildlife management area. The Ord-Rodman DWMA has 392 miles of closed routes, 280 miles of open routes to be signed, and 172 miles of undesignated routes to be signed or closed. At least 100 miles of these routes would be rehabilitated. The enhancement funds may be used to cover environmental review and implementation of the above activities, including the hiring of contractors to carry out the activities. Additionally, habitat enhancement via exotic weed control, fencing along I-40, safing of mines that tortoise are at risk of falling into, and funding of a headstart program for desert tortoise that would be developed in coordination with the USFWS's Desert Tortoise Recovery Office may also be implemented with these funds.

The portion of the compensation required by the CDFG/CEC would be used to acquire desert tortoise habitat in the Ord-Rodman, Superior-Cronese, or Fremont-Kramer DWMA's. The CDFG/CEC would provide the details as to how this land acquisition shall take place, including the need for enhancement and management fees, in their own permitting documents.

### Impacts on Critical Habitat

Designated Critical Habitat (DCH) for the desert tortoise has five Primary Constituent Elements:

- (1) Sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow;
- (2) Sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species;
- (3) Suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites;
- (4) Sufficient vegetation for shelter from temperature extremes and predators; and
- (5) Habitat protected from disturbance and human-caused mortality.

The Proposed Project site itself does not contain any DCH for the desert tortoise. However, the implementation of the Translocation Plan would require the movement of tortoises into the Ord-Rodman DWMA, which encompasses DCH. Increasing tortoise densities within the DCH along with the potential to introduce diseased animals into DCH has the potential to adversely affect the constituent elements of the critical habitat unit. In total, the long-range receiver site in the Ord-Rodman DWMA is composed of 9,833 acres of critical habitat. Also, activities such as driving vehicles through the DCH could impact vegetation, and thus degrade the Primary Constituent Elements of the DCH. While the implementation of the Desert Tortoise Translocation Plan has the potential to adversely affect DCH, the BLM has determined that implementation would not adversely modify DCH given that the translocation plan will have protocols that would prevent the translocation of diseased animals and would limit translocation densities to levels which would not exceed the habitat carrying capacity. Furthermore, we have reached this conclusion because most activities associated with the translocation would be conducted on existing roads, which do not support DCH Primary Constituent Elements.

### Summary of Impacts

Impacts on desert tortoises would be unavoidable due to the need to remove them from the project site. These impacts would be minimized and mitigated for through the implementation of project-specific mitigation measures, and the terms and conditions of the USFWS's and CDFG's incidental take statements would be enforced during the construction, operation, and decommissioning of the solar facility. A summary of the number of desert tortoises that would be impacted under the Proposed Action Alternative is provided in Table 4-9.

**Table 4-9 Desert Tortoise Impact Summary**

<b>Project Component</b>	<b>Estimated Number of Adult and Subadult Tortoises</b>	<b>Estimated Number of Juvenile Tortoises/Estimated Number of Eggs</b>	<b>Total</b>
Project Site (Individuals to be translocated; 8,230 acres)	176 (max: 337)	55–90/817	1,048 (max: 1,244)
1,000-foot Buffer Area (2,200 acres) indirectly affected	69 (based on an assumed density of 20 per square mile)	21–35/0	90–104
NAP Area A (1,280 acres) indirectly affected	40 (based on an assumed density of 20 per square mile)	12–20/0	52–60
Recipient Site Resident Individuals	176 (max: 337)	55–90/0	231 (max: 427)
Control Area Individuals	176 (max: 337)	55–90/0	231 (max: 427)
<b>Total Directly Affected</b>	528–1,011	165–270/817	1,510–2,098
<b>Total Directly and Indirectly Affected</b>	637 (max: 1,120)	198 (max: 325)/817	1,652 (max: 2,262)

Source: Adapted from BLM 2010c.

The Proposed Action would have direct and indirect short- and long-term adverse impacts on desert tortoises on the project site, in the immediate project vicinity, at translocation receiver sites, and at the translocation control site. The Proposed Action could also have adverse short- and long-term impacts on desert tortoise critical habitat within the Ord-Rodman DWMA, which has been identified as a receiver site for desert tortoises that are removed from the project site during pre-construction clearance surveys, although the risk of spreading disease would be minimized by testing tortoises for disease prior to translocating them.

#### Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard is known to occur on the project site and in the immediate project vicinity in dune systems as well as in smaller habitat patches where suitable sandy deposits occur, such as hummocks or pockets of soft sand interspersed with hard packed sand and more dense and varied vegetation. There would be direct and indirect impacts on Mojave fringe-toed lizards that occur in suitable habitats on the project site; there would also be some potential indirect impacts on Mojave fringe-toed lizards from a change in sand and sediment transport across the project site.

Direct impacts on Mojave fringe-toed lizards from the construction and operation of the facility would include habitat loss; mortality, injury, or harassment of individuals as a result of

encounters with vehicles or heavy equipment; disturbance from increased vehicular and human presence on the project site; and displacement due to habitat loss or alteration. Their camouflage and tendency to hide beneath the surface of the sand increases the likelihood that individuals could be injured or killed during ground-disturbing activities.

Indirect impacts on this species would consist primarily of ongoing project-related disturbance and habitat degradation from the compaction of soils, introduction or spread of nonnative or invasive plant species, alterations to the existing hydrologic and wind conditions that transport sand to both on- and off-site populations, alterations in the existing solar regime from shading, and the loss or alteration of its prey base. Another indirect impact would be the increased risk of predation from the placement of fencing, transmission towers, and other aboveground structures (e.g., SunCatchers) that would provide roosting opportunities for avian predators that target lizard prey, including shrikes, merlins, burrowing owls, roadrunners, and other avian predators. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife Section, above.

Road construction, the placement of aboveground structures such as SunCatchers, and the construction of drainage structures and retention basins would alter the transport of sand and would likely degrade suitable Mojave fringe-toed lizard habitat on the project site. These built structures would also create substantial barriers to movement and dispersal of Mojave fringe-toed lizards in the area and would reduce connectivity to other occupied habitats in the immediate project vicinity. The land use conversion on the project site and disruption of existing habitat conditions could make an estimated 164.7 acres of suitable habitat on the project site unsuitable for Mojave fringe-toed lizards and could also prevent dispersal from or colonization of suitable habitats that do remain on the project site.

Impacts on Mojave fringe-toed lizards would be unavoidable, but would be minimized and mitigated for through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect, short- and long-term adverse impacts on Mojave fringe-toed lizards occurring on the project site and in the immediate project vicinity.

### ***Impacts on Special-Status Birds***

There is foraging, cover, and/or breeding habitat for a variety of resident and migratory birds on the project site and in adjacent habitats, including the Cady Mountains to the north of the site. The Applicant documented 36 avian species during pre-construction surveys on the project site and in the immediate project vicinity (SES 2009; SES 2010c; SES 2010d). Special-status birds that have been documented on the project site or immediate project vicinity consist of one state listed Threatened and BLM Sensitive species (Swainson's hawk) and five other BLM Sensitive species including golden eagle, burrowing owl, mountain plover, Bendire's thrasher, and

Le Conte's thrasher. The golden eagle is also a state listed Fully Protected species. Potential impacts on these six special-status birds are discussed below.

### Bendire's Thrasher

Bendire's thrasher was observed in an area adjacent to the project site during pre-project surveys conducted by the Applicant (SES 2009); suitable nesting and foraging habitat for this species occurs throughout the project site.

Direct and indirect impacts on Bendire's thrashers could occur through the loss or alteration of breeding, foraging, and sheltering habitat; noise or visual disturbance from construction or maintenance activities; disruption of foraging or breeding activities as a result of increased noise and visual disturbance on the project site; displacement due to habitat loss or alteration; or collision with SunCatchers or other aboveground structures on the project site. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife and Impacts on Birds sections, above.

The BLM would require the implementation of mitigation measures by the Applicant to address potential impacts on Bendire's thrashers occurring on the project site. In addition to the general minimization and avoidance measures, the BLM would require specific mitigation actions that would address impacts on breeding birds including conducting pre-construction nest surveys for activities conducted during the breeding season (from February 1 through August 15) and establishing 500 foot no-activity buffers around any active nests until nestlings have fledged and dispersed.

Because of the potential for project-related impacts on birds in general, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed. An Avian Protection Plan would be developed by the Applicant that would include adaptive management strategies such as the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with SunCatchers or other aboveground structures on the project site.

Impacts on Bendire's thrashers would be unavoidable, but would be minimized and mitigated for through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect, short- and long-term adverse impacts on any Bendire's thrashers occurring on the project site.

### Burrowing Owl

Burrowing owls are present on the project site. During sampling surveys conducted in 2008 (SES 2009), two owls were documented in the north-central portion of the project site and another individual was observed to the southeast of the project site in the Pisgah ACEC.

Protocol surveys for this species were conducted by the Applicant in January 2010; two burrowing owls and approximately eleven burrows with sign were detected on the project site during the 2010 surveys (SES 2010c). Burrowing owls and their nests are protected under both federal and state laws and regulations, including the MBTA and California Fish and Game Code Section 3503.5.

Implementation of the proposed Calico Solar project would result in impacts on at least two burrowing owls; based on the number and location of occurrences that have been documented on the project site, it is possible that up to four territories are present. Because of the presence of suitable foraging, nesting, and sheltering habitat, burrowing owls could occur throughout the project site; however, based on the documented occurrences of this species on the project site, it likely occurs in low densities. It has not been established yet whether burrowing owls are actually breeding on the project site, if they are year-round residents on the project site, or if they are otherwise using this habitat for migratory stopovers or for over-wintering.

Construction of the Proposed Action would directly and indirectly affect burrowing owl breeding, foraging, and sheltering habitat. The potential effects to burrowing owls depend on many factors including the number of owls present within the project footprint and how the species utilizes the area (i.e., migratory stopover, year round, breeding, or wintering). Impacts from construction would be greater if owls use the site year-round or for breeding.

Direct and indirect impacts on burrowing owls could occur through the crushing or collapsing of burrows during construction or maintenance activities, which could result in mortality to any occupant owls; the loss or alteration of breeding, foraging, and sheltering habitat; noise or visual disturbance from construction or maintenance activities; disruption of foraging or breeding activities as a result of increased noise and visual disturbance on the project site; displacement due to habitat loss or alteration; collision with SunCatchers or other aboveground structures on the project site; or electrocution on power lines or transmission structures. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife and Impacts on Birds sections, above.

Burrowing owls can tolerate some level of human activity and it may be possible that some owls would remain or colonize areas within the project site following construction. However, the alteration of habitat and the expected noise levels associated with the operation of the SunCatcher engines may preclude use of the project site.

The BLM would require the implementation of project mitigation measures by the Applicant to address potential impacts on burrowing owls. In addition to the general minimization and avoidance measures, the BLM would require specific mitigation actions that would address impacts on burrowing owls. There are some potential impacts associated with the implementation of mitigation measure. Passive relocation, which involves the installation of a one-way door that prevents access to burrowing owls after they leave their burrow and the

subsequent excavation and collapsing of the unoccupied burrow, is a commonly-used method of excluding owls from areas where they could potentially be harmed. Because project construction would occur over the course of several years and would result in the eventual land use conversion of 8,230 acres of existing habitat, passive relocation activities could result in the repeated harassment of resident owls. While construction of replacement burrows in off-site areas would be considered to have some potential benefits to the species, it is likely that owls would tend to occupy areas close to existing territories. Because of the construction timeframe, this could require multiple passive relocation events, each of which stresses the birds and exposes them to predation, thermal stress, and potential territorial disputes.

The USFWS has raised concerns regarding potential collision threats associated with solar and renewable technologies. Because of the potential for project-related impacts, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed. An Avian Protection Plan would be developed by the Applicant that would include adaptive management strategies such as the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with SunCatchers or other aboveground structures on the project site.

Impacts on burrowing owls would be unavoidable, but would be minimized and mitigated for through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect, short- and long-term adverse impacts on any burrowing owls occurring on the project site.

### Golden Eagle

Golden eagles were observed during the pre-project surveys conducted in 2007 and 2008 by the Applicant (SES 2009); additional observations were made during a helicopter survey that was conducted to document active and potential nest sites within a 10-mile radius of the project site in March 2010 (SES 2010b). Results from the 2010 helicopter surveys indicate that at least nine confirmed and two potential golden eagle nests occur within a 10 mile radius of the project site, one of which was active with incubating golden eagles present at the time of the survey.

Golden eagles can use alternate nest sites within their territories from year to year, so the number of breeding golden eagle pairs in the project vicinity cannot be extrapolated from the number of potential nest sites. The BLM has determined that four golden eagle territories are present within 10 miles of the project site; only one of these territories is considered occupied, and the other three are considered historic (i.e., there has been no use of these territories within the last 10 years). There is no suitable habitat for nesting on the project site; however, nesting habitat occurs within 1 mile of the project boundary in the adjacent Cady Mountains and on existing transmission structures. The nearest active golden eagle nest that was detected during the 2010 helicopter survey was located to the east of the project site, approximately 3.5 miles from the project boundary and not within the line of sight.

Direct and indirect impacts on golden eagles could occur through the loss of foraging habitat, noise or visual disturbance from construction or maintenance activities, disruption of foraging or breeding activities as a result of increased noise and visual disturbance on the project site, displacement due to habitat loss or alteration, collision with SunCatchers or other aboveground structures on the project site, or electrocution on power lines or transmission structures. Raptors in general also tend to return to the same nesting sites and territories year after year, and many species have narrow habitat requirements for nesting and nest placement. Golden eagles are sensitive to human encroachment and if nests are disturbed by humans, nest abandonment will typically occur (Thelander 1974). The project would not involve human disturbance at any nest sites, and the nearest active golden eagle nest is located far enough away that constructing, maintaining, and operating the Calico Solar facility should not disturb the nesting eagles.

The development of the 8,230 acre project site would result in a loss of foraging habitat for this species in the vicinity of suitable nesting habitat and known nest sites. Although studies are currently in progress, the home range size for golden eagles in arid habitats is unknown. Golden eagles have been demonstrated to forage primarily within four miles of the center of their territories in mesic environments (McGrady et al. 2002), but this distance may be longer in xeric habitats, up to 10 miles (Fesnock 2010). Within this range of foraging distances, the proposed project would account for the loss of up to 8,230 acres; this loss would impact approximately 2 to 7 percent of the foraging habitat associated with the nearest active nest. This amount of loss would not be considered large enough to affect the breeding success of eagles in the project vicinity. While golden eagles could potentially forage between the arrays of SunCatchers, the noise generated by the SunCatchers coupled with the presence of human activity would likely preclude foraging within the Calico Solar project site. If it occurred, foraging among the SunCatcher arrays would also increase the risk of collision or electrocution for this species. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife and Impacts on Birds sections, above.

The Bald and Golden Eagle Protection Act of 1940 (16 USC 668) 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.

Data from the Western EcoSystems Technology Inc. surveys from 2006 through 2009 suggest a decline since 2006 in the total golden eagle population within the area covered by the surveys (Neilson et al. 2010, USFWS 2009a). On November 10, 2009, the USFWS implemented new rules (74 FR 46835) governing the “take” of bald and golden eagles under the Bald and Golden Eagle Protection Act of 1940 (16 USC 668). The USFWS is the primary federal authority charged with the management of golden eagles in the United States; as a result of the new

rules governing the “take” of bald and golden eagles, all activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity must be permitted by the USFWS under this Act. USFWS guidance on the applicability of current statutes and mitigation is currently under review. The direct take of golden eagles would not be authorized by the CDFG; this species is designated as “fully protected” under California Fish & Game Code (Section 3511) and may not be taken or possessed.

The USFWS has raised concerns regarding potential collision threats associated with solar and renewable technologies. Because of the potential for project-related impacts from collision with aboveground structures, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed. The Applicant would be required to also develop an Avian Protection Plan in coordination with the USFWS and CDFG that would include adaptive management strategies such as the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with SunCatchers or other aboveground structures on the project site.

The Proposed Action would have direct and indirect, short- and long-term adverse impacts on any golden eagles occurring in the project vicinity. While there would be unavoidable adverse impacts on golden eagle foraging habitat under the Proposed Action, potential impacts on golden eagles (including nesting golden eagles) would be avoided through the implementation of the Avian Protection Plan.

### Le Conte’s Thrasher

Le Conte’s thrasher is present on the project site, as one individual was observed on the project site during surveys conducted in 2008 (SES 2009) suitable nesting and foraging habitat for this species occurs throughout the project area.

Direct and indirect impacts on Le Conte’s thrashers could occur through the loss or alteration of breeding, foraging, and sheltering habitat; noise or visual disturbance from construction or maintenance activities; disruption of foraging or breeding activities as a result of increased noise and visual disturbance on the project site; displacement due to habitat loss or alteration; or collision with SunCatchers or other aboveground structures on the project site. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife and Impacts on Birds sections, above.

The BLM would require the implementation of mitigation measures by the Applicant to address potential impacts on Le Conte’s thrashers occurring on the project site. In addition to the general minimization and avoidance measures, the BLM would require specific mitigation actions that would address impacts on breeding birds including conducting pre-construction nest surveys for activities conducted during the breeding season (from February 1 through August 15) and

establishing 500 foot no-activity buffers around any active nests until nestlings have fledged and dispersed.

Because of the potential for project-related impacts on birds in general, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed. An Avian Protection Plan would be developed by the Applicant that would include adaptive management strategies such as the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with SunCatchers or other aboveground structures on the project site.

Impacts on Le Conte's thrashers would be unavoidable, but would be mitigated for through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect, short- and long-term adverse impacts on any Le Conte's thrashers occurring on the project site.

#### Mountain Plover

The mountain plover has not been documented on the project site or immediate project vicinity during any of the pre-project surveys conducted by the Applicant, and its likelihood of occurrence on the project site is low. This species does not breed in California and its wintering habitat in the west Mojave Desert consists almost exclusively of private agricultural lands.

Direct and indirect impacts on mountain plovers could potentially occur through the loss or alteration of migratory stopover habitat; noise or visual disturbance from construction or maintenance activities; disruption of foraging activities as a result of increased noise and visual disturbance on the project site; or collision with SunCatchers or other aboveground structures on the project site. More information regarding these potential impacts is provided in the Impacts on Wildlife and Impacts on Birds sections, above.

The mountain plover does not breed in California, so no specific mitigation measures would be necessary to protect the nests of this species. The BLM would not require the implementation of any specific mitigation measures by the Applicant to address potential impacts on mountain plovers because they have a low potential to occur on the project site. However, because of the potential for project-related impacts on birds in general, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed.

The mountain plover does not breed in California, so there would be no impacts on nesting mountain plovers. The Proposed Action would have negligible direct and indirect, short- and long-term adverse impacts on mountain plovers if they do occur on the project site.

## Swainson's Hawk

Two Swainson's hawks were observed flying over the project area by the Applicant on March 30, 2008 (SES 2009). Based on the timing of this observation it is not possible to determine whether these birds were a nesting pair or migrating through the area. However, there are no recent observations of this species nesting in the region and the project site does not support nesting habitat for this species. With the exception of the windrows of salt cedar that occur along the BNSF railroad and existing transmission towers, potential nest trees are not present on the project site. This species is more commonly associated with large nest trees in the San Joaquin Valley, but has also been documented nesting in Joshua trees in the Antelope Valley. Within the West Mojave Planning Area, the nearest documented nesting attempts have been recorded in Victorville, approximately 50 miles southwest of the project site (BLM et al. 2005); historical nesting records (circa 1970s) for this species have been documented as far east as the Ivanpah Valley (Bloom 2010). Nonetheless, there does not appear to be any nesting by this species on the project site or in the immediate project vicinity.

The Applicant conducted helicopter surveys within 10 miles of the project site to document potential nest sites for golden eagles in March 2010; there were no additional observations of Swainson's hawks during the helicopter surveys or any other pre-project biological surveys conducted by the Applicant. Potential direct and indirect impacts on Swainson's hawks would consist primarily of the loss of foraging habitat; the potential disruption of foraging activities as a result of increased noise and visual disturbance on the project site; collision with SunCatchers or other aboveground structures on the project site; or electrocution on power lines or transmission structures. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife and Impacts on Birds sections, above.

The BLM would require the implementation of mitigation measures by the Applicant to address potential impacts on Swainson's hawks. Mitigation measures would require the Applicant to design, install, and maintain transmission lines and all electrical components in accordance with the APLIC's Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of bird electrocution on the project site.

The USFWS has raised concerns regarding potential collision threats associated with solar and renewable technologies. Because of the potential for project-related impacts, the BLM would require the Applicant to implement a bird monitoring study so that if impacts do occur, they can be documented and addressed.

There would be unavoidable adverse impacts on potential stopover and foraging habitat for Swainson's hawks under the Proposed Action. Swainson's hawk is not expected to nest on the project site or in the immediate project vicinity because of the lack of suitable nesting habitat and the lack of documented nesting in the area. It is anticipated that there would be no impacts

on nesting Swainson's hawks. The Proposed Action would have negligible direct and indirect short- and long-term adverse impacts on any Swainson's hawks occurring in the project vicinity.

### ***Impacts on Special-Status Mammals***

Seven special-status mammals have been documented on the project site and immediate project vicinity during pre-project surveys conducted by the Applicant, or could otherwise potentially occur on the project site. This includes four BLM Sensitive bat species (pallid bat, Townsend's big-eared bat, spotted bat, and western mastiff bat), Nelson's bighorn sheep (a BLM Sensitive species), American badger (a California Species of Special Concern), and desert kit fox (protected under Title 14 of the California Code of Regulations). Potential impacts on these seven special-status mammals are discussed below.

#### American Badger

American badgers are present on the Calico Solar project site, which supports suitable foraging and denning habitat for this species. Because of the large size of the project site, numerous badgers may occur on the project site or have home ranges that partially overlap the project site. Depending on prey densities, home ranges of badgers can vary from 338 to 1,549 acres (Ziener et al. 1990). Their distribution in a landscape coincides with the availability of prey, burrowing sites, and mates, with males ranging wider than females during the breeding and summer months (Minta 1993).

Potential direct impacts on American badgers from the construction and operation of the facility would include habitat loss; mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment; disturbance from increased vehicular and human presence on the project site; and displacement due to habitat loss or alteration. Their tendency to retreat into a burrow when they are alarmed or disturbed increases the likelihood that individuals could be injured or killed during ground-disturbing activities. Construction activities could also result in the disturbance of badger maternity dens during the cub-rearing season (February 15 to July 1).

As noted for other wildlife species, the dispersal of badgers from the project site would likely be hindered by tortoise exclusion fencing that would enclose the project site (i.e., a chain link fence and a tortoise exclusion fence). The BLM concludes that on-site habitat for badgers would not be maintained over time; therefore, 8,230 acres of potential badger habitat would be lost with construction of the Propose Project. Additionally, individuals that remain in the immediate project vicinity could suffer from reduced productivity and survivorship as a result of construction-related and ongoing noise and visual disturbance.

Indirect impacts on this species would consist primarily of ongoing project-related disturbance and habitat degradation from the introduction or spread of nonnative or invasive plant species

and the loss or alteration of its prey base. Another indirect impact would be the increased risk of predation from the placement of fencing, transmission towers, and other aboveground structures (e.g., SunCatchers) that would provide roosting opportunities for avian predators. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife Section, above.

The BLM would require the implementation of project-specific mitigation measures by the Applicant to address potential impacts on American badgers. Mitigation measures would include conducting a pre-construction survey for badger dens on the project site, including areas within 250 feet of all project facilities, utility corridors, and access roads. If present, the Applicant would flag and avoid occupied badger dens during ground-disturbing activities, and would also establish a minimum 200-foot buffer to avoid the loss of maternity dens during the cub-rearing season (February 15 through July 1).

Impacts on American badgers would be unavoidable, but would be minimized and mitigated through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect, short- and long-term adverse impacts on American badgers on the project site and in the immediate project vicinity.

### Desert Kit Fox

Desert kit foxes are present on the project site; this species has been incidentally detected during pre-project surveys and a total of 39 potential kit fox dens were detected during burrowing owl surveys that were conducted in January and February 2010 (SES 2010c; SES 2010f). Estimates of kit fox home range size vary widely, and population densities fluctuate drastically depending on the availability of food, predation pressures, rainfall, and other environmental factors (Zoellick and Smith 1992; White and Garrott 1999; Arjo et al. 2003). While it is difficult to estimate the actual number of desert kit fox that currently occupy the project site, relatively few are likely to occur there based on the number of dens that were observed during burrowing owl surveys conducted in 2010 (SES 2010d).

Potential direct impacts on desert kit foxes from the construction and operation of the facility would include habitat loss; mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment; disturbance from increased vehicular and human presence on the project site; and displacement due to habitat loss or alteration. Their tendency to seek shelter in burrows increases the likelihood that individuals could be injured or killed during ground-disturbing activities. Construction activities could also result in the disturbance of kit fox maternity dens during the pup-rearing season (February 15 to July 1).

As noted for other wildlife species and badgers, above, the dispersal of kit foxes would likely be hindered by tortoise exclusion fencing that would enclose the project site (i.e., a chain link fence and a tortoise exclusion fence). The BLM concludes that on-site habitat for kit foxes would

not be maintained over time; therefore, 8,230 acres of potential kit fox habitat would be lost with construction of the Proposed Project. Individuals that remain in the immediate project vicinity could suffer from reduced productivity and survivorship as a result of construction-related and ongoing noise and visual disturbance.

Indirect impacts on this species would consist primarily of ongoing project-related disturbance and habitat degradation from the compaction of soils, introduction or spread of nonnative or invasive plant species, and the loss or alteration of its prey base. Another indirect impact would be the increased risk of predation from the placement of fencing, transmission towers, and other aboveground structures (e.g., SunCatchers) that would provide roosting opportunities for avian predators. More information regarding these potential direct and indirect impacts is provided in the Impacts on Wildlife Section, above.

The BLM would require the implementation of project-specific mitigation measures by the Applicant to address potential impacts on desert kit foxes. Mitigation measures would include conducting a pre-construction survey for kit fox dens on the project site, including areas within 250 feet of all project facilities, utility corridors, and access roads. If present, the Applicant would flag and avoid occupied kit fox dens during ground-disturbing activities, and would also establish a minimum 200-foot buffer to avoid the loss of maternity dens during the pup-rearing season (February 15 through July 1).

Impacts on desert kit foxes would be unavoidable, but would be minimized and mitigated through the implementation of project-specific mitigation measures. The Proposed Action would have direct and indirect, short- and long-term adverse impacts on desert kit foxes on the project site and in the immediate project vicinity.

### Nelson's Bighorn Sheep

The project site overlaps with the known occupied year-round use area for the Cady Mountains population, which consists of at least 300 Nelson's bighorn sheep (Defenders of Wildlife 2010). Nelson's bighorn sheep were not observed during the pre-project desert tortoise or plant surveys conducted across the project site by the Applicant in 2007 and 2008; however, two bighorn sheep horns, two bighorn sheep skeletons, and two occurrences of scat were documented near the northern boundary of the project site during the April 2010 desert tortoise survey and during subsequent site visits by the CEC. Helicopter surveys conducted by the Applicant in March 2010 observed eight separate groups totaling 62 bighorn sheep (12 rams, 38 ewes, and 12 lambs) in the Cady Mountains within 10 miles of the project site (SES 2010b). While little is known regarding the movements or specific habitat use of this species in the immediate project vicinity, Nelson's bighorn sheep are known to move seasonally from the Cady Mountains to winter ranges in the Bristol Mountains to the east; the project site may also be used during occasional intermountain movements across the valley floor (SES 2009).

Direct effects to Nelson's bighorn sheep would include the loss of approximately 2,240 acres of spring foraging habitat and 430 acres of year-round occupied habitat that would be fenced off within the project site. Other direct and indirect effects could include disturbance from construction activities and ongoing operation and maintenance activities (including nighttime maintenance activities); displacement from suitable habitats in the immediate project vicinity; and displacement from or loss of existing movement corridors, which are discussed in more detail below.

There is evidence that in some circumstances, bighorn sheep may habituate to predictable human activity (Wehausen et al. 1977; Kovach 1979), including highway traffic (Horesji 1976), hiking (Hicks and Elder 1979; Hamilton et al. 1982; Holl and Bleich 1987), and aircraft (Krausman et al. 1998). However, even in otherwise optimum habitat, sheep are known to abandon an area, either temporarily or permanently, when the limit of their tolerance to disturbance is exceeded (Welles and Welles 1961; Light 1971; Wehausen 1980; Papouchis et al. 2001). Even when bighorn sheep appear to be tolerant of a particular activity, continued and frequent disturbance can cause them to avoid an area, potentially interfering with their use of resources such as water, mineral licks, lambing or feeding areas, or traditional movement routes. In addition, disturbance can result in physiological responses such as elevated heart rate, even when no behavioral response is discernible.

While it is expected that habitat use by this species in the project vicinity would shift away from the project site if bighorn sheep are sufficiently distracted by the construction and operation of the facility, noise or visual disturbance could disrupt the foraging, breeding, and sheltering activities of Nelson's bighorn sheep that continue to use habitats in the immediate project vicinity. Portions of the proposed project site on the lower reaches of the Cady Mountains currently provide seasonal foraging opportunities for Nelson's bighorn sheep. Construction of the project would reduce the availability of seasonal forage for Nelson's bighorn sheep and expose sheep that continue to utilize this area to human disturbance. The current access to private lands in the immediate project vicinity is via open routes that traverse the project site; traffic associated with access to private lands would be diverted around the project site via the perimeter road, which would put it in closer proximity to the Cady Mountains. Public interest in the new facility may also result in increased road traffic along desert roads in the project vicinity and in the Cady Mountains.

Wehausen (2005) and others (Schwartz et al. 1986; Bleich et al. 1990, 1996) consider intermountain areas of the desert floor that bighorn traverse between mountain ranges as important to the long term viability of populations as the mountain ranges themselves. The physical barrier posed by the facility would be an additional impediment (in addition to I-40 and the BNSF Railroad) to any movement across the valley to the south of the Cady Mountains; the project could also affect the movement of sheep that might normally use the south side or foothills of the Cady Mountains to traverse to winter ranges in the Bristol Mountains.

Access to water is of critical importance to bighorn sheep, particularly during the summer when environmental conditions are particularly stressful and surface water is scarce. There is an existing guzzler (i.e., artificial wildlife water) in the Cady Mountains that is currently accessed by means of roads on the proposed project site; this access would be maintained post development. The proposed project would not impact access to the guzzler for bighorn sheep.

As discussed in Chapter 3, the Applicant proposes to use a groundwater well (Well 3) located on private land adjacent to the project site as its primary water supply (Figure A-18). Pump testing of Well 3 demonstrates it can support water demands for the project during construction and the lifespan of its operations. The projected total consumptive water use over the forty-year functional life of the Proposed Action would be approximately 1,325 acre-feet, which constitutes approximately 0.4 percent, of the total Lavic Basin capacity; this level of use would not deplete groundwater supplies or cause water shortages that would impact bighorn sheep in the area. The backup water supply for operation of the facility would require obtaining water from the BNSF Cadiz well, located approximately 64 miles southeast of the project site. Nelson's bighorn sheep are known to occupy the Marble and Ship mountain ranges surrounding the Cadiz Valley, where the BNSF Cadiz well is located, and a movement corridor for this species connects these areas across the valley. However, estimated average annual water use for the proposed project (20 acre-feet per year) is approximately 2.5 percent of the groundwater basin's annual recharge volume, and the proposed total use over a 30 year project life would be only 0.01 percent of the total basin storage. Therefore, the use of water from the BNSF Cadiz well would also not deplete groundwater supplies or cause water shortages that would impact bighorn sheep in the area. For additional discussion regarding water resources see Section 4.17 Water Resources.

The BLM would require the implementation of project-specific mitigation measures by the Applicant to address potential impacts on Nelson's bighorn sheep. These measures would include monitoring construction activities and halting construction if bighorn sheep come within 500 feet of any construction activity.

Impacts on Nelson's bighorn sheep foraging habitat would be unavoidable, but would be minimized and mitigated for through the implementation of project-specific mitigation measures. The Proposed Action could have direct and indirect, short- and long-term adverse impacts on Nelson's bighorn sheep occurring in the Cady Mountains to the north of the project site.

### Special-Status Bats

Several special-status bat species are expected to occur in the vicinity of the Calico Solar project site including the pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western mastiff bat (*Eumops perotis*). Other species such as spotted bat (*Euderma maculatum*) could potentially occur, but little is known about their distribution or habitat use in general. All of the aforementioned species have the potential to forage within the project area, and some bat species utilize large areas for foraging. For

example, the pallid bat is capable of flying more than 18 miles, although most foraging occurs within about 2 miles of a diurnal roost (Hermanson and O'Shea 1983).

The rocky, mountainous terrain associated with the Cady Mountains, historic mining operations, and the lava tubes at Pisgah Crater all support suitable bat roosts and potential hibernacula. Railroad trestles and highway bridges in the immediate project vicinity may also provide roosting habitat. Construction of the Calico Solar facility would not be expected to result in the loss of maternity colonies, day roosts, or hibernacula for special-status bats. These features are not known to occur on the project site, and while bats will utilize large trees for day roosts, the habitat on the project site (primarily creosote bush scrub and windrows of sparse salt cedar) is generally not suited for this behavior; however, it may be possible that some areas of the project site that have rock outcrops or exposed lava formations may have limited potential to support small bat roosts.

Direct impacts on bats could include disturbance to or mortality of individuals at small roost sites during construction, the loss of foraging habitat due to construction of permanent structures on the project site (e.g., SunCatchers), and the loss of roost sites. Bats that forage near the ground, such as the pallid bat, would also be subject to mortality, injury, or harassment of individuals by vehicles driving at dusk, dawn, or during the night. Indirect effects could include the loss of foraging habitat due to habitat alteration, increased predation from nighttime lighting that exposes bats, and alteration in prey bases. However, bats may ultimately be attracted to project features such as nighttime lighting, evaporation ponds, and retention basins, as these features may attract prey items such as insects.

In general, bats are highly mobile and it is unlikely that construction activities would result in any direct impacts. However, because potential roost sites occur on the project site (e.g., railroad trestles, areas of rock outcrop) and special-status bats are known to occur nearby at Pisgah Crater, the BLM would require the development of a Bat Protection Plan and implementation of project mitigation measures by the Applicant to address potential impacts to bats. These measures would include conducting pre-construction surveys of suitable roosting habitats including rock outcrops and railroad trestles, allowing bats to leave prior to demolition of any roosts, and avoiding impacts on any maternity colonies that are found by providing alternate roosting habitat. The Applicant would also need to avoid potential adverse effects of any evaporation ponds through the preparation and implementation of an Evaporation Pond Design, Monitoring, and Management Plan.

There would be unavoidable adverse impacts on foraging habitat for special-status bats under the Proposed Action. No impacts on maternity colonies, day roosts, or hibernacula would be expected to occur, and pre-construction surveys of potential roosting habitats would most likely result in the avoidance of any impacts on roosting bats. The Proposed Action would have negligible short- and long-term adverse impacts on special-status bats that forage over the project site.

## CDCA Plan Amendment Impacts

The proposed CDCA Plan amendment required to allow the project site to be developed into an 8,230-acre solar facility would result in the impacts described above for the estimated 30-year project lifespan. Therefore, there would be short- and long-term direct and indirect adverse impacts on biological resources resulting from the CDCA Plan amendment. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

### 4.3.2.2 Alternative 1a: Agency Preferred Alternative

The Agency Preferred Alternative would result in a 24 percent reduction in footprint size relative to the Proposed Action while retaining the same number of SunCatchers (and production capacity) as with the Proposed Action. Under the Agency Preferred Alternative, the project footprint would occupy approximately 6,215 acres of land (Figure 2-6).

### Impacts on Vegetation

Under Alternative 1a, there would be a loss of approximately 5,946 acres of Mojave creosote bush scrub (71 acres of this is previously disturbed), 242 acres of desert saltbush scrub, and 28 acres of developed areas, totaling 6,215 acres of vegetation loss on the project site (Table 4-10). The impacts on vegetation would generally be the same as described for the Proposed Action, although there would be 2,015 fewer acres of native vegetation impacted under the Agency Preferred Alternative. Areas mapped as unvegetated habitat would be avoided under this alternative.

**Table 4-10 Summary of Impacts on Vegetation**

Vegetation Type	Acres of Loss [Table Note 1]
Mojave creosote bush scrub (including 3.3 acres of microphyll woodland)	5,875
Disturbed Mojave creosote bush scrub	71
Desert saltbush scrub	242
Developed lands	28

*Table Note 1:* Rounded to the nearest acre, resulting in a total greater than 6,215 acres.

The Agency Preferred Alternative would still require the construction of numerous retention basins, detention and sediment basins, and a series of small diversion channels that direct flow into the primary natural drainages on site. As with the Proposed Action, these structures would attenuate peak flood discharge rates and would impact sediment transport within and

downstream of the project site. However, the detention basins would be moved downslope and away from sensitive biological resources.

Adverse impacts on vegetation under the Agency Preferred Alternative would be localized, occurring on the project site and extending a short distance from the project boundary. This alternative would result in direct, adverse short-term and long-term impacts on vegetation and plant communities on the project site. The types of effects to native vegetation communities resulting from the Agency Preferred Alternative would be similar to the Proposed Action, but less intense in scale and magnitude.

Mitigation measures that would be implemented to address the Agency Preferred Alternative's direct and indirect impacts on vegetation communities are identical to those identified for Proposed Action.

### **Impacts from Invasive, Nonnative, and Noxious Weeds**

Under the Agency Preferred Alternative there would be less potential for the introduction or spread of invasive, nonnative, and noxious weeds than under the Proposed Action because there would be 2,015 fewer acres of potential ground disturbance under this alternative.

Adverse impacts from invasive, nonnative, and noxious weeds under the Agency Preferred Alternative would be localized, occurring on the project site and extending a short distance from the project boundary. Even with the implementation of project-specific BMPs and control measures to minimize the spread of weeds, there could still be localized, direct and indirect, adverse long-term impacts from the introduction or spread of invasive, nonnative, and noxious weeds on the project site and in the immediate project vicinity.

The implementation of mitigation measures to address potential impacts, which are the same as identified for the Proposed Action, would result in the avoidance or minimization of impacts from the introduction and spread of invasive, nonnative, and noxious weeds.

### **Impacts on Wildlife**

Impacts on wildlife under the Agency Preferred Alternative would be similar those identified for the Proposed Action, but the magnitude and intensity of these impacts would be proportionately reduced due to the approximately 24 percent decrease in the size of the project site. The potential impacts on birds would also be similar to the Proposed Action, although the magnitude of these impacts would also be reduced under the Agency Preferred Alternative because of its reduced acreage.

Wildlife movement would not be constrained under the Agency Preferred Alternative to the degree to which it would be under the Proposed Action. While the Calico Solar facility would still

present a north-south barrier to wildlife movement under the Agency Preferred Alternative, the shift of the project footprint away from the toe of the Cady Mountains would significantly reduce barriers and topographical constraints to east-west movement for desert tortoise and other species, and would provide a habitat linkage that supports live-in habitat as well as a corridor for wildlife movement. Impacts on wildlife movement in the region would be more than proportionally reduced under this alternative. To address other impacts on wildlife, the BLM would require the same mitigation measures that were identified for the Proposed Action, except that any habitat acquisition components would be proportionally reduced.

## **Impacts on Special-Status Species**

### ***Impacts on Special-Status Plants***

Four special-status plant species (small-flowered androstephium, Emory's crucifixion thorn, an unnamed lupine species, and white-margined beardtongue) were detected during surveys conducted by the Applicant for the Proposed Action (SES 2009; SES 2010a; SES 2010e). The reduced footprint of the Agency Preferred Alternative would avoid all mapped occurrences of Emory's crucifixion thorn and the unnamed lupine species, although these occurrences would otherwise have been avoided and protected on-site under the Proposed Action. Mapped occurrences of small-flowered androstephium and white-margined beardtongue would still occur within the boundaries of this alternative. As with the Proposed Action, all occurrences of white-margined beardtongue would be avoided in specially-designated Environmentally Sensitive Areas. Five additional BLM Sensitive species have some potential to occur on the project site, but have not been documented during any of the pre-project surveys conducted by the Applicant (see Table 3-9 in Section 3.3, Biological Resources); if occurrences are documented during future surveys, the BLM would determine the level of avoidance that is appropriate on a case-by-case basis.

Because small-flowered androstephium is not distributed uniformly across the project site, impacts would not be proportionally lower under the Agency Preferred Alternative. Species occurring along the northern project boundary under the Proposed Action would be avoided altogether with the Agency Preferred Alternative. Therefore, the Agency Preferred Alternative would still result in adverse impacts on special-status plants that are similar to the types of impacts that were identified for the Proposed Action, but the magnitude of the impacts would be lower due to the reduction in the size of the project footprint under this alternative.

Mitigation measures to address impacts on special-status plants would be the same as those identified for the Proposed Action, and would include general minimization and avoidance measures.

### **Impacts on Special-Status Wildlife**

The Agency Preferred Alternative would result in reduced impacts on a number of special-status wildlife species on the project site, including desert tortoise, Mojave fringe toed-lizard, and Nelson's bighorn sheep. Direct and indirect impacts on special-status wildlife species would still be considered adverse, short-term and long-term impacts, but would be reduced in extent and magnitude under the Agency Preferred Alternative.

The Agency Preferred Alternative would avoid a large area of occupied desert tortoise habitat that occurs near the foothills of the Cady Mountains (which has the highest density of tortoises) and would greatly reduce the number of tortoises that would need to be translocated during construction. Protocol surveys conducted in 2010 detected 57 tortoises within the project footprint; using the formula in the USFWS's 2010 survey protocol (to calculate the total number of tortoises that are likely present but were not observed during the surveys), the project footprint associated with the Agency Preferred Alternative is expected to support approximately 93 tortoises. The 95 percent confidence interval for this estimate is 47 to 185 adult individuals. Using the estimated range of juveniles making up 31.1 to 51.1 of the overall population and the estimate of 93 adult tortoises on the proposed site, BLM estimates that the 6,215-acre project site may support from 29 to 48 juvenile tortoises. To estimate the number of eggs that could be present on the 6,215-acre project site, BLM used the average number of clutches per reproductive female in a given year, (i.e., 1.6; see Turner et al. 1984), multiplied by the average number of eggs found in a clutch (i.e., 5.8; see Service 1994). By approximating a 1:1 sex ratio, we assumed that 47 out of the 93 adult desert tortoises onsite are reproductive females and that, together, they could produce approximately 436 eggs in a given year. Fewer eggs are likely to be onsite at any given time because the territories of the female desert tortoises likely extend, at least in part, off of the project site and individuals may establish nests in these areas. A summary of the number of desert tortoises that would be impacted under the Agency Preferred Alternative is provided in Table 4-11.

**Table 4-11 Desert Tortoise Impact Summary**

<b>Project Component</b>	<b>Estimated Number of Adult and Subadult Tortoises</b>	<b>Estimated Number of Juvenile Tortoises/Estimated Number of Eggs</b>	<b>Total</b>
Project Site (Individuals to be translocated; 6,215 acres)	93 (max: 185)	29–48/436	558 (max: 669)
1,000-foot Buffer Area (1,495 acres) indirectly affected	37 (based on an assumed density of 16 per square mile)	12–19/0	49–56

<b>Project Component</b>	<b>Estimated Number of Adult and Subadult Tortoises</b>	<b>Estimated Number of Juvenile Tortoises/Estimated Number of Eggs</b>	<b>Total</b>
NAP Area A (960 acres) indirectly affected	24 (based on an assumed density of 16 per square mile)	8–13/0	32–37
Receiver Site Resident Individuals	93 (max: 185)	29–48/0	122 (max: 233)
Control Area Individuals	93 (max: 185)	29–48/0	122 (max: 233)
<b>Total Directly Affected</b>	279–555	87–144/436	802–1,135
<b>Total Directly and Indirectly Affected</b>	340 (max: 616)	107 (max: 176)/436	883 (max: 1,228)

Source: Adapted from BLM 2010d.

The Agency Preferred Alternative would also greatly reduce the barriers and topographical constraints to east-west movement for desert tortoises along the northern project boundary, although the facility would still be a barrier to north-south movement across the project site. Accordingly, impacts on desert tortoises would be reduced, both in magnitude and scale, but not eliminated.

Implementation of the Agency Preferred Alternative would result in the same general impacts on Mojave fringe-toed lizard habitat as the Proposed Action. The Agency Preferred Alternative would impact the same general areas of soft, friable sands that are known to support this species. In addition, this alternative would interfere with aeolian and hydrologic sediment transport on the project site, which could indirectly impact habitat for this species. Even with the 24 percent reduction in project size associated with this alternative, overall impacts on the Mojave fringe-toed lizard would be largely the same as with the Proposed Action.

Gila monsters have not been detected during pre-project surveys conducted by the Applicant; however, the reduced acreage of this alternative would decrease potential impacts on this species, if present. Similarly, impacts on special-status birds including golden eagles, burrowing owls, Swainson's hawk, mountain plover, and Bendire's and Le Conte's thrashers would be reduced in proportion to the reduction in size of the Agency Preferred Alternative.

The Agency Preferred Alternative would minimize impacts on Nelson's bighorn sheep, as the reduced project footprint would impact approximately 1,078 acres of spring foraging habitat along the south side of the Cady Mountains and would not impact any year-round occupied habitat. Bighorn sheep would not be constrained from ranging into the southern foothills of the Cady Mountains as they would under the Proposed Action. Direct effects, including disturbance from construction and maintenance activities, noise, and lighting, would also be minimized as the Agency Preferred Alternative would place the project farther from areas that could

potentially be used by this species. Therefore, impacts on Nelson's bighorn sheep would be reduced in magnitude and extent under this alternative.

Impacts on other wide-ranging species in the project area, including American badger, desert kit fox, and special-status bats would also be reduced in proportion to the reduction in size of the Agency Preferred Alternative. Generally speaking, a 24 percent reduction in habitat loss would occur. Therefore, impacts on these species would also be reduced in magnitude and extent.

To address impacts on special-status wildlife, the BLM would require the exact same mitigation measures that were identified for the Proposed Action, except that any habitat acquisition components would be proportionately reduced. As a result of the smaller project footprint associated with the Agency Preferred Alternative and the fewer acres of desert tortoise and Mojave fringe-toed lizard habitat that would be impacted, there would be a reduction in the amount of compensatory mitigation required under this alternative.

### **CDCA Plan Amendment**

The proposed CDCA Plan amendment required to allow the project site to be developed into a 6,215-acre solar facility would result in the impacts described above for the estimated 30-year project lifespan. Therefore, there would be short- and long-term direct and indirect adverse impacts on biological resources resulting from the CDCA Plan amendment. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would retain 31 percent (11,000) of the proposed SunCatchers and would affect 32 percent of the land required for the Proposed Action. Under Alternative 3, the project footprint would occupy approximately 2,600 acres of land (Figure 2-8).

### **Impacts on Vegetation**

The impacts on vegetation would generally be the same as described for the Proposed Action, although there would be 5,630 fewer acres of native vegetation impacted under the Reduced Acreage Alternative. The Reduced Acreage Alternative would result in the loss of 2,569 acres of creosote bush scrub and 31 acres of developed areas, totaling 2,600 acres of vegetation loss on the project site (Table 4-12). Areas mapped as desert saltbush scrub and unvegetated habitat would be avoided under this alternative. In addition, because this alternative would avoid some of the desert washes where microphyll woodland vegetation occurs, impacts on this vegetation association would be reduced.

**Table 4-12 Summary of Impacts on Vegetation**

<b>Vegetation Type</b>	<b>Acres of Loss [Table Note 1]</b>
Mojave creosote bush scrub	2,569
Developed lands	31

*Table Note 1:* Rounded to the nearest acre.

The Reduced Acreage Alternative would still require the construction of numerous retention basins, detention and sediment basins, and a series of small diversion channels that direct flow into the primary natural drainages on site. As with the Proposed Action, these structures would attenuate peak flood discharge rates and would impact sediment transport on the project site.

Adverse impacts on vegetation under the Reduced Acreage Alternative would be localized, occurring on the project site and extending a short distance from the project boundary. This alternative would result in direct, adverse short-term and long-term impacts on vegetation and plant communities on the project site. The types of effects to native vegetation communities resulting from the Reduced Acreage Alternative would be similar to the Proposed Action, but less intense in scale and magnitude.

Mitigation measures that would be implemented to address the Reduced Acreage Alternative's direct and indirect impacts on vegetation communities are identical to those identified for Proposed Action.

### **Impacts from Invasive, Nonnative, and Noxious Weeds**

Under the Reduced Acreage Alternative there would be less potential for the introduction or spread of invasive, nonnative, and noxious weeds than under the Proposed Action or the Agency Preferred Alternative because there would be considerably less ground disturbance (5,630 fewer acres) associated with the construction of the Reduced Acreage Alternative.

Adverse impacts from invasive, nonnative, and noxious weeds under the Reduced Acreage Alternative would be localized, occurring on the project site and extending a short distance from the project boundary. Even with the implementation of project-specific BMPs and control measures to minimize the spread of weeds, there could still be localized, direct and indirect, adverse long-term impacts from the introduction or spread of invasive, nonnative, and noxious weeds on the project site and in the immediate project vicinity.

The implementation of mitigation measures to address potential impacts, which are the same as identified for the Proposed Action, would result in the avoidance or minimization of impacts from the introduction and spread of invasive, nonnative, and noxious weeds.

## **Impacts on Wildlife**

Impacts on wildlife under the Reduced Acreage Alternative would be similar to the Proposed Action, but the magnitude and intensity of these impacts would be proportionately reduced due to the approximately 68 percent decrease in the size of the project site. The potential impacts on birds would be the same as under Proposed Action, although the magnitude of these impacts would be considerably reduced under the Reduced Acreage Alternative.

While the Calico Solar facility would still present a permanent north-south barrier to wildlife movement under the Reduced Acreage Alternative, the shift of the project footprint away from the foothills of the Cady Mountains would significantly reduce barriers and topographical constraints to east-west movement for desert tortoise and other species; therefore, wildlife movement would not be constrained to the degree to which it would be under the Proposed Action, or even the Agency Preferred Alternative. Impacts on wildlife movement in the region would be more than proportionally reduced under this alternative. To address impacts on wildlife, the BLM would require the same mitigation measures that were identified for the Proposed Action, except that any habitat acquisition components would be proportionally reduced.

## **Impacts on Special-Status Species**

### ***Impacts on Special-Status Plants***

Four special-status plant species (small-flowered androstephium, Emory's crucifixion thorn, an unnamed lupine species, and white-margined beardtongue) were detected during surveys conducted by the Applicant for the Proposed Action (SES 2009; SES 2010a; SES 2010e). The Reduced Acreage Alternative would avoid all mapped occurrences of Emory's crucifixion thorn and the unnamed lupine species. Mapped occurrences of small-flowered androstephium and white-margined beardtongue still occur within the boundaries of this alternative; as with the Proposed Action. All occurrences of white-margined beardtongue would be avoided in Environmentally Sensitive Areas that are delineated and fenced on the project site. Five additional BLM Sensitive species have some potential to occur on the project site, but have not been documented during any of the pre-project surveys conducted by the Applicant (see Table 3-9 in Section 3.3, Biological Resources); if occurrences are documented during future surveys, the BLM would determine the level of avoidance that is appropriate on a case-by-case basis.

Because small-flowered androstephium is not distributed uniformly across the project site, impacts would not be proportionally lower under the Reduced Acreage Alternative. Species occurring along the northern project boundary under the Proposed Action would be avoided altogether with the Reduced Acreage Alternative. Therefore, the Reduced Acreage Alternative

would still result in adverse impacts on special-status plants that are similar to the types of impacts that were identified for the Proposed Action, but the magnitude of the impacts would be lower due to the reduction in the size of the project footprint under the Reduced Acreage Alternative.

Mitigation measures to address impacts on special-status plants would be the same as those identified for the Proposed Action, and would include general minimization and avoidance measures.

### ***Impacts on Special-Status Wildlife***

The Reduced Acreage Alternative would result in reduced impacts on a number of special-status wildlife species on the project site, including desert tortoise, Mojave fringe toed-lizard, and Nelson's bighorn sheep. Direct and indirect impacts on special-status wildlife species would still be considered adverse, short-term and long-term impacts, but would be reduced in extent and magnitude under the Reduced Acreage Alternative.

The Reduced Acreage Alternative would avoid large areas of occupied desert tortoise habitat that occurs near the foothills of the Cady Mountains (which has the highest density of tortoises) and would require fewer tortoises to be translocated during construction. Under this alternative, at least 7 desert tortoises (the number documented within the reduced footprint) would require translocation; compared to the 104 tortoises that were documented within the 8,230 acre footprint and that would require translocation under the Proposed Action, this is a 93 percent reduction in impacts. In addition, the Reduced Acreage Alternative would not isolate a 1,280 acre parcel of land (NAP Area A) that would have been surrounded on three sides by the project site under the Proposed Action. The Reduced Acreage Alternative would significantly reduce the number of tortoises that would need to be translocated from the project site compared to the Proposed Action. The Reduced Acreage Alternative would also significantly reduce the barriers and topographical constraints to east-west movement for desert tortoises along the northern project boundary, although the facility would still be a barrier to north-south movement across the project site. Accordingly, impacts on desert tortoises would be significantly reduced, both in magnitude and scale, but not eliminated.

The Reduced Acreage Alternative would also avoid much of the existing dune habitat that was identified in the SA/DEIS. This and other sandy areas on the project site provide habitat for the Mojave fringe-toed lizard. Although this species is expected to range more broadly across the project site due to the presence of sandy washes, friable soils, and micro-dune environments, this alternative would reduce overall impacts on the species and would not result in complete barriers to dispersal when compared to the Proposed Action. Drainage modifications would still be likely to interfere with aeolian and fluvial sand transport in the area, which could indirectly

impact habitat for this species in the immediate project vicinity. However, overall impacts on Mojave fringe-toed lizard would be reduced in extent and magnitude under this alternative.

Gila monsters have not been detected during pre-project surveys conducted by the Applicant; however, the reduced acreage of this alternative would decrease impacts on this species, if present. Similarly, impacts on special-status birds including golden eagles, burrowing owls, Swainson's hawk, mountain plover, and Bendire's and Le Conte's thrashers would be reduced in proportion to the reduction in size of the Reduced Acreage Alternative. Construction-related disturbance would occur over a shorter period under this alternative since this alternative would only include 31percent of the SunCatchers and associated infrastructure proposed in the Proposed Action.

The Reduced Acreage Alternative would minimize impacts on Nelson's bighorn sheep, as the reduced project footprint would impact approximately 218 acres of spring foraging habitat along the south side of the Cady Mountains and would not impact any year-round occupied habitat. Bighorn sheep would not be constrained from ranging into the southern foothills of the Cady Mountains as they would under the Proposed Action. Direct effects, including disturbance from construction and maintenance activities, noise, and lighting, would also be minimized as the Reduced Acreage Alternative would place the project farther from areas that could potentially be used by this species. Therefore, impacts on Nelson's bighorn sheep would be reduced in magnitude and extent under this alternative.

Impacts on other wide-ranging species in the project area, including American badger, desert kit fox, and special-status bats would also be reduced in proportion to the reduction in size of this the Reduced Acreage Alternative. Generally speaking, a 68 percent reduction in habitat loss would occur. Therefore, impacts on these species would also be reduced in magnitude and extent.

To address impacts on special-status wildlife, the BLM would require the exact same mitigation measures that were identified for the Proposed Action, except that any habitat acquisition components would be proportionately reduced. As a result of the smaller project footprint associated with the Reduced Acreage Alternative and the fewer acres of desert tortoise and Mojave fringe-toed lizard habitat that would be impacted, there would be a reduction in the amount of compensatory mitigation required under this alternative.

### **CDCA Plan Amendment**

The proposed CDCA Plan Amendment required to allow the project site to be developed into a 2,600-acre solar facility would result in the impacts described above for the estimated 30-year project lifespan. Therefore, there would be short- and long-term direct and indirect adverse impacts on biological resources resulting from the CDCA Plan amendment. The multiple-use

guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

As discussed in the SA/DEIS, the Avoidance of Donated and Acquired Lands Alternative was developed by the BLM and CEC to avoid all lands that were donated by the Wildlands Conservancy to BLM and all lands that were acquired by BLM with funding from the LWCF. The Avoidance of Donated and Acquired Lands Alternative would occupy approximately 7,050 acres of land (Figure 2-10). This alternative would retain 100 percent (34,000) of the SunCatchers on 85 percent of the land identified for the Proposed Action.

#### **Impacts on Vegetation**

Under the Avoidance of Donated and Acquired Lands Alternative, there would be a loss of approximately 6,709 acres of Mojave creosote bush scrub (92 acres of this is previously disturbed), 242 acres of desert saltbush scrub, 68 acres of unvegetated habitat, and 28 acres of developed areas, totaling 7,050 acres of vegetation loss on the project site (Table 4-13). Implementation of the Avoidance of Donated and Acquired Lands Alternative would have the same types of effects as described for the Proposed Action, but they would be of somewhat lower magnitude than under the Proposed Action because of the exclusion of 1,180 acres from development (i.e., a 15 percent reduction). However, even with this reduction the resulting site boundary would surround a large parcel of LWCF-acquired lands that would be entirely enclosed within the developed solar field (Figures 2-10 and A-8). Although this parcel would remain undeveloped and direct impacts would not occur, as a result of being surrounded by solar development, this area would be subject to indirect effects and would lose much of its value as wildlife habitat due to its isolation. Indirect effects to vegetation could include altered hydrologic regimes due to the construction of a drainage system and retention basins on the developed solar site, dust, and the spread of nonnative and invasive weeds.

**Table 4-13 Summary of Impacts on Vegetation**

<b>Vegetation Type</b>	<b>Acres of Loss [Table Note 1]</b>
Mojave creosote bush scrub (including 3.3 acres of microphyll woodland)	6,617
Disturbed Mojave creosote bush scrub	92
Desert saltbush scrub	242
Unvegetated habitat (rock outcrop)	68
Developed lands	31

Table Note 1: Rounded to the nearest acre.

Mitigation measures to address impacts on vegetation under the Avoidance of Donated and Acquired Lands Alternative would be identical to those identified for the Proposed Action, except the Applicant would not be required to mitigate for the loss of 1,180 acres of donated and acquired lands.

### **Impacts from Invasive, Nonnative, and Noxious Weeds**

Under the Avoidance of Donated and Acquired Lands Alternative, there would be less potential for the introduction or spread of invasive, nonnative, and noxious weeds than under the Proposed Action because there would be less ground disturbance associated with the construction. However, the Avoidance of Donated and Acquired Lands Alternative would not reduce the potential for impacts from invasive, nonnative, and noxious weeds to the extent that the Reduced Acreage Alternative would. Given that the LWCF-acquired lands would be surrounded by project development, the potential for indirect impacts from invasive, nonnative, and noxious weeds would remain on these lands.

Adverse impacts from invasive, nonnative, and noxious weeds under the Avoidance of Donated and Acquired Lands Alternative would be localized, occurring on the project site and extending a short distance from the project boundary. Even with the implementation of project-specific BMPs and control measures to minimize the spread of weeds, there could still be localized, direct and indirect, long-term impacts from the introduction or spread of invasive, nonnative, and noxious weeds on the project site and in the immediate project vicinity.

Mitigation measures to address potential impacts would be the same as those identified for the Proposed Action, and would result in the avoidance or minimization of impacts from the introduction and spread of invasive, nonnative, and noxious weeds.

### **Impacts on Wildlife**

Impacts on wildlife under the Avoidance of Donated and Acquired Lands Alternative would be similar to those identified for the Proposed Action, but the magnitude and intensity of these impacts would be slightly reduced due to the 14 percent decrease in the project footprint. However, the reduction in impacts on wildlife would not decrease proportionally to the reduction in project size because of the large parcel of LWCF-acquired lands would be entirely enclosed within the developed solar field (Figures 2-10 and A-8). This area would become isolated and while it would be expected to support many wildlife species with small home ranges, the parcels may be insufficient to support wildlife with larger home ranges, such as badgers and foxes.

Terrestrial wildlife that could survive within the enclosed area would likely be subject to increased predation and intra- and interspecific competition as well as inbreeding resulting from the lack of genetic exchange. The lack of connectivity would also result in some species not being able to successfully disperse from their natural habitat or recolonize after being extirpated from what would effectively be a habitat patch. Indirect effects related to noise, changes in vegetation due to altered hydrology and/or the spread of weeds, and general human disturbance would also occur to wildlife within this parcel.

The overall potential impacts on wildlife resulting from the Avoidance of Donated and Acquired Lands Alternative would be only slightly reduced in comparison to the Proposed Action because of the reduction in the project footprint. Impacts on wildlife movement in the area would also be similar to the Proposed Action under this alternative. The Avoidance of Donated and Acquired Lands Alternative would include perimeter fencing designed to exclude desert tortoises from the project site, and a separate chain link fence for site security. Therefore, this alternative would still present a substantial barrier to wildlife movement in the area. In addition, because the northern perimeter of the site would extend into the foothills of the Cady Mountains (as described for the Proposed Action), the obstacle to movement presented by the topography of this area would still occur, and animal movement would still be constrained to the same degree to which it would be under the Proposed Action.

Mitigation measures to address impacts on wildlife under the Avoidance of Donated and Acquired Lands Alternative would be identical to those identified for the Proposed Action, except the Applicant would not be required to mitigate for the loss of 1,180 acres of donated and acquired lands.

## **Impacts on Special-Status Species**

### ***Impacts on Special-Status Plants***

As described above, four special-status plant species (small-flowered androstephium, Emory's crucifixion thorn, an unnamed lupine species, and white-margined beardtongue) were detected during surveys conducted by the Applicant for the Proposed Action (SES 2009; SES 2010a; SES 2010e). The project footprint associated with the Avoidance of Donated and Acquired Lands Alternative would avoid two of the three mapped occurrences of Emory's crucifixion thorn and the other occurrence would be avoided and protected on-site. Mapped occurrences of small-flowered androstephium, white-margined beardtongue, and the unnamed lupine species still occur within the boundaries of this alternative. As with the Proposed Action, all occurrences of white-margined beardtongue and the unnamed lupine species would be protected in specially-designated Environmentally Sensitive Areas.

Because small-flowered androstephium is not distributed uniformly across the project site, impacts would not be proportionally lower under the Avoidance of Donated and Acquired Lands Alternative. Five additional BLM Sensitive species have some potential to occur on the project site, but have not been documented during any of the pre-project surveys conducted by the Applicant (see Table 3-9 in Section 3.3, Biological Resources); if occurrences are documented during future surveys, the BLM would determine the level of avoidance that is appropriate on a case-by-case basis. Therefore, this alternative would still result in adverse impacts on special-status plants that are similar to the types of impacts that were identified for the Proposed Action, but the magnitude of the impacts would be slightly lower due to the reduction in the size of the project footprint under the Avoidance of Donated and Acquired Lands Alternative.

Mitigation measures that would be implemented to address the Avoidance of Donated and Acquired Lands Alternative's impacts on special-status plants are identical to those identified for the Proposed Action.

### ***Impacts on Special-Status Wildlife***

Implementation of the Avoidance of Donated and Acquired Lands Alternative would initially result in a reduction in the number of desert tortoises subject to project impacts and would also reduce the amount of desert tortoise habitat directly impacted by avoiding the donated and acquired lands. However, the reduction in impacts on individuals or their habitat would not decrease proportionally to the reduction in project size because of the large parcel of LWCF-acquired land that would be entirely enclosed within the developed solar field. This area would be an isolated habitat patch and indirect impacts from the construction and operation of the facility would likely result in the extirpation of tortoises from the parcel over time. Because the facility's perimeter fencing would prevent any dispersal to adjacent habitats, tortoises located on the parcel of LWCF-acquired land would likely require translocation in order to provide for the preservation of these individuals, resulting in essentially the same level of impact as under the Proposed Action Alternative.

Implementation of the Avoidance of Donated and Acquired Lands Alternative would result in the same general impacts on Mojave fringe-toed lizard habitat as the Proposed Action. The Avoidance of Donated and Acquired Lands Alternative would impact the same general areas of soft, friable sands that are known to support this species. In addition, this alternative would also likely interfere with aeolian and hydrologic sand transport in the immediate project vicinity, which could indirectly impact habitat for this species. Even with the 15 percent reduction in project size associated with this alternative, overall impacts on Mojave fringe-toed lizard would be largely the same as with the Proposed Action. Generally, the donated and acquired lands do not contain the soils favored by this species, and avoidance of these areas would not reduce direct impacts on the species or its habitat, or contribute to the viability of the species on the project site.

Gila monsters have not been detected during pre-project surveys conducted by the Applicant; however, the reduced acreage of this alternative would slightly decrease potential direct impacts on this species. Similarly, impacts on special-status birds would be slightly reduced, but because a large portion of the avoided lands in this alternative would be surrounded by the solar field, this fragment may become less suitable for foraging and breeding for some species. Therefore, impacts would be reduced, but not in proportion to the reduction in size of this alternative.

The Avoidance of Donated and Acquired Lands Alternative would impact 1,631 acres of spring foraging habitat and 427 acres of year-round occupied habitat along the south side of the Cady Mountains. Bighorn sheep would be constrained from ranging into the southern foothills of the Cady Mountains to about the same extent as they would under the Proposed Action. Direct and indirect impacts including disturbance from construction activities, noise, and lighting would be the same as was described for the Proposed Action.

Impacts on other wide-ranging species in the area, including American badger, desert kit fox, and special-status bats would also be reduced, but not in proportion to the reduction in size of this alternative because of the habitat fragmentation that would occur as a result of surrounding the LWCF-acquired lands with the developed solar field. Therefore, impacts on these species would be only slightly reduced in magnitude and extent.

To address impacts on special-status wildlife, the BLM would require the same mitigation measures that were identified for the Proposed Action. As a result of the smaller project footprint associated with the Avoidance of Donated and Acquired Lands Alternative and the fewer acres of desert tortoise habitat that would be impacted, there would be a reduction in the amount of compensatory mitigation required under this alternative (although not as much of a reduction as would occur under the Agency Preferred Alternative or the Reduced Acreage Alternative).

### **CDCA Plan Amendment**

The proposed CDCA Plan amendment required to allow the project site to be developed into a 7,050-acre solar facility would result in the impacts described above for the estimated 30-year project lifespan. Therefore, there would be short- and long-term direct and indirect adverse impacts on biological resources resulting from the CDCA Plan amendment. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under Alternative 4, the proposed Calico Solar Project would not be approved by the BLM and the impacts associated with the proposed project would not occur. The BLM would not amend the CDCA Plan to allow the development of the site for solar energy production and would continue to manage the site under the existing land use designation in the CDCA Plan. Under this alternative, project site would become available to other uses that are consistent with BLM's land use plan, including potentially another solar energy project, although this would require a future CDCA Plan amendment to allow for solar development. If no projects are approved for the site in the future, the site would continue to remain in its existing condition. With no new structures or facilities constructed or operated on the project site, there would be no additional impacts on biological resources.

Under the No Action alternative, the BLM would deny the Calico Solar Project ROW grant and there would be no CDCA Plan amendment. As such, there would be no direct or indirect impacts on vegetation, wildlife, or special-status species.

#### **4.3.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under Alternative 5, the proposed Calico Solar Project would not be approved by the BLM and the impacts associated with the proposed project would not occur. The BLM would amend the CDCA Plan to allow for other solar projects on the site and as a result, it is possible that another solar energy project would be constructed on the project site. Different solar technologies have different resource requirements for their construction, operation, and maintenance, so it is impossible to speculate on the potential impacts on biological resources at this time.

The proposed CDCA Plan amendment to allow future solar projects to be developed on the project site would likely impact biological resources, but it is impossible to speculate on the potential impacts on biological resources at this time. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under Alternative 6, the proposed Calico Solar Project would not be approved by the BLM and the impacts associated with the proposed project would not occur. The BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. While the CDCA Plan would be amended to make the area unavailable for future solar development, other development could be proposed for this area. We cannot speculate on the potential biological impacts of these proposed projects, if any, at this time. Under this alternative, the BLM would continue to manage the site under the existing land use designation in the CDCA Plan.

The proposed CDCA Plan amendment to prohibit future solar projects from being developed on the project site may impact biological resources, but it is impossible to speculate on the potential impacts on biological resources at this time. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

### **4.3.3 Cumulative Impacts**

#### **4.3.3.1 Methodology**

This cumulative effects analysis employed a combination of quantitative and qualitative analyses: a Geographic Information Systems (GIS)-based quantitative analysis for assessing the direct cumulative effects to habitat loss, a qualitative analysis of indirect effects based on consultations with agency biologists and regional experts, and a literature review of the threats to species and their habitats.

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.
- Create statistical tables to summarize the direct impacts on these resources from existing and anticipated future projects and the proposed 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.

GIS is a widely used and effective tool for analyzing large amounts of spatial data and 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 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 nonnative 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, 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 energy projects proposed on BLM and private land that made up the dataset of future projects in the cumulative analysis for Biological Resources (see Table 4-14 and Table 4-15 and Figures A-22 and A-23) represent projects that had applications to the BLM, the CEC, or eastern Riverside County as of February 2010. Projects for which no GIS-based shape files were available were not included in the quantitative analysis. Not all of the projects shown on the table will complete an 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.

For the analysis of cumulative effects to special-status species, this analysis does not compare the loss of individuals against 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 environmental conditions.

A GIS-based analysis requires the use of compatible datasets that encompass the entire geographic scope of the analysis; the project-specific survey data could not be compared against data for the region that was derived from different methodologies. For example, the project survey data for habitats is based on field surveys; the West Mojave Plan datasets for plant communities are based largely on aerial photo interpretation. The GIS analysis of impacts on plant communities, landforms, and habitats is based on region-wide datasets for those resources (primarily West Mojave Plan datasets), and not on project survey data. Therefore, the acreages presented in the analysis below will not match or reflect 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.

### 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-40 corridor as well as the greater West Mojave Planning Area. Figure A-22 illustrates the numerous proposed renewable projects on BLM, State, and private land in the I-40 corridor in the proposed project vicinity, and Figure A-23 illustrates the numerous proposed renewable projects on BLM, State, and private land in the West Mojave Planning Area. Table 4-14 and Table 4-15 list the existing and foreseeable future projects (proposed) that were included in the quantitative analysis of cumulative effects.

The dataset for existing projects was limited to West Mojave Plan vegetation mapping for urban, agricultural, and rural areas, and a few solar and wind projects on private land. The data set for reasonably foreseeable future projects was limited to available GIS-based spatial data for proposed energy projects, and does not include any residential or commercial projects planned within the watershed. The quantitative analysis could be said to under-represent the number of projects. However, it also over-estimates, to some degree, the actual impacts of the future BLM renewable projects because the entire right-of-way was included in the calculations; not all of the projects depicted in Figure A-23 will complete the environmental review, not all projects will be funded and constructed, and many will not use the entire right-of-way area.

**Table 4-14 Existing Projects Considered in the Cumulative Impact Analysis**

Project	Area (acres)
Urban lands mapped in the West Mojave Planning Area (includes the cities of Ridgecrest, Lancaster, Palmdale, Barstow, Victorville, Hesperia, Apple Valley, Yucca Valley, and Twentynine Palms)	219,644
Agricultural lands mapped in the West Mojave Planning Area	182,360
Total Existing Projects Acreage	402,004

Table Source: BLM and CEC 2010.

Table General Note: Project and acreage data is based on the West Mojave Plan Plant Communities dataset (BLM et al. 2005).

**Table 4-15 Foreseeable Future Projects (Proposed) (Analyzed Quantitatively)  
Considered in the Cumulative Impact Analysis**

Project	Right-of-way Area (acres)	Project	Right-of-way Area (acres)
Advanced Development Services – Barren Ridge	11,541	LSR Pisgah, LLC – Reche Road	17,685
AES Seawest – Daggett Ridge	1,574	AES Wind Generation, Inc.	211
AES SeaWest Daggett	2,593	Airtricity / E On	15,485
AES Seawest, Inc.	8,598	Alta Gas – Ghost Town	7,954
AES Wind Generation – North Daggett	1,642	Boulevard Associates – Tehachapi	9,712
AES Wind Generation – Sand Ridge	3,898	BP Orion – Sidewinder Mountain	2,398
AES Wind Generation – Sand Ridge	4,176	Brewer Energy – Black Hills	4,503
AES Wind Generation – Sand Ridge 2	801	Caithness LLC – Soda Mountain	7,987
Horizon Waterman Hills	724	Calico Solar LLC, Phase 1	5,207
Horizon Wind – Calico Mountains	27,945	Calico Solar LLC, Phase 2	3,389
Horizon Wind – Iron Mountain	10,103	Cameron Ridge, LLC	546
Horizon Wind – Stoddard/Daggett	24,380	Chevron Energy Solutions – Lucerne Valley	518
IDIT, Inc. – Rabbit Dry Lake	477	Competitive Power Ventures, LLC – Saltdale	38,364
Little Mountain Wind Power – Bristol Lake	14,786	Debenham Energy-Searles Hills	7,943
DPT Broadwell Lake	8,616	Oak Creek Energy – Rand Mountain	9,215
LSR Pisgah, LLC – Barstow Road	7,440	Oak Creek Energy – Soledad Mountain	1,229
enXco – Donut	5,033	Oak Creek Energy – Tehachapi	160
enXco Avalon One	276	Pacific Crest Power, LLC	21
enXco Troy Lake Solar	3,707	Padoma Wind Power – Flat Top Mountain	12,680
First Solar – Desert Garnet	6,719	Padoma Wind Power – Pinto Mountains	23,797
First Solar – Desert Obsidian	8,943	Power Partners SW – Tylerhorse Canyon	1,531
First Solar – Desert Opal	15,803	Power Partners SW – Tylerhorse Canyon	1,207
First Solar – Desert Sapphire	5,327	Oak Creek Energy – Black Butte	36,315
FPL Energy – West Fry Wind Project	2,908	Oak Creek Energy – Lucchese	7,250

Project	Right-of-way Area (acres)	Project	Right-of-way Area (acres)
Granite Wind LLC – Granite Mountains	2,085	Oak Creek Energy – Ludlow South	23,664
GreenWing – Mojave Valley	640	Power Partners SW/EnXco – Troy Lake	10,118
Horizon – Daggett Camp Rock	4,741	Oak Creek Energy – Mojave/Tehachapi	1,442
Renewergy, LLC – El Paso Peaks	7,646	Solel, Inc. – Johnson Valley	1,798
RES North American/Granite Wind	2,085	Solel, Inc. – Stedman	7,443
Ridgecrest/Solar Millennium	3,884	Verde Resources	3,105
Sean Roberts RMC	536	West Fry Wind LLC – West Fry Mountains	3,060
Sierra Renewables LLC – Black Lava Butte	4,042	Wind Power Partners – Short Canyon	2,258
Sierra Renewables – Pearsonville	4,121	Total Foreseeable Future Projects Acreage	509,013
Sierra Renewables – Rose Valley	13,994		

*Table Source:* BLM and CEC 2010.

*Table General Note:* BLM Solar and Wind Renewable Projects – 02/16.2010. 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 right-of-way area.

*Table Key:* LLC = limited liability company; Inc. = incorporated.

### 4.3.3.2 Temporal and Geographic Scale

This cumulative impact analysis makes a broad, regional evaluation of the impacts of past, present, and reasonably foreseeable future projects that threaten plant and animal communities within the context and geographic scope of the West Mojave Plan (BLM et al. 2005).

The West Mojave Planning Area is located in the southeastern CDCA, and encompasses 9.3 million acres in Inyo, Kern, Los Angeles, and San Bernardino counties. Solar, wind, and geothermal energy providers have recently submitted project applications that would collectively cover more than 1 million acres of the region (BLM 2010a), with each project posing a potential incremental contribution to cumulatively significant habitat loss and fragmentation.

The California Desert remained an isolated 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 proposed site for the Calico Solar facility is located south of the Cady Mountains in a broad alluvial fan that abuts I-40. While the more recent development of infrastructure (i.e., I-40, Route 66, and utility corridors), and military uses (Marine Corps Logistics Base Yermo, Marine

Air Combat Center Twentynine Palms) has resulted in habitat fragmentation in the region, to some degree, large areas of open space still remain.

The introduction of nonnative plant species and increases in predators such as ravens has contributed to population declines and range contractions for many native species (Boarman 2002). Combined with the effects of historical grazing and military training, and fragmentation from highways and other infrastructure, the proposed wind and solar energy projects in the West Mojave Planning Area have the potential to further reduce and fragment native plant and animal populations, in particular sensitive species such as desert tortoise. In the context of this large scale habitat loss, the Calico Solar facility would contribute, at least incrementally, to the cumulative loss and degradation of habitat for desert plants and wildlife, including desert tortoise, bighorn sheep, and white-margined beardtongue, within the Mojave Desert region of southeastern California. Cumulative impacts associated with the construction, operation, and decommissioning of the Calico Solar facility are considered here for the 30 year life of the project.

### **4.3.3.3 Alternative 1: Proposed Action**

#### **Cumulative Impacts on Vegetation**

Thirty-two distinct plant communities are found within the western Mojave Desert (BLM et al. 2005), some of which have been consolidated into more general categories in Table 4-16. Mojave creosote scrub and saltbush scrub are the most common, together occupying 75 percent of the undeveloped lands. Mojave mixed woody scrub accounts for 13 percent of the native vegetation. The remaining 29 plant communities are found in isolated areas with unique conditions, such as freshwater or alkali wetlands, or occur along the south and west edges of the West Mojave Planning Area, in the desert-mountain transition (BLM et al. 2005).

The geographic scope of the analysis of cumulative effects on plant communities and general wildlife habitat encompasses the West Mojave Planning Area and uses the West Mojave Plan plant communities dataset to map and quantify cumulative effects on plant communities (Table 4-16 and Figure A-24). The West Mojave Plan plant communities dataset is based on the 1996 California Gap Analysis Project conducted by the Biogeography Lab at the University of California, Santa Barbara, and coordinated through the U.S. Geological Survey's (USGS) Biological Resources Division. A new vegetation mapping dataset recently became available for the Mojave Desert region (Thomas et al. 2002); however, the dataset does not cover the entire West Mojave Planning Area and therefore was not used in this analysis.

Table 4-16 quantifies the cumulative effects to plant communities, stratified by community type. Mojave creosote scrub refers to the creosote bush-dominated desert scrubs that occur within the Mojave Desert region of the California Desert geographic subdivision (Hickman 1993).

Adverse impacts on plant communities from past, present, and future projects have and would be seen in many community types, particularly Mojave creosote scrub, mixed desert scrubs, woodland habitats, playa and desert sink scrub, desert wash scrub, and riparian scrub. The Proposed Action would contribute incrementally to the cumulatively significant adverse impacts of past, present, and future projects to Mojave creosote scrub and saltbush scrub.

The analysis of impacts on native vegetation based on the West Mojave Plan plant communities dataset concludes that the Proposed Action would impact 2.2 percent of all the Mojave creosote bush scrub affected by future projects, as well as 1.1 percent of all the saltbush scrub affected by future projects. The Proposed Action's contribution to these effects would be minimized through the application of compensatory mitigation for impacts on desert tortoise habitat and Mojave fringe-toed lizard habitat; the implementation of best management practices during construction; habitat enhancement activities off-site; and site restoration following decommissioning of the facility. While land acquisition does not address the net loss of habitat in the immediate future (a temporal net loss of habitat), 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, agricultural or energy development.

**Table 4-16 Cumulative Impacts: Plant Communities**

<b>Plant Community [Table Note 1]</b>	<b>Total Plant Communities in the West Mojave Planning Area</b>	<b>Impacts on Habitat from Existing Projects (percent of all community type in the West Mojave Planning Area) [Table Note 2]</b>	<b>Impacts on Habitat from Foreseeable Future Projects (percent of all community type in the West Mojave Planning Area) [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total future impacts)</b>
Mojave Creosote Scrub	5,685,847 acres	2,272 acres (0.04%)	362,587 acres (6.4%)	7,998.2 acres (2.2%)
Mixed Desert Scrub	1,462,366 acres	32 acres (0.002%)	73,128 acres (5%)	0 acres
Saltbush Scrub	845,157 acres	1,569 acres (0.2%)	21,247 acres (2.5%)	231 acres (1.1%)
Oak/Juniper/Pine/Joshua Tree Woodland	320,031 acres	0 acres	14,812 acres (4.6%)	0 acres
Urban	219,644 acres	211,399 acres (96%)	46 acres (0.02%)	0 acres
Chaparral	194,551 acres	0 acres	11,546 acres (5.9%)	0 acres
Agriculture	182,360 acres	182,360 acres (100%)	0 acres	0 acres
Playa/Dry Lake	153,593 acres	0 acres	11,546 acres (5.9%)	0 acres
Desert Wash Scrub	81,683 acres	0 acres	1,387 acres (1.7%)	0 acres

Plant Community [Table Note 1]	Total Plant Communities in the West Mojave Planning Area	Impacts on Habitat from Existing Projects (percent of all community type in the West Mojave Planning Area) [Table Note 2]	Impacts on Habitat from Foreseeable Future Projects (percent of all community type in the West Mojave Planning Area) [Table Note 3]	Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total future impacts)
Nonnative Grassland	69,563 acres	0 acres	344 acres (0.5%)	0 acres
Sand Dunes	41,416 acres	0 acres	8 acres (<0.1%)	0 acres
Desert Sink Scrub	30,586 acres	0 acres	853 acres (2.8%)	0 acres
Riparian Scrub/Forest	26,671 acres	0 acres	378 acres (1.4%)	0 acres
Lava	23,789 acres	0 acres	17 acres (0.1%)	0.8 acres (4.7%)
Mesquite Bosque	7,576 acres	0 acres	0 acres	0 acres
Native Grassland	3,375 acres	0 acres	24 acres (0.7%)	0 acres
Montane Meadow	974 acres	0 acres	2 acres (0.2%)	0 acres
Sand Fields	547 acres	0 acres	0 acres	0 acres
Seeps	447 acres	0 acres	0 acres	0 acres
Palm Oasis	33 acres	0 acres	0 acres	0 acres

Table Source: BLM and CEC 2010.

Table Note 1: Based on the Bureau of Land Management West Mojave Plan Plant Communities dataset.

Table Note 2: Based on Agriculture and Urban mapping units from the West Mojave Plan Plant Communities dataset (BLM et al. 2005). See Table 4-15, Foreseeable Future Projects.

Table Note 3: Includes only Bureau of Land Management renewable projects that had submitted a Plan of Development at the time of the analysis and those additional future projects listed in Table 4-15, Foreseeable Future Projects.

Table Key: % = percent.

## Cumulative Impacts from Invasive, Nonnative, and Noxious Weeds

The past and present land uses in the West Mojave Planning Area have had a direct adverse effect on the extent and composition of native vegetation communities and have also resulted in the introduction of invasive, nonnative, and noxious weeds into these communities. Residential, commercial, and agricultural development has converted native shrub communities to urban landscaping and agricultural crops and pastures, which are common sources of invasive plant species. All of these developments are accompanied by the construction of roads; many weed species thrive along roadsides, which provide suitable habitats and can also act as corridors for the dispersal of weed seeds.

The vegetation communities in the West Mojave Planning Area have various susceptibilities to weed invasion, and the impacts of invasive, nonnative, and noxious weeds vary depending on

the sensitivity or rarity of a particular community. Many desert landscapes are not adapted to withstand the effects of fire and the introduction and spread of invasive weed species into these communities can permanently alter their vegetation composition and degrade wildlife habitats.

Current and foreseeable future renewable energy developments in the West Mojave Planning Area would contribute to impacts from invasive, nonnative, and noxious weeds through the loss, alteration, and fragmentation of native plant communities, as well as the construction of roads, which facilitate the introduction and spread of nonnative and invasive weeds. There would be a significant adverse cumulative impact from the introduction and spread of invasive, nonnative, and noxious weeds associated with past, present, and foreseeable future projects because of the threats to native plant communities from future developments, and the Proposed Action would contribute incrementally to this cumulative effect.

### **Cumulative Impacts on Wildlife**

The vegetation communities described above provide habitat for a variety of desert-adapted mammals (large and small), birds, reptiles, and amphibians. The past and present land uses in the West Mojave Planning Area have had a direct effect on the presence, extent, and composition of wildlife populations and their habitat in the region. Commercial, residential, and agricultural development have converted native vegetation communities to urban landscaping and agricultural crops and pastures, influencing their quality and availability to native wildlife species. Construction of roads and highways have reduced habitat, created barriers to wildlife movement, and increased the risk of mortality from vehicle collisions. The presence and noise of human habitation and activity has reduced habitat quality. Despite these adverse impacts, much of the West Mojave Planning Area is still undeveloped and retains its native vegetation communities. These undeveloped lands provide important linkages between suitable habitats; provide opportunities for migration, dispersal, genetic exchange, and adaptation to climate change (i.e., shifts in ranges over time); and support the viability of interconnected metapopulations.

The habitat types that would be impacted by the Proposed Action include Mojave creosote scrub, saltbush scrub, and lava flows (see Table 4-16). Lava flows were not mapped on the project site, but are identified here for the purposes of the cumulative impact analysis since they are part of the West Mojave Plan plant communities dataset. Foreseeable future projects in the region (see Table 4-15) are expected to result in cumulative impacts on 362,587 acres of Mojave creosote scrub (6.4 percent of the total available acres) and 21,247 acres of saltbush scrub (2.5 percent of the total available acres); lava flows, which tend to provide limited wildlife habitat, are expected to be reduced by 17 acres (0.1 percent of the total available acres). The analysis of impacts on native vegetation based on the West Mojave Plan plant communities dataset concludes that the Proposed Action would impact 2.2 percent of all the Mojave creosote bush scrub affected by future projects, as well as 1.1 percent of all the saltbush scrub affected

by future projects. The Proposed Action would therefore contribute incrementally to a significant adverse cumulative effect to wildlife, although the Proposed Action itself would only have a minor contribution to the regional impacts on wildlife.

Foreseeable future projects would result in further changes to the quality of wildlife habitat in the region and to the populations of species that depend upon that habitat. These developments would convert existing habitat (both native and human-modified) through vegetation clearing, construction of buildings, and construction of roads, power lines, and other utilities. Further, these foreseeable future projects would increase human presence and activity on the landscape. All of these actions would alter existing wildlife habitat and populations, diminishing the quality of habitat and wildlife populations dependent on those habitats for some species, and improving habitat and populations for others (i.e., those that favor some degree of human modified landscapes).

Wildlife movement corridors provide a variety of functions including providing habitat connectivity between natural areas, providing stopover habitat for migratory species, and diverting wildlife across permanent physical barriers to dispersal such as highways and dams (Haas 2000; Simberloff et al. 1992). Habitat linkages provide the same functions as movement corridors with the addition of providing live-in habitat for the species for which they are developed. Threats to the integrity of wildlife movement corridors and habitat linkages are primarily associated with large-scale development or disturbance, which is associated with agricultural, infrastructure, commercial, residential, and military developments and uses. Current and foreseeable renewable energy developments in the West Mojave Planning Area may contribute to the loss and impairment of wildlife movement corridors and habitat linkages. The Proposed Action would disrupt wildlife movement corridors and habitat linkages across the project site and would fragment wildlife populations in the immediate project vicinity, contributing incrementally to the loss and degradation of wildlife movement corridors and habitat linkages in the region. Cumulatively, impacts on wildlife movement corridors and habitat linkages in the West Mojave Planning Area from past, present, and foreseeable future projects are expected to be significant.

Many species of birds can be found in the Mojave Desert as either seasonal or full-time residents of the natural and altered landscapes that are present. Threats to birds include breeding, wintering, and migratory stopover habitat loss or damage due to urbanization and agriculture, hunting, pesticide applications, and power line electrocution. Most of the birds whose ranges may extend to the West Mojave Planning Area are protected under the MBTA, which protects individual birds, their eggs, and their nests, but does not include habitat protections that would offer any local or regional conservation benefit through the preservation of existing habitats.

Development and recreational, commercial, industrial, and agricultural activities have converted and degraded bird habitats in the project vicinity. The direct and indirect impacts of current and

foreseeable future renewable energy developments in the Mojave Desert will contribute to the loss and degradation of suitable habitats for birds. The Proposed Action would impact 8,230 acres of suitable nesting and foraging habitat on the project site and would result in adverse short-term and long-term impacts on birds on the project site and in the immediate project vicinity. The cumulative impact to bird populations in the West Mojave Planning Area from past, present, and foreseeable future projects would be considered significant given the threats from future developments, and the Proposed Action would contribute incrementally to this cumulatively significant effect.

## **Cumulative Impacts on Special-Status Species**

### ***Cumulative Impacts on Special-Status Plants***

#### White-Margined Beardtongue

White-margined beardtongue is a locally endemic species in three widely disjunct locations in California, Nevada, and Arizona. It is a rare plant throughout its known range in all three states; in California, most of the documented occurrences are within the Pisgah ACEC, which is located immediately to the southeast of the project site. The California populations are far distant and genetically isolated from the other occurrences. Cumulative impacts are evaluated here in terms of the project's potential impacts on the regional population in California; however, any adverse impacts on the regional population would also be adverse in the broader context of all three known populations.

There is no quantitative data available on population sizes or areal extent of occupied habitat for this species. In the absence of quantitative data on populations and habitat area, the project's cumulative impacts on white-margined beardtongue are evaluated here in qualitative terms. All on-site occurrences of white-margined beardtongue would be avoided with the establishment of specially-designated Environmentally Sensitive Areas on the project site. Ground disturbance and aboveground structures associated with the Proposed Action would likely alter the wind-driven transport of sand across the site to downwind habitat within the adjacent Pisgah ACEC; however, these effects appear to be minimal.

As illustrated in Figure A-25, foreseeable future projects have the potential to convert a substantial portion of the range of this rare species in California. Threats to the southern Nevada populations have also been reported. Although portions of some white-margined beardtongue populations may be avoided by future projects, many of the known occurrences are in areas proposed for future energy development projects (Figure A-25). While the Proposed Action would not impact any individuals of white-margined beardtongue and therefore would not contribute to an adverse cumulative impact, impacts on white-margined beardtongue

from foreseeable future projects would be cumulatively significant given the highly restricted range of this species in California and threats to the California population.

### Other Special-Status Plants

A variety of special-status plant species have ranges that extend through the Mojave Desert, and several are endemic. Four special-status plants (Emory's crucifixion thorn, small-flowered androstephium, an unnamed lupine species, and white-margined beardtongue) occur on the Calico Solar project site. The cumulative effects to white-margined beardtongue were discussed in the previous section. Threats to the other special-status plants include habitat loss and fragmentation due to development in the Mojave Desert, off-highway vehicle activity, cattle and sheep grazing, overdrawn groundwater, and the spread of invasive plant species (CDFG 2005). Current and foreseeable renewable energy developments in the Mojave Desert would contribute to impacts on special-status plants through the loss, alteration, and fragmentation of habitat by development and other land uses, by contributing to depletion of groundwater supplies, and by contributing to the introduction and spread of nonnative and invasive weeds. Impacts on special-status plants would be cumulatively significant given the threats to these species from future developments; while the Proposed Action would not impact Emory's crucifixion thorn or the unnamed lupine species, it would contribute incrementally to an adverse cumulative impact to small-flowered androstephium.

## ***Cumulative Impacts on Special-Status Reptiles***

### Banded Gila Monster

Overall, the distribution, population status, and life history of banded Gila monsters in California are not well known. Current and foreseeable future renewable energy developments in the West Mojave Planning Area could contribute to the loss and degradation of suitable habitat for this species through development, reductions in prey base, and the fragmentation of natural areas. Cumulatively, impacts on banded Gila monster populations in the West Mojave Planning Area are difficult to discern because of the lack of knowledge regarding its distribution and population status, but these cumulative impacts are expected to be adverse given the large areas that will be impacted by foreseeable future projects. While no banded Gila monsters have been observed on the project site, suitable habitat for this species is present; therefore, the Proposed Action would contribute incrementally to this overall adverse cumulative effect.

### Desert Tortoise

This analysis addresses cumulative impacts on desert tortoise 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 a useful tool for evaluating different land-

use issues that tortoises face at a landscape scale. Figure A-26 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. The report 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.” (Nussear et al. 2009)

GIS-based files for the boundaries of the Western Mojave Recovery Unit of the 1994 Desert Tortoise Recovery Plan were not available from the USFWS at the time of this analysis 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 West Mojave Plan boundary was used for this analysis. The West Mojave Plan boundary closely approximates the boundaries of the USFWS recovery unit; however, the USFWS boundaries extend farther north of the West Mojave Plan boundary, past SR 190.

Urbanization/loss of habitat, deteriorating habitat quality from off-highway vehicles, invasion of nonnative grasses and weeds, predation by ravens, collection, livestock grazing, and spread of an upper respiratory tract disease have all contributed to the decline of desert tortoise populations. In response to this decline, large expanses of desert tortoise critical habitat and numerous ACEC/DWMA areas have been identified or established within the West Mojave Planning Area. A BLM-designated DWMA that contains critical habitat for the desert tortoise occurs adjacent to the Calico Solar project site (to the south of the project site, on the other side of I-40).

The cumulative impacts on desert tortoise habitat were analyzed using the GIS-based habitat model and data from USGS. The project's unmitigated effects to desert tortoise habitat (based on the 2009 USGS habitat model) are quantified below in Table 4-17 (and Figure A-26). The Calico Solar project site supports medium and high quality desert tortoise habitat according to the USGS model. The cumulative effect of past, present, and foreseeable future projects would be considered adverse and significant given that nearly 54 percent of the acreage associated with future projects is within high quality desert tortoise habitat (rated between 0.8 and 1.0), and another 16 percent of this acreage is within medium quality desert tortoise habitat. The Proposed Action would also contribute to cumulatively adverse effects to desert tortoise habitat and connectivity.

The adverse significant cumulative effects of past, present, and foreseeable future projects can only be addressed through a regional and coordinated effort aimed at preserving and enhancing large tracts of high quality desert tortoise habitat, restoring degraded areas to address the net loss of habitat, and protecting or enhancing corridors/linkages between DWMA's and other protected habitats. Ongoing collaborative efforts by federal and state agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS provide appropriate vehicles for such a regional mitigation approach.

**Table 4-17 Cumulative Impacts: Desert Tortoise Habitat**

<b>Habitat Value [Table Note 1]</b>	<b>Total Desert Tortoise Habitat in West Mojave Planning Area (percent of total habitat) [Table Note 1]</b>	<b>Impacts on Habitat from Existing Projects (percent of total habitat) [Table Note 2]</b>	<b>Impacts on Habitat from Foreseeable Future Projects (percent of total habitat) [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total future impacts)</b>
0	833,990 acres	12,547 acres (1.5%)	36,678 acres (4.4%)	0 acres
0.1	480,313 acres	36,482 acres (7.6%)	24,471 acres (5.1%)	0 acres
0.2	405,839 acres	43,260 acres (10.7%)	26,038 acres (6.4%)	0 acres
0.3	406,093 acres	23,107 acres (5.7%)	20,339 acres (5.0%)	0 acres
0.4–0.5	895,828 acres	68,394 acres (7.6%)	38,161 acres (4.3%)	0 acres
0.6–0.7	1,359,657 acres	70,201 acres (5.2%)	92,929 acres (6.8%)	412 acres (0.4%)
0.8 –0.9	4,881,903 acres	138,505 acres (2.8%)	2,495,543 acres (51.1%)	7,818 acres (0.3%)
1.0	84,001 acres	0 acres	2,227 acres (2.7%)	0 acres

*Table Source:* BLM and CEC 2010.

*Table Note 1:* Based on USGS Desert Tortoise Habitat Model (Nussear et al. 2009).

*Table Note 2:* Based on Agriculture and Urban mapping units from the West Mojave Plan Plant Communities dataset (BLM et al. 2005).

*Table Note 3:* Includes only BLM renewable projects that had submitted a POD at the time of the analysis and those additional future projects listed in Table 4-15, Foreseeable Future Projects.

*Table Key:* % = percent

### Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard is endemic to southern California and a small area of western Arizona. These lizards occur at several disjunct localities in the West Mojave Planning Area, including the Saddleback Buttes region of Los Angeles County, Edwards Air Force Base, El Mirage, Mojave River near Barstow, Mojave Valley, Alvord Mountain, Pisgah, Cronese Lakes, Dale Lake, Twentynine Palms, and Harper Dry Lake. Threats to the Mojave fringe-toed lizard include habitat loss and population fragmentation from both urban and rural development along the Mojave River and at Twentynine Palms, as well as agricultural development in the Mojave

Valley. Other major threats are flood control structures which prevent the waterborne (fluvial) flow of sand toward occupied habitat, construction of windbreaks and other features that impede the windborne (aeolian) transport of sand to occupied habitat, and vehicle use within occupied habitat (BLM et al. 2005).

Mapping from the Mojave Desert Ecosystem Project (MDEP) was used to map and quantify cumulative effects to Mojave fringe-toed lizard habitat in the SA/DEIS. These data are misleading, however, because they indicated no habitat in some areas of known Mojave fringe-toed lizard occurrence, and indicate suitable habitat in urban areas including several large cities (Palmdale, Barstow, and others) where suitable habitat does not occur. The landforms dataset also did not identify suitable habitat for the Mojave fringe-toed lizard on the Calico Solar project site, which illustrates the limits of large-scale mapping efforts for project-specific mapping or analysis; this species has been observed on the project site and there is an estimate 164.7 acres of suitable habitat present.

Anticipated cumulative effects to Mojave fringe-toed lizard include: downwind adverse indirect impacts on dune habitats from interruption of the fluvial and aeolian sand transport systems; premature stabilization of dunes by the spread of noxious weeds, which can also fuel wildfires; the effects of past and future grazing and off-road vehicles; fragmentation of the remaining habitat and reduced gene flow; an increase in predation by ravens and other predators from an increase in perching structures; and an increase in the potential for fire from transmission lines and increased vehicle use. Compensatory mitigation has been proposed by the CEC to off-set the expected habitat loss, degradation, and fragmentation that would occur from the development of the project site; compensatory mitigation for the loss of Mojave fringe-toed lizard habitat would include the acquisition of suitable dune/sand habitat at a 3:1 ratio.

Current and foreseeable future renewable energy developments in the range of the Mojave fringe-toed lizard contribute to the loss and degradation of habitat through development, habitat fragmentation, and disruption of fluvial and aeolian sand transport processes. Therefore, when considered along with past, present, and foreseeable future projects in the West Mojave Planning Area, the Proposed Action would contribute incrementally to a potentially significant adverse cumulative to the Mojave fringe-toed lizard.

### ***Cumulative Impacts on Special-Status Birds***

#### **Bendire's Thrasher**

Bendire's thrashers occur in desert habitats in California, Nevada, Utah, Colorado, Arizona, New Mexico, and Mexico; its breeding range in the West Mojave Planning Area extends as a discontinuous band in suitable habitat from Joshua Tree National Park to near Victorville (BLM et al. 2005). The primary threat that has been identified for this species is the loss of breeding

habitats to urban and agricultural development (BLM et al. 2005). Existing and foreseeable future renewable energy developments in the West Mojave Planning Area contribute to the loss and degradation of habitat for Bendire's thrashers through development, reductions in prey base, and the fragmentation of natural areas. Cumulatively, impacts on populations of Bendire's thrasher in the West Mojave Planning Area would be considered adverse given the threats to this species from future developments; the Proposed Action would contribute incrementally to this overall adverse cumulative effect.

### Burrowing Owl

The burrowing owl is widely distributed throughout western North America in areas containing short vegetation and/or bare ground in desert, grassland, and low-lying shrub habitats. Threats to this species include habitat loss or damage and/or a reduction in prey base due to urbanization, mining, trash disposal, pesticide use, grazing activities, off-highway vehicle use, invasion of nonnative plants, and brush control activities (BLM et al. 2005). Existing and foreseeable future renewable energy developments in the Mojave Desert contribute to the loss and degradation of burrowing owl habitat through development, reductions in prey base, and the fragmentation of natural areas. Cumulatively, impacts on the burrowing owl populations in the West Mojave Planning Area may be significant given the threats to this species from future developments; the Proposed Action would contribute incrementally to this potentially significant adverse cumulative effect.

### Golden Eagle

The geographic scope of the analysis of cumulative effects to golden eagle foraging habitat was completed for the entire West Mojave Planning Area, as well as on foraging habitat within 10 miles of nests occurring within 10 miles of the proposed project, and used the WEMO plant communities dataset to map and quantify cumulative effects on foraging habitat (Table 4-18 and Table 4-19 and Figures A-27 and A-28). The West Mojave Plan plant communities dataset is based on the 1996 California Gap Analysis Project conducted by the Biogeography Lab at the University of California, Santa Barbara and coordinated through the USGS Biological Resources Division.

Figure A-28 also depicts the locations of other known and documented golden eagle nest locations. The source of this information includes the "nest card" database—helicopter surveys conducted desert-wide in 1978 and 1979—and locations depicted in a 1984 BLM CDCA map of "Sensitive, Rare, Threatened and Endangered Fish and Wildlife". An EA and Implementation Guidance for take permits were issued under the Bald Eagle and Golden Eagle Protection Act (USFWS 2009a). 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.

The project's contribution to impacts on foraging habitat within 10 miles of the nearest known nests is considerable; 15 percent of the anticipated impacts on Mojave creosote scrub and 22.9 percent of the impacts on saltbush scrub. The analysis of direct habitat loss does not reflect the indirect effects of the proposed new transmission lines and associated collisions and raptor electrocutions, which also contribute to cumulative impacts on golden eagle populations. The USFWS (2010b) estimates there are currently approximately 30,000 golden eagles in the western United States, 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.

Threats to the golden eagle include habitat loss; declines in prey species; and the spread of invasive weeds, which displace native species and habitats, fuel wild fires and alter fire regimes (USFWS 2009a). The loss of foraging habitat for this species would add to the cumulative, potentially significant loss of habitat that is occurring within the region. Existing and foreseeable future renewable energy developments in the West Mojave Planning Area contribute to the loss and degradation of habitat for golden eagles through development, reductions in prey base, and the fragmentation of natural areas. While the Proposed Action would not impact any nesting habitat for this species, it would contribute incrementally to a potentially significant cumulative effect through the loss of foraging habitat.

**Table 4-18 Cumulative Impacts: Golden Eagle Foraging Habitat for Nests within 10 Miles of the Project Site**

<b>Foraging Habitat (by plant community) [Table Note 1]</b>	<b>Total Plant Communities in 10-mile radius [Table Note 1]</b>	<b>Impacts on Foraging Habitat from Existing Projects (percent of all community type in a 10-mile radius) [Table Note 2]</b>	<b>Impacts on Foraging Habitat from Foreseeable Future Projects (percent of all community type in 10-mile radius) [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total future impacts)</b>
Mojave Creosote Scrub	260,451 acres	0 acres	53,533 acres	7,998.2 acres (14.9%)
Mixed Desert Scrubs	22.1 acres	0 acres	0 acres	0 acres
Saltbush Scrub	13,038 acres	0 acres	997 acres	231 acres (23.1%)
Playa/Dry Lake	1,691 acres	0 acres	10 acres	0 acres
Desert Wash Scrub [Table Note 4]	2608.5 acres	0 acres	376 acres (14.4%)	0 acres [Table Note 4]
Sand Dunes [Table Note 4]	0 acres	0 acres	0 acres	0 acres [Table Note 4]
Desert Sink Scrub	66.5 acres	0 acres	699 acres (32.8%)	0 acres
Riparian Scrub/Forest	139 acres	0 acres	0 acres	0 acres
Lava	8,798 acres	0 acres	15 acres (0.2%)	0.8 acres (5.3%)

Table Source: BLM and CEC 2010.

*Table Note 1:* Based on the West Mojave Plan Plant Communities dataset (BLM et al. 2005).

*Table Note 2:* Based on Agriculture and Urban mapping units from the West Mojave Plan Plant Communities dataset (BLM et al. 2005). See Table 4-15, Foreseeable Future Projects.

*Table Note 3:* Includes only BLM renewable projects that had submitted a POD at the time of the analysis and those additional future projects listed in Table 4-15, Foreseeable Future Projects.

*Table Note 4:* Acreages based on the West Mojave Plan Plant Communities dataset (BLM et al. 2005) vegetation mapping and does not reflect the ground-based delineation of habitat.

*Table Key:* % = percent.

**Table 4-19 Cumulative Impacts: Golden Eagle Foraging Habitat in the West Mojave Planning Area**

<b>Foraging Habitat (by plant community) [Table Note 1]</b>	<b>Total Plant Communities in the West Mojave Planning Area [Table Note 1]</b>	<b>Impacts on Foraging Habitat from Existing Projects [Table Note 2]</b>	<b>Impacts on Foraging Habitat from Foreseeable Future Projects [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts</b>
Mojave Creosote Scrub	5,685,847 acres	2,272 acres (0.04%)	362,587 acres (6.4%)	7,998.2 acres (2.2%)
Mixed Desert Scrubs	1,462,366 acres	32 acres (0.002%)	73,128 acres (5%)	0 acres
Saltbrush Scrub	845,157 acres	1,569 acres (0.2%)	21,247 acres (2.5%)	231 acres (1.1%)
Oak/Juniper/Pine/Joshua Tree Woodland	320,031 acres	0 acres	14,812 acres (4.6%)	0 acres
Urban	219,644 acres	211,399 acres (96%)	46 acres (0.02%)	0 acres
Chaparral	194,551 acres	0 acres	11,546 acres (5.9%)	0 acres
Agriculture	182,360 acres	182,360 acres (100%)	0 acres	0 acres
Playa/Dry Lake	153,593 acres	0 acres	3,329 acres (2.2%)	0 acres
Desert Wash Scrub	81,683 acres	0 acres	1,387 acres (1.7%)	0 acres
Nonnative Grassland	69,563 acres	0 acres	344 acres (0.5%)	0 acres
Sand Dunes	41,416 acres	0 acres	8 acres (<0.1%)	0 acres
Desert Sink Scrub	30,586 acres	0 acres	853 acres (2.8%)	0 acres
Riparian Scrub/Forest	26,671 acres	0 acres	378 acres (1.4%)	0 acres
Lava	23,789 acres	0 acres	17 acres (0.1%)	0.8 acres (4.7%)
Mesquite Bosque	7,576 acres	0 acres	24 acres (0.7%)	0 acres
Native Grassland	3,375 acres	0 acres	24 acres (0.7%)	0 acres
Montane Meadow	974 acres	0 acres	2 acres (0.2%)	0 acres
Sand Fields	547 acres	0 acres	0 acres	0 acres
Seeps	447 acres	0 acres	0 acres	0 acres

<b>Foraging Habitat (by plant community) [Table Note 1]</b>	<b>Total Plant Communities in the West Mojave Planning Area [Table Note 1]</b>	<b>Impacts on Foraging Habitat from Existing Projects [Table Note 2]</b>	<b>Impacts on Foraging Habitat from Foreseeable Future Projects [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts</b>
Palm Oasis	33 acres	0 acres	0 acres	0 acres

*Table Source:* BLM and CEC 2010.

*Table Note 1:* Based on the West Mojave Plan Plant Communities dataset (BLM et al. 2005).

*Table Note 2:* Based on Agriculture and Urban mapping units from the West Mohave Plan Plant Communities dataset (BLM et al. 2005). See Table 4-15, Foreseeable Future Projects.

*Table Note 3:* Includes only BLM renewable projects that had submitted a POD at the time of the analysis and those additional future projects listed in Table 4-15, Foreseeable Future Projects.

*Table Key:* % = percent.

### Le Conte's Thrasher

Le Conte's thrasher is patchily distributed within the deserts of the American Southwest and northwestern Mexico (Sheppard 1996). Threats to Le Conte's thrasher primarily include habitat loss or degradation due to development, grazing, invasion of nonnative weeds, wildfires, and off-highway vehicle use. Current and foreseeable future renewable energy developments in the West Mojave Planning Area contribute to the loss and damage of habitat through development and fragmentation of natural areas. Cumulatively, impacts on Le Conte's thrasher populations in the West Mojave Planning Area would not be significant given this species' widespread distribution in the Mojave Desert; the Proposed Action would contribute incrementally to this adverse cumulative impact.

### Mountain Plover

The loss and degradation of breeding and wintering habitats are the greatest threats to the mountain plover, including the loss of agricultural areas in California (BLM et al. 2005). In the West Mojave Planning Area, mountain plover wintering habitat is almost exclusively private agricultural land. The analysis of impacts on agricultural lands based on the West Mojave Plan plant communities dataset concludes that the neither the Proposed Action nor any foreseeable future project would impact any agricultural lands (see Table 4-16). Cumulatively, impacts on the wintering populations of mountain plover in the West Mojave Planning Area may be negligible given the lack of threats to this species from future developments.

### Swainson's Hawk

The cause of Swainson's hawks recent decline is uncertain; potential threats include the loss of Joshua tree woodland and riparian habitats, a reduction in prey base due to loss of riparian and agricultural habitats, pesticide use, and disturbance from off-highway vehicle use at nest sites

(BLM et al. 2005). Existing and foreseeable future renewable energy developments in the West Mojave Planning Area contribute to the loss and degradation of Swainson's hawk habitat through development, reductions in prey base, and the fragmentation of natural areas. Cumulatively, adverse impacts on the Swainson's hawk population in the West Mojave Planning Area would be considered potentially significant given the threats to this species from future developments, particularly those developments occurring in desert wash and riparian habitats. While the Proposed Action would not impact any nesting habitat for this species, it would contribute incrementally to this potentially significant cumulative effect through the loss of foraging habitat.

### ***Cumulative Impacts on Special-Status Mammals***

#### American Badger

The range of the American badger extends throughout the state of California in areas where suitable vegetative structure exists for cover and friable soils are present for burrowing. The American badger is a CDFG Species of Special Concern. Threats to this species include habitat loss or damage due to development, agriculture, pesticide use, off-highway vehicle use, mining, and trash disposal. Current and foreseeable renewable energy developments in the West Mojave Planning Area contribute to the loss and damage of habitat through development, habitat fragmentation, and the disruption of natural areas. Cumulatively, impacts on American badger populations in the West Mojave Planning Area would not be significant given this species' widespread distribution in the Mojave Desert; the Proposed Action would contribute incrementally to this adverse cumulative impact.

#### Desert Kit Fox

The desert kit fox ranges from the southwestern United States into areas of northern Mexico, and can be found in many of the same habitats that support the American badger. The desert kit fox currently retains no special status; however, it is protected under Title 14 of the California Code of Regulations (Section 460). Threats to this species include habitat loss or damage due to development, agriculture, pesticide use, off-highway vehicle use, mining, and trash disposal. Current and foreseeable renewable energy developments in the West Mojave Planning Area contribute to the loss and damage of habitat through development, fragmentation, and the disruption of natural areas. Cumulatively, impacts on desert kit fox populations in the West Mojave Planning Area would not be significant given this species' widespread distribution in the Mojave Desert; the Proposed Action would contribute incrementally to this adverse cumulative impact.

## Nelson’s Bighorn Sheep

Within the West Mojave Planning Area, there are 16 bighorn sheep populations are known to have existed as defined by mountain range complexes. Five of these 16 areas no longer contain populations, three have reintroduced populations, and two have been augmented with sheep from another population (BLM et al. 2005). Within the West Mojave Planning Area there are three metapopulations: the south, central, and north Mojave Desert metapopulations (Torres et al. 1994, 1996), whose geographic boundaries are now delineated by major fenced highways (I-15 and I-40). The distribution and extent of bighorn sheep occupied and unoccupied range (Wildlife Habitat Management Areas, or WHMAs), connectivity corridors, and spring forage habitat (identified as lands within 1 mile of the outer edges of their delineated range), overlaid with past and foreseeable future projects within the West Mojave Planning Area are quantified in Table 4-20 and illustrated in Figure A-29.

The GIS analysis of the WEMO bighorn sheep range and connectivity corridors indicates that the effects of past and foreseeable future projects (i.e., land use conversion) to occupied and unoccupied ranges are relatively minor, due largely to their locations, in wilderness areas and at higher elevations. Cumulatively, however, large-scale renewable energy development in the West Mojave Planning Area could significantly impact gene flow between sheep populations, decreasing the viability of the regional bighorn sheep metapopulation. The Proposed Action would result in the loss of bighorn sheep habitat, as spring foraging habitat and year-round occupied habitat overlap the northern portion of the project site; therefore, the Proposed Action would contribute incrementally to the cumulative loss of bighorn sheep habitat in the Cady Mountains and significant adverse cumulative impacts on Nelson’s bighorn sheep populations in the West Mojave Planning Area.

**Table 4-20 Cumulative Impacts: Bighorn Sheep Range and Connectivity Corridors**

<b>Bighorn Sheep Range (WHMAs) and Connectivity Corridors [Table Note 1]</b>	<b>Total Range or Connectivity Corridor in the West Mojave Planning Area [Table Note 1]</b>	<b>Impacts on Range and Connectivity Corridors from Existing Projects (percent of all WHMAs or corridors in the West Mojave Planning Area) [Table Note 2]</b>	<b>Impacts on Range and Connectivity Corridors from Foreseeable Future Projects (percent of all WHMAs or corridors in the West Mojave Planning Area) [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total future impacts)</b>
Total in WEMO	5,319,405 acres	7.196 acres (0.1% of total WEMO)	300,524 acres (5.6% of total WEMO)	430 acres (0.01% of total WEMO)
Occupied Range	1,020,111 acres	548 acres (0.05% of total occupied range)	35,488 acres (3.5% of total occupied range)	430 acres (1.2% of total impacts from Future Projects)

<b>Bighorn Sheep Range (WHMAs) and Connectivity Corridors [Table Note 1]</b>	<b>Total Range or Connectivity Corridor in the West Mojave Planning Area [Table Note 1]</b>	<b>Impacts on Range and Connectivity Corridors from Existing Projects (percent of all WHMAs or corridors in the West Mojave Planning Area) [Table Note 2]</b>	<b>Impacts on Range and Connectivity Corridors from Foreseeable Future Projects (percent of all WHMAs or corridors in the West Mojave Planning Area) [Table Note 3]</b>	<b>Contribution of Calico Solar Project to Future Cumulative Impacts (percent of total future impacts)</b>
Unoccupied Range	601,955 acres	0 acres	12,421 acres (2.1% of total unoccupied range)	0 acres
Connectivity Corridors	3,695,747 acres	6,621 acres (0.2% of total connectivity corridor)	252,615 acres (6.8% of total connectivity corridor)	0 acres
Concentration Area	1,592 acres	0 acres	0 acres	0 acres

*Table Source:* BLM and CEC 2010.

*Table Note 1:* Based on the BLM West Mojave Plan Bighorn Sheep WHMAs dataset.

*Table Note 2:* Based on Agriculture and Urban mapping units from the West Mojave Plan Plant Communities dataset (BLM et al. 2005). See Table 4-15, Foreseeable Future Projects.

*Table Note 3:* Includes only BLM renewable projects that had submitted a POD at the time of the analysis and those additional future projects listed in Table 4-15, Foreseeable Future Projects.

*Table Key:* % = percent; WEMO = West Mohave Plan; WHMA = wildlife habitat management areas.

### Special-Status Bats

A variety of bat species are known to occur in the Mojave Desert, including numerous special-status species. The pallid bat, Townsend's big-eared bat, and spotted bat range throughout most of California, while the western mastiff bat is generally found south of the San Joaquin Valley (inland range) and Monterey County (coast range). All four species are BLM Sensitive species and CDFG Species of Special Concern. Threats to bats in the region include habitat loss or damage and/or a reduction in prey base due to urbanization, mining, trash disposal, pesticide use, and noise from off-road vehicles. Past, present, and future foreseeable projects in the West Mojave Planning Area contribute to the loss and degradation of roosting and foraging habitat through development, reductions in prey base, and disturbance in natural areas. Cumulatively, impacts on bat populations in the West Mojave Planning Area are expected to be adverse given the threats to these species from foreseeable future projects, although perhaps not significant due to the ongoing protection of maternity colonies and communal roost sites. The Proposed Action would contribute incrementally to this overall adverse cumulative effect.

## **CDCA Plan Amendment Impacts**

The proposed CDCA Plan amendment required to allow the project site to be developed into an 8,230-acre solar facility would result in the cumulative impacts described above for the estimated 30-year project lifespan. Therefore, there would be adverse cumulative impacts on biological resources resulting from the CDCA Plan amendment. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

### **4.3.3.4 Alternative 1a: Agency Preferred Alternative**

The Agency Preferred Alternative would impact 2,015 fewer acres than the Proposed Action, and would contribute less of an adverse impact to vegetation, wildlife (including wildlife movement corridors), and special-status species (most notably, Nelson's bighorn sheep and desert tortoise) compared to the Proposed Action. There would still be a potentially significant adverse cumulative impact to these resources from past, present, and future foreseeable projects.

### **4.3.3.5 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would impact 5,630 fewer acres than the Proposed Action and would contribute substantially less of an adverse impact to vegetation, wildlife (including wildlife movement corridors), and special-status species (most notably, Nelson's bighorn sheep and desert tortoise) compared to the Proposed Action. There would still be a potentially significant adverse cumulative impact to these resources from past, present, and future foreseeable projects.

### **4.3.3.6 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative would have a similar contribution to adverse cumulative effects to vegetation, wildlife, and special-status species as the Proposed Action, but would impact 1,180 fewer acres. The Avoidance of Donated and Acquired Lands Alternative would not contribute substantially less of an adverse impact to vegetation, wildlife, or special-status species compared to the Proposed Action, and there would still be a potentially significant adverse cumulative impact to these resources from past, present, and future foreseeable projects.

#### **4.3.3.7 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Alternative 4 would result in no direct or indirect impacts on the project site and, therefore, would not contribute to cumulative impacts on vegetation, wildlife, or special-status species.

#### **4.3.3.8 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Alternative 5 would not result in any disturbance at the project site and, therefore, would not contribute to cumulative impacts on vegetation, wildlife, or special-status species.

The proposed CDCA Plan amendment to allow future solar projects to be developed on the project site would likely impact biological resources, but impacts would vary depending upon the size and configuration of the project. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.3.9 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Alternative 6 would not result in any disturbance at the project site and, therefore, would not contribute to cumulative impacts on vegetation, wildlife, or special-status species.

The proposed CDCA Plan amendment to prohibit future solar projects to be developed on the project site would however allow for consideration of other kinds of projects that may have impacts on biological resources, which would vary depending upon the size and configuration of the project. The multiple-use guidelines and elements from the CDCA Plan that pertain to vegetation, wildlife, and special-status species would not be affected.

#### **4.3.3.10 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures**

Mitigation measures described here address environmental impacts that are applied in the impact analysis to reduce intensity or eliminate the impacts. These measures represent a culmination of mitigation measures (required by CEC) and Stipulations associated with the issuance of BLM's Record of Decision. It is anticipated that these measures will be slightly modified and/or supplemented during consultation with the USFWS and CDFG.

##### **4.3.4.1 Project Mitigation Measures**

###### **BIO-1 Designated Biologist Selection**

The Applicant shall assign at least one Designated Biologist to the project. The Applicant shall submit the resume of the proposed Designated Biologist, with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) and the Bureau of Land Management's (BLM's) Wildlife Biologist for approval in consultation with the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS):

- (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 ([http://www.fws.gov/ventura/speciesinfo/protocols\\_guidelines](http://www.fws.gov/ventura/speciesinfo/protocols_guidelines)), demonstrate familiarity with protocols and guidelines for the desert tortoise
- (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 BLM's Wildlife Biologist and the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement these mitigation measures.

**Verification:** No fewer than 30 days prior to construction-related ground disturbance, the Designated Biologist(s) shall complete a USFWS Desert Tortoise Authorized Biologist Request Form ([http://www.fws.gov/ventura/speciesinfo/protocols\\_guidelines](http://www.fws.gov/ventura/speciesinfo/protocols_guidelines)) and submit it to the USFWS, BLM's Wildlife Biologist, and the CPM for review and final approval.

The Applicant shall submit the resume of the Designated Biologist to the CPM and BLM within 7 days of receiving the Energy Commission Decision, or the signing of the Record of Decision, whichever occurs first. 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 BLM's Wildlife Biologist and the CPM as soon as possible prior to the termination or release of the Designated Biologist. In an emergency, the Applicant shall immediately notify the BLM's Wildlife Biologist and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to BLM's Wildlife Biologist and the CPM and for consideration.

## **BIO-2 Designated Biologist Duties**

The Applicant 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 Applicant, BLM's Wildlife Biologist, and the CPM. The Designated Biologist Duties shall include the following:

- (1) Advise the Applicant's Construction and Operation Managers on the implementation of the biological resources mitigation measures;
- (2) Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the Applicant;
- (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 Applicant, the BLM's Wildlife Biologist and the CPM of any non-compliance with any biological resources mitigation measure;
- (7) Respond directly to inquiries of BLM's Wildlife Biologist and 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 to both the CPM and BLM Wildlife Biologist;
- (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 ([http://www.fws.gov/ventura/speciesinfo/protocols\\_guidelines](http://www.fws.gov/ventura/speciesinfo/protocols_guidelines)); and
- (10) Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, BLM's Wildlife Biologist, and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base.

**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 BLM's Wildlife Biologist and 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 BLM's Wildlife Biologist and the CPM.

### **BIO-3 Biological Monitor Qualifications**

The Designated Biologist shall submit the resume, at least three references, and contact information of each of the proposed Biological Monitors to BLM's Wildlife Biologist and the CPM. The resume shall demonstrate, to the satisfaction of the BLM's Wildlife Biologist and 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 2008c).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the project-specific mitigation measures, BRMIMP, WEAP, and USFWS guidelines on desert tortoise surveys and handling procedures

([http://www.fws.gov/ventura/speciesinfo/protocols\\_guidelines](http://www.fws.gov/ventura/speciesinfo/protocols_guidelines)).

**Verification:** The Applicant shall submit the specified information to the BLM's Wildlife Biologist and 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 BLM's Wildlife Biologist and 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 BLM's Wildlife Biologist and the CPM for approval at least 10 days prior to their first day of monitoring activities.

#### **BIO-4 Biological Monitor Duties**

The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of site mobilization activities, construction-related ground disturbance, grading, boring, or trenching. The Designated Biologist shall remain the contact for the Applicant, BLM's Wildlife Biologist, and the CPM.

**Verification:** The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Wildlife Biologist and the CPM and 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 BLM's Wildlife Biologist and the CPM.

#### **BIO-5 Designated Biologist and Biological Monitor Authority**

The Applicant's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources mitigation measures. The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these mitigation measures 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 Applicant'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 Applicant and the construction/operation manager when to resume activities; and
- (3) Notify BLM's Wildlife Biologist and 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.
- (4) If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

**Verification:** The Applicant shall ensure that the Designated Biologist or Biological Monitor notifies BLM's Wildlife Biologist and 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, and operation activities. The Applicant shall notify BLM's Wildlife Biologist and the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the Applicant, a determination of success or failure would be made by BLM's Wildlife Biologist and the CPM within five working days after receipt of notice that corrective action is completed, or the Applicant would be notified by BLM's Wildlife Biologist and the CPM that coordination with other agencies would require additional time before a determination can be made.

### **BIO-6 Worker Environmental Awareness Program (WEAP)**

The Applicant shall develop and implement a Project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from BLM's Wildlife Biologist and 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 tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and whitemargined beardtongue, 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;
- (7) Include printed training materials, including photographs and brief descriptions of desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;
- (8) Prominently display posters and descriptions in offices, conference rooms, employee break rooms, and other areas where employees may congregate of desert tortoises, Mojave fringe-toed lizards, burrowing owls, golden eagles, nesting birds, badgers, and white-margined beardtongue, including behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures; and
- (9) Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

**Verification:** Within 7 days of publication of the Energy Commission's License Decision, or the Record of Decision/ROW Issuance, whichever comes first, the Applicant shall provide to BLM's Wildlife Biologist and 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 Applicant 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 Applicant shall submit two copies of the BLM- and CPM-approved final WEAP. Training acknowledgement forms signed during construction shall be kept on file by the Applicant for at least 6 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. All long-term personnel shall attend annual refresher training. 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 Applicant and shall be made available to BLM's Wildlife Biologist and the CPM upon request. Workers shall receive and be required to visibly display a hardhat sticker and Certification Card that they have completed the training. The WEAP Certification Card shall be presented to the Designated Biologist, Biological Monitor, or appropriate Agency Representative upon request. Failure to present such certification may serve as grounds to deny access to the project site.

During project operation, signed statements for operational personnel shall be kept on file for 6 months following the termination of an individual's employment.

### **BIO-7 Biological Resources Mitigation Implementation and Monitoring Plan**

The Applicant shall develop a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), and shall submit copies of the proposed BRMIMP to the BLM-Wildlife Biologist and the CPM for review and approval. The Applicant shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Hazardous Materials Plan; the Revegetation Plan; the Weed Management Plan; the Special-Status Plant Protection and Monitoring Plan; the Special-Status Plant Remedial Action Plan; the Seed Collection Plan; the Protected Plant Salvage Plan; the Desert Tortoise Translocation Plan; the Raven Monitoring, Management, and Control Plan; the Burrowing Owl Monitoring and Mitigation Plan; the Burrowing Owl Relocation Area Management Plan; the Bighorn Sheep Mitigation Plan; the Streambed Management Plan; the Evaporation Pond Design, Monitoring, and Management Plan; the Avian Protection Plan, and the Bat Protection Plan.

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 Applicant;
- (2) All biological resources mitigation measures 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, the CDFG 2080.1 consultation, and BLM stipulations;
- (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 BLM's Wildlife Biologist and 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 (CNDDB) per CDFG requirements.

**Verification:** The Applicant shall submit the final BRMIMP to BLM's Wildlife Biologist and the CPM at least 30 days prior to start of any preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching. The BRMIMP shall contain all of the required measures included in all biological mitigation measures. No construction-related ground disturbance, grading, boring, or trenching may occur prior to approval of the final BRMIMP by BLM's Wildlife Biologist and the CPM.

If any permits have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to BLM's Wildlife Biologist and the CPM within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit conditions within at least 10 days of their receipt by the Applicant. Ten days prior to site and related facilities mobilization, the revised BRMIMP shall be resubmitted to BLM's Wildlife Biologist and the CPM.

To verify that the extent of construction disturbance does not exceed that described in this analysis, the Applicant shall submit aerial photographs, at an approved scale, taken before and after construction to the CPM and BLM's Wildlife Biologist. 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 at least 60 days 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 and BLM's Wildlife Biologist no later than 90 days after completion of construction. The Applicant shall also provide a final accounting of the acreages of vegetation communities/cover types present before and after construction and a depiction of the approved project boundaries superimposed on the post project aerial photograph. If final acreages and/or disturbance footprints exceed those previously approved, the Applicant shall coordinate with the CEC, CDFG, and USFWS to determine appropriate mitigation for such impacts. Such mitigation may exceed the requirements as outlined in these mitigation measures (i.e., higher mitigation ratios may be imposed at the discretion of the wildlife agencies).

Any changes to the approved BRMIMP (including the project footprint) must be approved by BLM's Wildlife Biologist and the CPM and in consultation with CDFG and USFWS before such action is taken.

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 Applicant shall provide to BLM's Wildlife Biologist and the CPM, for review and approval, a written Construction Termination Report identifying which items of the BRMIMP have been completed, summarizing all modifications to mitigation measures made during the project's preconstruction site mobilization and construction-related ground disturbance, grading, boring, and trenching, naming any mitigation and monitoring items still outstanding, and providing a timeline for implementing outstanding items. The Applicant shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize the Construction Termination Report to fulfill its reporting requirements to be outlined in the BRIMP.

## **BIO-8 Impact Avoidance and Minimization Measures**

The Applicant shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources. All measures shall be subject to review and approval by the CPM.

- (1) Limit Disturbance Areas and Perimeter Fencing. 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 or within the approved disturbance footprint (after appropriate tortoise exclusion fencing has been installed and tortoises have been removed consistent with the Desert Tortoise Translocation Plan). Parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat or within the approved disturbance footprint (after appropriate tortoise exclusion fencing has been installed and tortoises have been removed consistent with the Desert Tortoise Translocation Plan). All disturbances, project vehicles, and equipment shall be confined to the flagged areas. Tortoise fencing shall be placed along the outside perimeter of the access road that would provide access to areas north of the project site.
- (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 designated 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 within the project area, on maintenance roads for linear facilities, or on access roads to the project site. Speed limits on paved roads shall be consistent with posted speed limits.
- (4) Monitor During Construction. In areas that have not been fenced with desert tortoise exclusion fencing and cleared, 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.

- (5) Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments, and temporary access roads) temporary tortoise exclusion fencing shall be installed. Only pre-approved temporary disturbance areas may be used. All temporary fencing shall be removed upon completion of construction activities.
- (6) Minimize Potential for Bird Electrocutions and Collisions. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.
- (7) Avoid Use of Toxic Substances. Use of toxic substances is prohibited. 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 outside of the approved project footprint.
- (9) Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing. All access roads outside of the fenced project footprint shall be delineated with desert tortoise exclusion fencing on either side of the access road.
- (10) Avoid Wildlife Pitfalls:
  - (a) *Avoid Wildlife Entrapment.* At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled. If backfilling is not done, 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, but no less than three times, throughout the day and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual 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 shall be stored within areas delineated with desert tortoise exclusion fencing. No storage of equipment, vehicles, or materials shall take place outside of areas delineated with tortoise exclusion fencing.
- (11) 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.
- (12) Dispose of Road-killed Animals. Road-killed animals or other carcasses detected on roads near the project area shall be reported immediately to the Biological Monitor. For special-status species roadkill, the Biological Monitor shall contact the BLM Wildlife Biologist within 1 working day of report of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall report the special-status species record as described below. All other roadkill shall be removed from the site and properly disposed of by the Biological Monitor as soon as possible after being reported.
- (13) Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.
- (14) Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to approved 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.

- (15) 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 a drainage shall be stabilized to reduce erosion potential.
- (16) 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. All such activities must be authorized by BLM (and other wildlife agencies) prior to implementation.
- (17) Control and Regulate Fugitive Dust. To reduce the potential for the transmission of fugitive dust the Applicant shall implement dust control measures. These shall include:
  - (a) The Applicant shall apply non-toxic soil binders, equivalent or better in efficiencies than the CARB-approved soil binders, to active unpaved roadways, unpaved staging areas, and unpaved parking area(s) throughout construction to reduce fugitive dust emissions.
  - (b) Water the disturbed areas of the active construction sites at least three times per day and more often if uncontrolled fugitive dust is noted.
  - (c) Enclose, cover, water twice daily, and/or apply non-toxic soil binders according to manufacturer’s specifications to exposed piles with a 5% or greater silt content.
  - (d) Establish a vegetative ground cover (in compliance with biological resources mitigation measures) or otherwise create stabilized surfaces on all unpaved areas at each of the construction sites within 21 days after active construction operations have ceased. All temporary disturbance areas shall be restored consistent with the agency approved Revegetation Plan.
  - (e) Increase the frequency of watering, if water is used as a soil binder for disturbed surfaces, or implement other additional fugitive dust mitigation

measures, to all active disturbed fugitive dust emission sources when wind speeds (as instantaneous wind gusts) exceed 25 mph.

**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 Applicant shall provide to BLM's Wildlife Biologist and the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

### **BIO-9 Compliance Verification**

The Applicant shall provide the CEC, BLM, CDFG, and USFWS with reasonable access to the project site and mitigation lands under the control of the Applicant and shall otherwise fully cooperate with the Energy Commission's and BLM's efforts to verify the Applicant's compliance with, or the effectiveness of, the project mitigation measures. The Applicant shall hold harmless the Designated Biologist, the CEC, BLM, and any other agencies with regulatory requirements addressed by the Energy Commission's sole permitting authority for any costs the Applicant 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, BLM, CDFG, and USFWS at least 14 calendar days before initiating ground-disturbing activities. Immediately notify the CPM, BLM, CDFG, and USFWS in writing if the Applicant is not in compliance with any mitigation measures, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified. CDFG shall be notified at their Southern Region Headquarters Office, 4949 Viewridge Avenue, San Diego, CA 92123; (858) 467 4201. USFWS shall be notified at their Ventura office at 2493 Portola Road, Suite B, Ventura, CA 93003; (805) 644 1766. BLM shall be notified at their Barstow Field Office 2601 Barstow Road, Barstow, CA, 92311, (760) 252-6033. The CEC contact is Mary Dyas, Compliance Project Manager, California Energy Commission, 1516 9th Street, MS-2000, Sacramento, CA 95814, (916) 651-8891.
- (2) **Monitoring.** During construction on any part of the project prior to desert tortoise exclusion fencing installation, the Designated Biologist shall remain on site daily to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protected zones. During operation of the project, the Designated Biologist

shall remain ~~on-call~~ in case tortoises need to be moved or other mitigation measures need attention.

- (3) Fence Monitoring. During construction maintain and check desert tortoise exclusion fences on a daily basis to ensure the integrity of the fence is maintained. The Designated Biologist shall be present on site to monitor construction and determine fence placement during fence installation. During operation of the project, fence inspections shall occur at least once per month throughout the life of the project, and within 24 hours after storms or other events that might affect the integrity and function of desert tortoise exclusion fences. Fence repairs shall occur within two days (48 hours) of detecting problems that affect the functioning of the desert tortoise exclusion fencing. If fence damage occurs during any time of year when tortoises may be active, the Applicant shall be responsible for monitoring the site of the damaged fence until it is fully repaired, to prevent a desert tortoise from entering the project area. All incidents of damaged tortoise exclusion fence, including dates of damage and repair; extent of damage; and monitoring summaries (methods and results) shall be reported to the BLM, CPM, CDFG, and USFWS. If fence repairs cannot take place within 48 hours, the BLM and CEC shall be immediately notified. Extended breaks in the fence may require remedial actions such as additional clearance surveys at BLM and CEC discretion. All wildlife found entrapped or dead in the fence shall be reported to the BLM, CPM, CDFG, and USFWS.
- (4) Construction Compliance Inspections. Conduct continuous compliance inspections during construction activities. After clearing, grubbing, and grading are completed monthly inspections shall be completed by the Designated Biologist. The Designated Biologist shall submit monthly compliance reports to the CPM, BLM, USFWS, and CDFG during active construction (due on the last day of each month).
- (5) Annual Listed Species Status Report. No later than January 31 of every year the Project facility remains in operation, provide the CPM, BLM, USFWS, and CDFG an annual Listed Species Status Report, which shall include, at a minimum: 1) a general description of the status of the project site and construction/operation activities, including actual or projected completion dates, if known; 2) a copy of the table in the BRMIMP with notes showing the current implementation status of each mitigation measure; 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for project impacts, 4) recommendations on how effectiveness of mitigation measures might be improved, and 5) a summary of any agency approved modifications to the BRMIMP.

- (6) Final Listed Species Mitigation Report. No later than 45 days after initiation of project operation for each of the two phases, provide the CPM and BLM Wildlife Biologist a Final Listed Species Mitigation Report that shall include, 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 the mitigation measures 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.
- (7) Notification of Injured, Dead, or Relocated Listed Species. In the event of an observation of injury, death, or relocation of any listed species, the CPM, BLM, CDFG, and USFWS shall be notified immediately by phone by the Designated Biologist or Biological Monitor. 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 five calendar days of the incident and 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 or operation, the Designated Biologist 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 Applicant. Following phone notification as required above, the CPM, BLM, 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, or if a desert tortoise is otherwise found dead, submit a written report with the same information as an injury report. The BLM and CEC shall be notified of such discoveries, as outlined above, and will provide direction regarding the disposition of the carcass. The Applicant shall pay to have the desert tortoises transported and necropsied if directed to do so by the BLM or CEC. The report shall include the date, time, and pertinent details of the finding or incident.

- (8) *Stop Work Order.* The CPM/BLM may issue the Applicant a verbal 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 mitigation measures (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the unauthorized take of an endangered, threatened, or candidate species. A written stop work order shall follow such verbal stop work order within 5 business days. The Applicant and their contractors shall comply with the stop work order immediately upon receipt thereof.

**Verification:** No later than two calendar days following the above-required notification of a sighting, kill, injury, or relocation of a listed species, the Applicant shall deliver to the CPM, BLM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of the sighting, 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 Applicant 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, BLM, CDFG, and USFWS. No later than January 31st of every year the Calico Solar Project facility remains in operation, provide the CPM and BLM an annual Listed Species Status Report as described above, and a summary of desert tortoise exclusion fence inspections and repairs conducted in the course of the year.

### **BIO-10 Revegetation Plan and Compensation for Impacts to Native Vegetation Communities**

The Applicant shall provide restoration/compensation for impacts to native vegetation communities and develop and implement a Revegetation Plan for all areas subject to temporary project disturbance. This Revegetation Plan must be approved by BLM and CEC prior to the initiation of any habitat disturbing activity. Upon completion of construction, all temporarily disturbed areas shall be restored to pre-project grade and revegetated according to the measures described below. Temporarily disturbed areas within the project area include, but are not limited to: all areas where underground infrastructure was installed (i.e., waterlines), temporary access roads, construction work temporary lay-down areas, construction equipment staging areas, and disturbance associated with installing the waterline. For the purpose of this mitigation measure, “temporarily disturbed areas” shall include disturbances that are considered permanent impacts in the analyses above (i.e., would take more than 5 years to recover) but would benefit from the revegetation activities identified here. The following measures shall be implemented for all temporarily disturbed areas, excluding areas immediately around facilities which may be landscaped according to a separate Landscape Plan. These measures will include:

- (1) Plan Details. The plans shall include at minimum: (a) locations and details for top soil storage; (b) methods to salvage and replant cacti and the plant species to be used in restoration; (c) seed collection guidelines; (d) a schematic depicting all the temporary disturbance areas; (e) time of year that the planting will occur and the methodology of the planting; (f) a description of the irrigation methodology if used; (g) measures to control exotic vegetation on site; (h) performance standards (see below); and (i) a detailed monitoring program. All habitats dominated by non-native species prior to project disturbance shall be revegetated using appropriate native species. This plan shall also contain contingency measures for failed restoration efforts (efforts not meeting success criteria).
- (2) Topsoil Salvage. Topsoil shall be stockpiled from the project site for use in revegetation of the disturbed soils. The topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. The upper 1 inch of topsoil which contains the seed bank shall be scraped and stockpiled for use as the top-dressing for the revegetation area. An additional 6 to 8 inches of soil below the top 1 inch of soil shall also be scraped and separately stockpiled for use in revegetation areas. Topsoil shall be replaced in its original vertical orientation following ground disturbance, ensuring the integrity of the top one inch in particular. All other elements of soil stockpiling shall be conducted as described on pages 39-40 of Rehabilitation of Disturbed Lands in California (Newton and Claassen 2003).
- (3) Seed Stock. Only seed of native species in the project area shall be used for revegetation. Seeds shall contain a mix of short-lived early pioneer species such as native annuals and perennials and subshrubs. Seeding shall be conducted as described in Chapter 5 of Rehabilitation of Disturbed Lands in California (Newton and Claassen 2003). A list of plant species suitable for Mojave Desert region revegetation projects, including recommended seed treatments, are included in Appendix A-8 of the same report. The list of plants observed during the 2010 special-status plant surveys of the Project area can also be used as a guide to site-specific plant selection for revegetation. The use of seed stock derived from on-site plants which will otherwise be removed is encouraged.
- (4) Monitoring Requirement and Performance Standards. Post-seeding and planting monitoring will be yearly and shall continue for a period of no less than 10 years or until the defined performance standards are achieved (whichever is later). Remediation activities (e.g., additional planting, removal of non-native invasive species, or erosion control) shall be taken during the 10-year period if necessary to ensure the success of the restoration effort. If the mitigation fails to meet the established performance standards after the 10-year maintenance and monitoring

period, monitoring and remedial activities shall extend beyond the 10-year period until the performance standards are met, unless otherwise specified by the Energy Commission and BLM. As needed to achieve performance standards, the Applicant shall be responsible for replacement planting or other remedial action as agreed to by BLM and CPM. Replacement plants shall be monitored with the same survival and growth requirements as required for original revegetation plantings. The following performance standards must be met by the end of the monitoring period: (a) at least 80% of the species and vegetative cover observed within the temporarily disturbed areas shall be native species that naturally occur in desert scrub habitats; (b) absolute cover and density of native plant species within the revegetated areas shall equal at least 60% of the pre-disturbance or reference vegetation cover; and (c) the site shall have gone without irrigation or remedial planting for a minimum of three years prior to completion of monitoring. Final success criteria must be obtained at least three years after supplemental watering, if any, has ceased being used. If a fire or flood damages a revegetation area within the 10-year monitoring period, the owner shall be responsible for a one-time replacement. If a second fire or flood occurs, no replanting is required, unless the event is caused by the owner's activity (e.g., as determined by BLM or other firefighting agency investigation).

- (5) Annual reports shall be submitted to CEC and BLM which outline the previous year's activities, evaluate the success or failure of mitigation measures, and provide discussion regarding suggested modifications which would improve success.

**Verification:** All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Within 90 days after completion of each year of project construction, the Applicant shall provide to the CPM verification of the total vegetation and community subject to temporary and permanent disturbance. To monitor and evaluate the success of the restoration, the Applicant shall submit annual reports of the restoration including the status of the site, percent cover of native and exotics, and any remedial actions conducted by the owner to the CPM and BLM Wildlife Biologist.

No less than 30 days following the publication of the Energy Commission License Decision or the Record of Decision/ROW Issuance, whichever comes first, the Applicant shall submit to the CPM and BLM's Wildlife Biologist a final agency-approved Revegetation Plan that has been reviewed and approved by BLM's Wildlife Biologist and the CPM. All modifications to the Revegetation Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM.

Within 30 days after completion of each year of project construction, the Applicant shall provide to the CPM for review and approval, a written report identifying which items of the Revegetation 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 until the completion of the revegetation monitoring specified in the Revegetation Plan, the Designated Biologist shall provide a report to the CPM and BLM's Wildlife Biologist 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, are planned for the upcoming year.

### **BIO-11 Weed Management Plan**

The Applicant shall revise and implement a Weed Management Plan that meets the approval of BLM and CEC. The draft Weed Management Plan submitted by the applicant shall provide the basis for the final plan, subject to review and revisions from BLM, USFWS, CDFG, and the CEC.

The final plan shall include weed control measures with demonstrated records of success, based on the best available information from sources such as The Nature Conservancy's The Global Invasive Species Team, Cooperative Extension, California Invasive Plant Council ([http://www.cal-ipc.org/ip/management/plant\\_profiles/index.php](http://www.cal-ipc.org/ip/management/plant_profiles/index.php)) and the California Department of Food and Agriculture Encycloweedia ([http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia\\_hp.htm](http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.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 preemergents 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.

In addition to describing weed eradication and control methods, and a reporting plan for weed management during and after construction, the final Weed Management Plan shall include at least the following Best Management Practices to prevent the spread and propagation of weeds:

- Limit the extent of any vegetation and/or ground disturbance to the absolute minimum needed, and limit ingress and egress to defined routes.
- Install and maintain vehicle wash and inspection stations and closely monitor the types of materials brought onto the site.

- Reestablish vegetation on disturbed sites with native seed mixes (measures and performance standards to be consistent with Revegetation Plan, described in Mitigation Measure BIO-10).
- Monitoring and timely implementation of control measures to ensure early detection and eradication for weed invasions. Weed infestations must be controlled or eradicated as soon as possible upon discovery, and before they go to seed, to prevent further expansion.
- Use only weed-free straw or hay bales used for sediment barrier installations, and weed-free seed.
- Reclamation and revegetation shall occur on all temporarily disturbed areas, including, but not limited to, transmission lines, temporary access roads, construction work temporary lay-down areas, staging areas, and underground waterlines.
- Control weeds in areas where irrigation and mirror washing take place.
- Prohibit disposal of mulch or green waste from mown weed infestations around the solar generators to prevent inadvertent introduction and spread of invasive plants beyond the immediate vicinity of the project area and possibly into rare plant populations off-site. Mulch or green waste shall be removed from the site in a covered vehicle to prevent seed dispersal, and transported to a landfill or composting facility.
- The Applicant shall coordinate with the weed specialist at the BLM's Barstow Field Office. Only herbicides approved by the BLM for use on public land shall be used (e.g., glyphosate). Herbicide treatment shall be conducted in accordance with the weed management plan. This plan stipulates, among other provisions, that only a state and federally certified contractor, approved by the BLM, will apply herbicides. Additionally, application shall be suspended when limiting conditions exist (i.e., excessive wind velocity, snow or ice covers the foliage of weeds, precipitation is occurring or is imminent, and/or air temperatures exceed 90°F).
- Areas outside the solar panel fields can be spot treated by applying a post-emergent herbicide prior to seed dissemination to manage the seedbank.
- All herbicide application will end by mid-May and not resume until the following December.

- Avoid herbicide use or other control methods in or around Environmentally Sensitive Areas (ESAs, see Mitigation Measure BIO-12) on-site or off-site; prevent any herbicide drift into ESAs.
- Annual reports shall be submitted to CEC and BLM which outline the previous year's activities, evaluate the success or failure of mitigation measures, and provide discussion regarding suggested modifications which would improve success.

From the time construction begins in each phase and throughout the life of the project, surveying for new invasive weed populations and the monitoring of identified and treated populations shall be required within the project area and surrounding 250-foot buffer area. See also requirements for weed monitoring and treatment in the adjacent Pisgah Crater ACEC described in Mitigation Measure BIO-12. Surveying and monitoring for weed infestations shall occur annually. Treatment of all identified weed populations shall occur at a minimum of once annually. When no new seedlings or resprouts are observed at treated sites for three consecutive, average rainfall years, the weed infestation at that site can be considered eradicated and weed control efforts, but not annual monitoring, may cease for that impact site.

**Verification:** At least 30 days prior to start of any project-related ground disturbance activities, the Applicant shall provide the BLM's Wildlife Biologist and the CPM with the revised Weed Management Plan. The Applicant shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize the Weed Management Plan. Any further modifications to the approved Weed Management Plan shall be made only after consultation with the CPM and BLM's Wildlife Biologist, in consultation with USFWS and CDFG. Within 30 days after completion of project construction, the Applicant shall provide to the BLM's Wildlife Biologist and 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. A summary report on weed management on the project site shall be submitted in the Annual Compliance Report during plant operations.

### **BIO-12 Special-Status Plant Impact Avoidance and Minimization**

With the exception of the white-margined beardtongue avoidance and minimization measures, these requirements were developed by the CEC and carried over from their Supplemental Staff Assessment (CEC 2010X). If modified by the CEC in the future, the modifications would be carried forward by the BLM.

This mitigation measure contains the following five sections:

- (1) Section A: White-margined Beardtongue Avoidance and Minimization Measures describes measures to protect all white-margined beardtongue plants located within

the project area or within 250 feet of its boundaries (including access roads, staging areas, lay-down areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure.

- (2) Section B: Conduct Late Season Botanical Surveys describes guidelines for conducting summer-fall 2010 surveys to detect special-status plants that would have been missed during the spring 2010 surveys.
- (3) Section C: Avoidance Requirements for Special-Status Plants Detected in the Summer/Fall 2010 Surveys outlines the level of avoidance required for plants detected during the summer-fall surveys, based on the species' rarity and status codes.
- (4) Section D: Off-Site Compensatory Mitigation for Special-Status Plants describes performance standards for mitigation for a range of options for compensatory mitigation through acquisition, restoration/ enhancement, or a combination of acquisition and restoration/enhancement.
- (5) Section E: Conformance with BLM and San Bernardino County Plant Protection Policies describes measures to salvage and transplant certain cacti, yucca, and other species in conformance with BLM and San Bernardino County policies.

“Project Disturbance Area” encompasses all areas to be temporarily and permanently disturbed by the Project, including the plant site, linear facilities, and areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas, parking, storage, or by any other activities resulting in disturbance to soil or vegetation.

The Applicant shall implement the following measures in Section A, B, C, D and E to avoid, minimize, and compensate for impacts to special-status plant species:

#### **Section A: White-margined Beardtongue Avoidance and Minimization Measures**

To protect all white-margined beardtongue plants located within the project area or within 250 feet of its boundaries (including access roads, staging areas, lay-down areas, parking and storage areas) from accidental and indirect impacts during construction, operation, and closure, the Applicant 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 mitigation measure 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) White-margined Beardtongue Impact Avoidance and Minimization Plan. The Applicant shall prepare and implement a White-margined Beardtongue Impact Avoidance and Minimization Plan and shall incorporate the Plan into the BRMIMP (BIO-7). The Plan shall be designed to prevent direct or indirect effects of project construction and operation to all white-margined beardtongue occurrences within the project boundary, and to any other special status plants including small-flowered androstephium located within Environmentally Sensitive Areas (defined below). The Plan shall include the following elements:
- (a) *Designate Environmentally Sensitive Areas (ESAs)*. Before construction, designate ESAs to protect all known white-margined beardtongue locations on the project site or within 250 feet of site boundaries. 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 ESAs shall be clearly delineated in the field with permanent 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.
  - (b) *Baseline Data*. Document baseline conditions, including numbers and areal extent of white-margined beardtongue and any other special-status plant occurrences within the ESAs;
  - (c) *Success Criteria*. Specify success standards for protection of special-status plant occurrences within the ESAs, and identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold);
  - (d) *Literature Review*. Describe and reference any available information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and propagation and culture requirements for white-margined beardtongue and any other special-status species within the ESAs;
  - (e) *Protection and Avoidance Measures*. Describe measures (e.g., fencing, signage) to avoid direct and indirect construction and operation impacts to special-status plants within the ESAs; these shall include but shall not be limited to: (1) training components specific to protection of white-margined beardtongue and surrounding habitat buffer area, which shall be incorporated into the WEAP described in BIO-6; (2) detailed specifications for avoiding herbicide and soil stabilizer drift, and shall include a list of herbicides and soil stabilizers that may be used on the Project with manufacturer's guidance on appropriate use; the Plan shall reference the Weed Management Plan (see

Mitigation Measure BIO-11) and shall be consistent with provisions of that Plan; (3) measures to ensure that erosion and sediment control 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.). Where applicable, these measures shall be incorporated in the Weed Management Plan and Storm Water Pollution Prevention Plan. Also, designate spoil areas; equipment, vehicle, and materials storage areas; parking; equipment and vehicle maintenance areas, and; wash areas at least 100 feet from boundaries of any ESAs;

- (f) *Monitoring and Reporting Requirements.* The Designated Botanist shall conduct weekly monitoring of the ESAs during any construction, operation, or decommissioning activities within 100 feet of the ESAs, and quarterly monitoring for the remainder of construction. The Applicant 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).
- (g) *Remedial Action Measures.* Specify remedial action measures to be implemented if success standards (above) are not met at any time during the life of the project;
- (h) *Seed Collection.* Over the life of the project, the Applicant shall collect a small proportion of any seed produced by white-margined beardtongue plants protected on-site within ESAs. The collection technique shall follow seed collection and storage guidelines contained in (Wall 2009a; Bainbridge 2007). Collection of seed shall be done by the Rancho Santa Ana Botanic Garden (RSABG) Conservation Program staff or other qualified seed or restoration specialist. The Applicant shall be responsible for all costs associated with seed collection and storage. All seed storage shall occur at RSABG or other qualified research institution and at least 40% 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;
- (i) *Propagation Research.* The project own shall be responsible for evaluating potential white-margined beardtongue propagation and reintroduction methods for eventual implementation on-site or off-site; a portion of seed (above) shall be made available for propagation research which may at some time inform contingency propagation efforts on the project site or elsewhere; propagation experimentation shall be funded by the Applicant and conducted by a qualified research institution such as Rancho Santa Ana Botanic Garden.

- (j) *Off-site Sand Transport Monitoring and Management.* The White-margined Beardtongue Impact Avoidance and Minimization Plan shall include a sand transport monitoring and management to document and manage project effects to eastward sand transport to occupied white-margined beardtongue aeolian sand habitat off-site to the east. At minimum, the plan shall include the following elements (1) quantify baseline eastward sand transport from the project area into the adjacent BLM Pisgah Crater ACEC, following methods described by Etyemesian et al. (2010); (2) specify methods and schedule for annual sand transport monitoring throughout the first five years of the project's life; (3) identification of thresholds which would trigger remediation requirements; and (4) development of adaptive management strategies to supplement eastward sand transport into the ACEC if needed. These strategies may include revisions to project fencing design, importing sand from off-site, or transporting sand across the project site for further dispersal. No sand transport remediation work would be permitted to cause new land disturbance outside the project area as analyzed in this SSA.
- (k) *Off-site Weed Monitoring and Management.* The White-margined Beardtongue Impact Avoidance and Minimization Plan shall include methods and schedule to monitor and manage weed abundance in occupied and suitable white-margined beardtongue habitat to the east. At minimum, the plan shall (1) quantify baseline weed abundance in the portion of the ACEC adjacent BLM Pisgah Crater ACEC, adjacent to and within 500 m of the eastern project boundary, north of the BNSF railroad tracks; (2) weed abundance monitoring schedule and methods to implement throughout that area by collecting and analyzing quantitative weed abundance during every year of average or greater rainfall throughout the life of the project; (3) identify weed abundance thresholds which would trigger remediation requirements; and (4) specify weed control methods to be implemented as needed in occupied and suitable white-margined beardtongue habitat throughout the area described above.

## **Section B: Conduct Late-Season Botanical Surveys**

The Applicant shall conduct late-summer/fall botanical surveys for late-season special-status plants as described below:

- (1) Survey Timing. To the extent feasible, 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 survey dates shall be based on

plant phenology and the timing of a significant storm (i.e., a 10 mm or greater rain or storm event, as measured at or within 1 mile of the Project site) if an event is recorded. 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. However, due to the undependable nature and scattered patterns of summer and early fall rainfall, it is possible that no suitable rain event will be documented in the area. Nevertheless, the project owner shall be responsible for conducting late-season botanical surveys along washes and other lowland areas on-site due to the possibility that rainstorms in the Cady Mountains may go undetected, but may initiate summer or fall blooms.

- (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 (2009) and BLM (2009) protocols. The botanical survey crew shall be prepared to mobilize quickly to conduct appropriately timed surveys. Each field botanist 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, 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 from the central portion of the Mojave Desert 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% visual coverage) of the washes, dune swales, and other lowlands within the project site. In the intervening uplands (e.g., bajadas and rock outcrops) surveys shall be conducted to ensure a 25% visual coverage. Other special or unique habitats associated with rare plants (such as dunes, washes, and chenopod scrubs) shall also be surveyed at 100% visual coverage. Transects shall be “intuitive controlled” (per BLM 2009b) 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.

- (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 (SES 2008). 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 Applicant 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, 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: Avoidance Requirements for Special-Status Plants Detected in the Summer/Fall 2010 Surveys**

The Applicant shall apply the following avoidance standards to special-status plants that might be detected during late summer/fall season surveys. Avoidance and/or the mitigation measures described in Section D below would reduce impacts to special-status plant species to less than significant levels.

*Mitigation for CNDDDB Rank 1 Plants (Critically Imperiled) – 75% Avoidance Required:* If species with a CNDDDB rank of 1 are detected within the Project Disturbance Area or are otherwise directly impacted by discharges from or the diversion of streams around the Project, the Applicant shall implement avoidance measures to protect at least 75% of the local population of this species. The local population shall be measured by the number of individuals occurring on the Project site and within the immediate watershed of the project for wash-dependent species or species of unknown dispersal mechanism, or the within the local sand transport corridor for wind-dispersed species. Avoidance shall include protection of the ecosystem processes essential for maintenance of the protected plant occurrence. Isolated ‘islands’ of protected plants disconnected by the Project from natural fluvial or Aeolian processes shall not be considered to be protected and shall not be credited as contributing to the 75% avoidance requirement because such isolated populations are not sustainable. The Applicant shall provide compensatory mitigation as described below in Section D for Project impacts to CNDDDB Rank 1 plants (impacts cannot exceed 25% of the local population) that could not be avoided.

*Mitigation for CNDDDB Rank 2 Plants (Imperiled) – 75% Avoidance Where Feasible:* If species with a CNDDDB rank of 2 are detected within the Project Disturbance Area, the Applicant shall implement avoidance measures where feasible to protect 75% of the local population of this species. Avoidance is feasible if avoidance results in 10 percent or less loss of electrical output. The Applicant shall provide compensatory mitigation as described below in Section D for impacts to plants that could not be avoided.

*Mitigation for CNDDDB Rank 3 Plants (Vulnerable) – No On-Site Mitigation for CNDDDB Avoidance Required Unless Local or Regional Significance:* If species with a CNDDDB rank of 3 are detected within the Project Disturbance Area, no onsite avoidance or compensatory mitigation shall be required unless the occurrence has local or regional significance, in which

case the plant occurrence shall be treated as a CNDDDB 2 ranked plant. A plant occurrence would be considered to have local or regional significance if:

- (1) It occurs at the outermost periphery of its range in California;
- (2) It occurs 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;
- (3) It exhibits any unusual morphology that is not clearly attributable to environmental factors that may indicate a potential new variety or subspecies.

*Pre-Construction Notification for State- or Federal-Listed Species, or BLM Sensitive Species.* If a state or federal-listed species or BLM Sensitive species is detected, the Applicant shall immediately notify the CDFG, USFWS, BLM, and the CPM.

*Preservation of the Germplasm of Affected Special-Status Plants.* For all significant impacts to special-status plants, regardless of whether compensatory mitigation is required, mitigation shall include seed collection from the affected special-status plants on-site prior to construction to conserve the germplasm and provide a seed source for restoration efforts. The seed shall be collected under the supervision or guidance of a reputable seed storage facility such as the Rancho Santa Ana Botanical Garden Seed Conservation Program, San Diego Natural History Museum, or the Missouri Botanical Garden. The costs associated with the long-term storage of the seed shall be the responsibility of the Applicant. Any efforts to propagate and reintroduce special-status plants from seeds in the wild shall be carried out under the direct supervision of specialists such as those listed above and as part of a Habitat Restoration/Enhancement Plan approved by the CPM.

#### **Section D: Off-Site Compensatory Mitigation for Special-Status Plants**

Where compensatory mitigation is required under the terms of Section C, above, the Applicant shall mitigate Project impacts to special-status plant occurrences with compensatory mitigation. Compensatory mitigation shall consist of acquisition of habitat supporting the target species, restoration/ enhancement of populations of the target species, or a combination of acquisition and restoration/enhancement as provided within this mitigation measure. Compensatory mitigation shall be at a 3:1 ratio, with three acres of habitat acquired or restored/enhanced for every acre of special-status plant habitat disturbed by the Project Disturbance Area. The Applicant shall provide funding for the acquisition and/or restoration/enhancement, initial improvement, and long-term maintenance and management of the acquired or restored lands. The actual costs to comply with this mitigation measure will vary depending on the Project Disturbance Area, the actual costs of acquiring compensation habitat, the actual costs of initially improving the habitat, the actual costs of long-term management as determined by a Property

Analysis Record (PAR) report, and other transactional costs related to the use of compensatory mitigation.

The Applicant shall comply with other related requirements in this mitigation measure:

- (1) Compensatory Mitigation by Acquisition: The requirements for the acquisition, initial protection and habitat improvement, and long-term maintenance and management of special-status plant compensation lands include all of the following:
  - (a) *Selection Criteria for Acquisition Lands*. The compensation lands selected for acquisition may include any of the following three categories:
    1. Occupied Habitat, No Habitat Threats. The compensation lands selected for acquisition shall be occupied by the target plant population and shall be characterized by site integrity and habitat quality that are required to support the target species, and shall be of equal or better habitat quality than that of the affected occurrence. The occurrence of the target special-status plant on the proposed acquisition lands should be viable, stable or increasing (in size and reproduction).
    2. Occupied Habitat, Habitat Threats. Occupied compensation lands characterized by habitat threats may also be acquired as long as the population could be reasonably expected to recover with minor restoration (e.g., OHV or grazing exclusion, pest plant removal) and is accompanied by a Habitat Enhancement/Restoration Plan as described in Section D.II, below.
    3. Unoccupied but Adjacent. The Applicant may also acquire habitat for which occupancy by the target species has not been documented, if the proposed acquisition lands are adjacent to occupied habitat. The Applicant shall provide evidence that acquisitions of such unoccupied lands would improve the defensibility and long-term sustainability of the occupied habitat by providing a protective buffer around the occurrence and by enhancing connectivity with undisturbed habitat.
  - (b) *Review and Approval of Compensation Lands Prior to Acquisition*. The Applicant 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 special-status plants in relation to the criteria listed above, and must be approved by the CPM.

- (c) *Management Plan.* The Applicant 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 goal of the management plan shall be to support and enhance the long-term viability of the target special-status plant occurrences. The Management Plan shall be submitted for review and approval to the CPM.
- (d) *Integrating Special-Status Plant Mitigation with Other Mitigation Lands.* If all or any portion of the acquired Desert Tortoise, 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.
- (e) *Compensation Lands Acquisition Requirements.* The Applicant shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, has approved the proposed compensation lands:
1. Preliminary Report. The Applicant, or an 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. 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.
  2. Title/Conveyance. The Applicant 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. 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. 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 Applicant shall

obtain approval of the CPM of the terms of any transfer of fee title or conservation easement to the compensation lands.

3. Initial Protection and Habitat Improvement. The Applicant shall fund activities that the CPM 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 are estimated to be \$750 per acre (\$250 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio, but actual costs 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.
4. Property Analysis Record. Upon identification of the compensation lands, the Applicant 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 before it can be used to establish funding levels or management activities for the compensation lands.
5. Long-term Maintenance and Management Funding. The Applicant 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. Until an approved PAR or PAR-like analysis is conducted for the compensation lands, the amount of required funding is initially estimated to be \$4,350 for every acre of compensation lands, using as the best available proxy the estimated cost of \$1,450 per acre for Desert Tortoise compensatory mitigation, at a 3:1 ratio. 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 mitigation measure), the Applicant shall either: (i) provide initial payment equal to the amount of \$4,350 multiplied by the number of acres the Applicant proposes to acquire for compensatory mitigation; or (ii) provide security to the Energy Commission under subsection (g), ~~“Mitigation Security,”~~ below, in an amount equal to \$4,350 multiplied by the number of acres the Applicant proposes to acquire for compensatory mitigation. The amount of the required initial payment or security for this item shall be adjusted for any change in the Project Disturbance Area as described above. If an initial payment is made based on the estimated per-acre costs, the Applicant 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 \$4,350 per acquired acre (at a 3:1 ratio) will be required for long-term maintenance and management, the excess paid will be returned to the Applicant. The Applicant 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 Applicant 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:

- 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 and is designed to protect or improve the habitat values of the compensation lands.
- 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 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.

- 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 special-status plants. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the CPM.
6. Other Expenses. In addition to the costs listed above, the Applicant 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.
  7. Mitigation Security. The Applicant shall provide financial assurances to the CPM to guarantee that an adequate level of funding is available to implement any of the mitigation measures 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. The amount of the Security shall be \$10,503 per acre (\$3,501 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio) for every acre of habitat supporting the target special-status plant species which is significantly impacted by the project. The actual costs to comply with this mitigation measure will vary depending on 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. Prior to submitting the Security to the CPM, the Applicant shall obtain the CPM’s approval of the form of the Security. The CPM may draw on the Security if the CPM determines the Applicant has failed to comply with the requirements specified in this mitigation measure. The CPM may use money from the Security solely for implementation of the requirements of this mitigation measure. The CPM’s use of the Security to implement these measures may not fully satisfy the Applicant’s obligations, and the Applicant remains responsible for satisfying the obligations under this mitigation measure if the Security is insufficient. The unused Security shall be returned to the Applicant in whole or in part upon successful

completion of the associated requirements in this mitigation measure.

The Applicant may elect to comply with the requirements in this mitigation measure 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 Applicant 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 mitigation measure) 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 Applicant, the Applicant 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, and 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 Applicant.

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.

- (2) Compensatory Mitigation by Habitat Enhancement/Restoration: As an alternative or adjunct to land acquisition for compensatory mitigation the Applicant may undertake habitat enhancement or restoration for the target special-status plant species. Habitat enhancement or restoration activities must achieve protection at a 3:1 ratio, with improvements applied to three acres of habitat for every acre special-status plant habitat directly or indirectly disturbed by the Project Disturbance Area. Examples of suitable enhancement projects include but are not limited to the following: 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.

If the Applicant elects to undertake a habitat enhancement project for mitigation, the project must meet the following performance standards: The proposed enhancement project shall achieve rescue of an off-site occurrence that is currently assessed, based on the NatureServe threat ranking system (Master et al. 2009; Morse et al. 2004) with one of the following threat ranks: a) long-term decline >30%; b) an immediate threat that affects >30% of the population, or c) has an overall threat impact that is High to Very High. ~~Rescue~~ would be considered successful if it achieves 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~~).increasing groundwater availability for dependent species.

If the Applicant elects to undertake a habitat enhancement project for mitigation, they shall submit a Habitat Enhancement/Restoration Plan to the CPM for review and approval, and shall provide sufficient funding for implementation and monitoring of the Plan. The amount of the Security shall be \$10,503 per acre (\$3,501 per acre, using the estimated cost per acre for Desert Tortoise mitigation as a best available proxy, at a 3:1 ratio) for every acre of habitat supporting the target special-status plant species which is directly or indirectly impacted by the project. The amount of the security may be adjusted based on the actual costs of implementing the enhancement, restoration and monitoring. The implementation and monitoring of the enhancement/restoration may be undertaken by an appropriate third party such as NFWF, subject to approval by the CPM. The Habitat Enhancement/Restoration Plan shall include each of the following:

- (a) *Goals and Objectives.* Define the goals of the restoration or enhancement project and a measurable course of action developed to achieve those goals. The objective of the proposed habitat enhancement plan shall include restoration of a target special-status plant occurrence that is currently threatened with a long-term decline. The proposed enhancement plan shall 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~~).

- (b) *Historical Conditions.* Provide a description of the pre-impact or historical conditions (before the site was degraded by weeds or grazing or ORV, etc.), and the desired conditions.
- (c) *Site Characteristics.* 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) *Ecological Factors.* Describe other important ecological factors of the species being protected, restored, or enhanced such as total population, reproduction, distribution, pollinators, etc.
- (e) *Methods.* 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) *Budget.* Provide a detailed budget and time-line, develop clear, measurable, objective-driven annual success criteria.
- (g) *Monitoring.* 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 then annual monitoring for the remainder of the enhancement project, and until the performance standards for rescue of a threatened occurrence are met. 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) *Reporting Program.* The Plan shall ensure accountability with a reporting program that includes progress toward goals and success criteria. Include names of responsible parties.
- (i) *Contingency Plan.* Describe the contingency plan for failure to meet annual goals.
- (j) *Long-term Protection.* 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 Desert Wildlife Management Area, Wildlife Habitat Management Area, or other land use protections that will protect the mitigation site and target species.

**Section E: Conformance with BLM and San Bernardino County Plant Protection Policies**

It is BLM policy to salvage yucca and cactus plants (excluding cholla species, genus *Cylindropuntia*) and transplant them to undisturbed sites within project Rights of Way. The San Bernardino County Plant Protection and Management Ordinance regulates the following where they occur on nongovernment land (San Bernardino County Code 88.01): desert native plants with stems 2 inches or greater in diameter or 6 feet or greater in height: *Psoralea* [*Dalea*] *spinosa* (smoke tree), *Prosopis* spp. (mesquites), all species of the family Agavaceae (century plants, nolin, yuccas), creosote rings 10 feet or greater in diameter, all Joshua trees; and any part of any of the following species, whether living or dead: *Olneya tesota* (desert ironwood), all species of the genus *Prosopis* (mesquites), and all species of the genus *Cercidium* (palo verdes). The project site is on public land and thus is not strictly subject to the County ordinance; however, the CEC is requiring conformance with the County standards, as follows:

- (1) The Applicant shall inventory all plants subject to BLM and County policies on the project site that would be removed or damaged by proposed project construction.
- (2) The Applicant shall prepare a Protected Plant Salvage Plan in conformance with BLM and San Bernardino County standards for review and approval by the BLM and CPM. The plan shall include detailed descriptions of proposed methods to salvage plants; transport them; store them temporarily (as needed); maintain them in temporary storage (i.e., irrigation, shade protection, etc.); proposed transplantation locations and methods for permanent relocation; proposed irrigation and maintenance methods at transplantation sites; and a monitoring plan to verify survivorship and establishment of translocated plants for a minimum of five years.
- (3) Prior to initiating any ground-disturbing activities on the project site, the Applicant shall implement the Protected Plant Replacement measures as approved by the CPM, BLM's State Botanist, and the County.

**Verification:** The Special-Status Plant Impact Avoidance and Minimization Measures shall be incorporated into the BRMIMP as required under Mitigation Measure BIO-7.

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 Applicant 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 Applicant 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.

Section A. No less than 30 days prior to the start of ground-disturbing activities the Applicant 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 mitigation measure. The Applicant shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize boundaries of the ESAs.

No less than 30 days prior to the start of ground-disturbing activities the Applicant shall submit to the CPM for review and approval, in consultation with the BLM State Botanist, the name and resume of the project's Designated Botanist. If a Designated Botanist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Wildlife Biologist and the CPM as soon as possible prior to the termination or release of the Designated Biologist. In an emergency, the Applicant shall immediately notify the BLM's Wildlife Biologist and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Botanist is proposed to BLM's Wildlife Biologist and the CPM and for consideration.

No less than 30 days prior to ground-disturbing activities the Applicant shall submit a draft White-margined Beardtongue Impact Avoidance and Minimization Plan to the CPM for review and approval, in consultation with the BLM State Botanist. Implementation of the white-margined beardtongue 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 Applicant 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 Applicant shall submit a monitoring report every year for the life of the project to monitor effectiveness of protection measures for all avoided white-margined beardtongue ESAs 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. The Applicant shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize monitoring reports and all reports described in this section, and shall specifically report any difficulties in meeting the protection goals and cooperatively develop adaptive measures as needed.

Section B. Raw GPS data, metadata, and CNDDDB field forms shall be submitted to the CPM within two weeks of the completion of each survey. A preliminary summary of results for the late summer/fall botanical surveys shall also be submitted to the CPM and BLM's State Botanist

within two weeks following the completion of the surveys. If surveys are split into more than one period, then a summary letter shall be submitted following each survey period. 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. The Final Report shall include a detailed accounting of the acreage of Project impacts to special-status plant occurrences.

Section C. The Applicant shall immediately provide written notification to the CPM, CDFG, USFWS, and BLM if it detects a State- or Federal-Listed Species, or BLM Sensitive Species at any time during its late summer/fall botanical surveys or at any time thereafter through the life of the Project, including conclusion of Project decommissioning.

Prior to construction, the Applicant shall provide verification that seed of any special status plants on the project site have collected and conveyed to a facility (as described in this measure) and that suitable long-term funding has been provided by the Applicant.

Section D. If compensatory mitigation is required, no less than 30 days prior to the start of ground-disturbing activities, the Applicant shall submit to the CPM Security adequate to acquire compensatory mitigation lands and/or undertake habitat enhancement or restoration activities, as described in this mitigation measure.

No fewer than 90 days prior to acquisition of compensatory mitigation lands, the Applicant shall submit a formal acquisition proposal and draft Management Plan for the proposed lands to the CPM, with copies to CDFG, USFWS, and BLM, describing the parcels intended for purchase and shall obtain approval from the CPM prior to the acquisition. No fewer than 90 days prior to acquisition of compensatory mitigation lands, the Applicant shall submit to the CPM and obtain CPM approval of any agreements to delegate land acquisition to an approved third party, or to manage compensation lands; such agreement shall be executed and implemented within 18 months of the Energy Commission's certification of the Project.

The Applicant or an approved third party shall complete the acquisition and all required transfers of the compensation lands, and provide written verification to the CPM 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 Applicant 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. If habitat enhancement is proposed, no later than six months following the start of ground-disturbing activities, the Applicant shall obtain CPM approval of the final Habitat Enhancement/Restoration Plan, prepared in accordance with Section D, and submit to the CPM or a third party approved by the CPM Security adequate for long-term implementation and monitoring of the Habitat Enhancement/Restoration Plan.

Enhancement/restoration activities 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.

Within 18 months of ground-disturbing activities, the Applicant shall transfer to the CPM or an approved third party the difference between the Security paid and the actual costs of (1) acquiring compensatory mitigation lands, completing initial protection and habitat improvement, and funding the long-term maintenance and management of compensatory mitigation lands; and/or (2) implementing and providing for the long-term protection and monitoring of habitat enhancement or restoration activities.

Section E. No more than 90 days following the publication of the Energy Commission Decision the Applicant shall submit draft versions of the Protected Plant Salvage measures for review by the CPM. The Applicant shall also provide a cost estimate for implementation of the measures which shall be subject to approval by the CPM. The final measures shall be submitted for approval by the CPM within 90 days of the publication of the Commission Decision. The final measures shall be incorporated into the BRMIMP. At this time, the Applicant shall also provide security sufficient to fund the implementation of the measures.

Throughout project construction, or at any phase during the project when plants covered in Section E of this mitigation measure are to be salvaged, the Designated Biologist or Designated Botanist shall submit quarterly and annual compliance reports to the CPM, BLM wildlife biologist, and CDFG describing all project activities pertinent to the Protected Plant Salvage measures. Compliance reports shall include summaries of written and photographic records of the plan implementation described above. Upon completion of all plant salvage and replacement, compliance reports shall be submitted annually for a period not less than 5 years to document irrigation, maintenance, and monitoring results, including plant survival. The Designated Biologist shall maintain written and photographic records of the tasks described above, and make these records available to the CPM, County, BLM State Botanist, and CDFG upon request. The Applicant shall coordinate with the CPM and BLM's Wildlife Biologist to revise and finalize all plans and reports named in this section.

### **BIO-13 Mojave Fringe-Toed Lizard Mitigation**

The CEC has identified requirements for compensatory mitigation for impacts to Mojave Fringe-toed Lizard habitat in their Supplemental Staff Assessment (CEC 2010X); however this is not a

mitigation requirement that is proposed by the BLM. If modified by the CEC in the future, the modifications would be carried forward by the BLM.

The Applicant shall provide compensatory land to mitigate for habitat loss and direct impacts to Mojave fringe-toed lizards based on revised estimates of suitable Mojave fringe-toed lizard habitat on-site, to be verified by an expert in this animal's ecology. The Applicant shall provide compensatory mitigation at a 3:1 ratio for impacts to breeding habitat (i.e., dune, sand ramp, or fine-sandy wash habitat), and at a 1:1 ratio for impacts to adjacent suitable foraging and cover habitat, such as thin aeolian sand overlying bajada surfaces, or foraging habitat surrounding the breeding habitat (Table 4-9). Estimated breeding habitat on the project site is 21.4 acres, and surrounding suitable foraging and cover habitat (i.e., 45 meter buffer) is estimated at 143.3 acres. Therefore, this mitigation measure would require the acquisition and dedication in perpetuity of at a minimum 207.5 acres of habitat. The Applicant shall provide funding for the acquisition, initial habitat improvements, and long-term management of the compensation lands, as described below.

**Table 4-21 Mojave Fringe-toed Lizard Compensation Acreage Summary**

Habitat Function	Project Impact Acreage	Mitigation Ratio	Compensation Acreage
Foraging and cover	143.3 acres	1:1	143.3 acres
Breeding	21.4 acres	3:1	64.2 acres
Total	164.7 acres		207.5 acres

Source: CEC 2010

To more accurately assess the extent of breeding habitat and adjacent foraging and cover habitat on the Project site, the Applicant shall provide a delineation of habitat for Mojave fringe-toed lizards to the CPM. The delineation shall be prepared by an expert on the species' ecology, whose qualifications have been approved by the CPM.

This compensation acreage may be included (“nested”) within the acreage acquired and managed as desert tortoise habitat compensation (Mitigation Measure BIO-17) only if:

- Adequate acreage of qualifying desert tortoise compensation lands also meet the Selection Criteria (below) as habitat for Mojave fringe-toed lizard;
- The desert tortoise habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the Applicant shall provide the required number of acres of Mojave fringe-toed lizard habitat compensation lands, adjusted to reflect the final project footprint and additional delineation of suitable habitat, independent of any compensation land

required under other project mitigation measures, and shall also provide funding for the initial improvement and long-term maintenance and management of the acquired lands, and shall comply with other related requirements of this mitigation measure. Costs of these requirements are estimated to be \$725,416.25 based on the acquisition of 207.5 acres.

In lieu of acquiring lands itself, the Applicant may satisfy the requirements of this mitigation measure by providing funds for the acquisition to the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in Section 3.i., below. Funding through the NFWF would require additional administrative costs estimated at \$15,744.99, bringing the total required deposit to \$741,161.24. If the Applicant elects to use the REAT Account with NFWF, the Applicant will be responsible for providing sufficient funds to cover actual acquisition costs and fees, even if those costs exceed the estimates in this mitigation measure, and will also need to pay NFWF fees to establish and manage the project-specific account for the land transfer and management.

The actual costs to comply with this mitigation measure will vary depending on the final footprint of the Project, the number of acres of Mojave fringe-toed lizard breeding and foraging or cover habitat identified in the final delineation of suitable habitat, 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 Property Analysis Report (PAR, 3. d., below). Regardless of actual cost, the Applicant shall be responsible for implementing all aspects of this mitigation measure.

The requirements for the acquisition, initial improvement, protection, and long term management of the compensation lands shall include the following:

- (1) Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission requirements shall:
  - (a) Be sand dune or partially stabilized sand dune habitat 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;
  - (b) Be biologically contiguous to lands currently occupied by Mojave fringe-toed lizard;
  - (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) Provide quality habitat for Mojave fringe-toed lizard, that has the capacity to regenerate naturally when disturbances are removed;

- (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) 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; and
  - (i) Be on land for which long-term habitat management for Mojave fringe-toed lizard and other native biological resources is feasible.
- (2) Review and Approval of Compensation Lands Prior to Acquisition. The Applicant 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 Mojave fringe-toed lizard 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 Conditions. The Applicant shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, have approved the proposed compensation lands:
- (a) *Preliminary Report.* The Applicant, 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 Applicant 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 nonprofit 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 approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. 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 Applicant 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 Habitat Improvement Fund.* The Applicant 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 are estimated at \$250 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 Applicant 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 Applicant shall provide money to establish an account with a 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 mitigation measure), the Applicant shall provide initial payment of \$1,450 an acre for the acres identified in the verified and approved delineation of habitat required by this mitigation measure, or if the delineation is not completed, shall provide \$300,875 calculated at \$1,450 an acre for 207.5 acres or as an alternative to initial payment of funds for long-term maintenance and management, the Applicant shall include an amount equal to this initial payment in the security that is provided to the Energy Commission under section 3.h. of this mitigation measure. 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 Applicant 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 Applicant. The Applicant 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 CPM, in consultation with CDFG, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Applicant shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following:

1. Interest. Interest generated from the initial capital shall be available for reinvestment into the principal and for the long-term operation,

management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the compensation lands.

2. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.
  3. Pooling Funds. A CPM-approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CPM.
  4. Reimbursement Fund. The Applicant shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.
- (f) *Other expenses*. In addition to the costs listed above, the Applicant shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to title and document review costs, expenses incurred from other state agency reviews, and 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 Applicant shall prepare a Management Plan for the compensation lands in consultation with the entity that will be managing the lands. The Management Plan shall reflect sitespecific enhancement measures

on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.

- (h) *Mitigation Security*. The Applicant shall provide financial assurances to the CPM with copies of the document(s) to BLM, CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement any of these items that are not completed prior to the start of ground-disturbing activities. The CPM may use money from the Security solely for implementation of the requirements of this mitigation measure. The CPM's use of the security to implement these measures may not fully satisfy the Applicant's obligations. Security not used to implement mitigation measures shall be returned to the Applicant upon successful completion of the associated requirements. 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 submitting the Security to the CPM, the Applicant shall obtain the CPM's approval, in consultation with CDFG of the form of the Security.

Security for the requirements of this mitigation measure shall be provided in the amount of \$725,416.25 (or (\$741,161.24 if the Applicant elects to use the REAT Account with NFWF pursuant to paragraph 3.h.1. of this mitigation measure, below). The security is calculated in part, from the items that follow but adjusted as specified below. However, regardless of the amount of the security or actual cost of implementation, the Applicant shall be responsible for implementing all aspects of this mitigation measure.

1. Land acquisition costs for compensation land, calculated at \$1,000/acre;
2. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as \$18,000 total per parcel (presuming 40-acres per parcel)
3. Initial site clean-up, restoration, or enhancement, calculated at \$250/acre;
4. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;
5. Long-term management and maintenance fund, calculated at \$1,450 per acre;

6. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.

The Applicant may elect to comply with the requirements in this mitigation measure for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands, 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 Applicant 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 mitigation measure) 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 Applicant, the Applicant 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 Applicant.

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 Applicant shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site.

If the mitigation actions required under this mitigation measure are not completed at least 30 days prior to the start of ground-disturbing activities, the Applicant shall provide the CPM and CDFG with an approved Security (as described above in section 3.h., Mitigation Security) in accordance with this mitigation measure no later than 30 days prior to beginning Project ground-disturbing activities. Prior to submitting the Security to the CPM, the Applicant shall obtain the CPM's approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security. The Applicant, or an approved third party, shall complete and provide written verification to the

CPM, CDFG, BLM and USFWS of the compensation lands acquisition and transfer within 18 months of the start of Project ground-disturbing activities.

No later than 12 months after the start of ground-disturbing project activities, the Applicant 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 Applicant shall fully cooperate with the third party to ensure the proposal is submitted within this time period. The Applicant 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 issuance of the Energy Commission Decision. If NFWF or another approved third party is being used for the acquisition, the Applicant 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 Applicant 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 Applicant 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 Applicant 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 Applicant, 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 Applicant 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.

If electing to satisfy the requirements of this mitigation measure by utilizing the options created by CDFG pursuant to SBX8 34, the Applicant shall notify the Commission that it would like a determination that the Project's in-lieu fee proposal meets CEQA and CESA requirements.

### **BIO-14 Gila Monster Mitigation**

Concurrent with Desert Tortoise Clearance surveys (BIO-15, below), the Applicant shall conduct pre-construction surveys for Gila monsters. If a Gila monster is encountered during clearance surveys or during construction, a qualified biologist experienced with Gila monster survey and capture techniques shall capture and maintain it in a cool (<85 degrees F) environment until it can be released to a safe, suitable area beyond the construction impact zone outside of the exclusion fencing. The biologist shall coordinate with CEC and CDFG biologists in the transport and relocation of any Gila monsters encountered during project surveys, construction, or operation. A written report documenting any Gila monsters relocated shall be provided to the CPM and BLM Wildlife Biologist within 30 days of relocation.

**Verification:** Within 30 days after completion of clearance surveys the Designated Biologist shall submit a report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG describing implementation and results, including description of any relocation of Gila monsters. The report shall include the number of Gila monsters moved; their state of health, including wounds or visible signs of illness; and the location of relocation.

### **BIO-15 Desert Tortoise Clearance Surveys and Exclusion Fencing**

The Applicant 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](http://www.fws.gov/ventura/speciesinfo/protocols_guidelines)) or more current guidance provided by CDFG and USFWS. The Applicant shall also implement all terms and conditions described in the Biological Opinion for the Project prepared by USFWS and State Take Permit issued by CDFG. These measures include, but are not limited to, the following:

- (1) Desert Tortoise Exclusion Fence Installation. To avoid impacts to desert tortoises, permanent desert tortoise exclusion fencing shall be installed along the perimeter of the entire site. This fencing shall encompass the perimeter roads within the project footprint and temporarily installed along the utility corridors and temporary access roads. Tortoise exclusion fencing shall also be installed as necessary to prevent tortoises on the southern NAP (not a part) area (between the project site and Interstate 40) to prevent tortoises from entering the highway. If the culvert

areas cannot be fenced due to restrictions associated with highway maintenance, the two tortoises would be translocated off the site (see BIO-16). The proposed alignments for the permanent perimeter fence, utility rights-of-way, and temporary access road fencing shall be flagged and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the perimeter exclusion fence and utility rights-of-way alignments shall be conducted by the Designated Biologist(s) using techniques approved by the USFWS and CDFG and may be conducted in any season with USFWS and CDFG approval. Biological Monitors may assist the Designated Biologist under his or her supervision with the approval of the CPM, BLM, USFWS, and CDFG. 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 USFWS' 2009 Desert Tortoise Field Manual.

- (a) *Timing, Supervision of Fence Installation.* The exclusion fencing shall be installed prior to the onset of site clearing and grubbing, establishment of the perimeter road network, or installation of the perimeter security fencing. Temporary fencing shall also be placed along either side of the proposed temporary access roads in tortoise habitat. 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 and temporary 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. Cattle grating designed to safely exclude desert tortoise shall be installed at the gated entries to discourage tortoises from gaining entry. Also, cattle grating shall be installed at all locations where there may be breaks in the

tortoise exclusion fencing needed to allow exit/entrance from the perimeter road onto existing private property access roads.

- (d) *Fence Inspections.* Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing exclusion areas, 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 and temporary fencing shall be inspected monthly and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which surface flow is detectable within the fenced drainage during the storm, or for which channels on-site show any evidence of newly deposited sediments, bank erosion, or channel reworking following the storm. The Applicant shall be responsible for monitoring storm flows and changes to channels to evaluate need for fence inspection. 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. All 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. If fencing is not repaired within 48 hours, the BLM Wildlife Biologist shall be notified within 5 business days to determine if additional remedial action is required such as the need for conducting additional clearance surveys within the project footprint.
- (2) Desert Tortoise Clearance Surveys within the Plant Site. Following construction of the permanent tortoise exclusion fencing around the perimeter of the project, 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% 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. Each separate survey shall be walked in a different direction to allow opposing angles of observation. 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 (Mitigation Measure BIO-16).

- (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 excavated by hand 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. Tortoises taken from burrows and from elsewhere on the power plant site shall be translocated as described in the Desert Tortoise Translocation Plan.
  - (b) *Burrow Excavation/Handling*. All potential desert tortoise burrows located during clearance surveys would be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. All desert tortoise handling and removal, and burrow excavations, including nests, would 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 temporary use areas, and initial memo or verbal completion report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG (below), workers and heavy equipment shall be allowed to enter the project site to perform clearing, grubbing, leveling, and trenching. A Designated Biologist or Biological Monitor shall monitor clearing and grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be translocated as described in the Desert Tortoise Translocation Plan to an area approved by the Designated Biologist. After clearing, grading, and leveling activities have been completed, the Designated Biologist and Biological Monitor will not be required to monitor further construction activities as long as the integrity of the exclusion fencing is maintained.
- (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 as described in the paragraph below. 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. Immediately upon completion of clearance surveys and desert tortoise removal from the site, the Designated Biologist shall provide an initial memo or verbal report of the results to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to BLM's Wildlife Biologist, the CPM, USFWS, and CDFG describing implementation of each of the mitigation measures listed above and compliance with Gila monster clearance survey (BIO-14). The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

### **BIO-16 Desert Tortoise Translocation Plan**

The Applicant shall develop and implement a final Desert Tortoise Translocation Plan (Plan) in conformance with standards and guidelines described in Translocation of Desert Tortoises (Mojave Population) From Project Sites: Plan Development Guidance (USFWS 2010), any more current guidance or recommendations as available from CDFG or USFWS, and meets the approval of USFWS, CDFG, BLM's Wildlife Biologist, and the CPM. The Plan must be approved prior to the issuance of the USFWS's Biological Opinion. The goal of the Plan shall be to safely translocate all desert tortoises from within the fenced project area to suitable habitat capable of supporting them, while minimizing stress and potential for disease transmission to and from receptor area populations. Tortoises to be moved farther than 500 meters shall be tested for disease prior to translocation. The Plan shall include written correspondence with Caltrans indicating whether tortoise exclusion fencing may be installed to prevent tortoises on the southern NAP area (between the project site and Interstate 40) to prevent tortoises from entering the highway. If Caltrans does not permit that fencing, then desert tortoises shall be translocated off the NAP site (see BIO-15). The final Plan shall be based on the draft Desert Tortoise Translocation Plan prepared by the applicant and shall include all revisions deemed necessary by USFWS, CDFG, BLM'S Wildlife Biologist, and the CEC. The Plan shall include but not be limited to, a list of the authorized handlers, protocols for disease testing and assessing tortoise health, proposed translocation locations and procedures, schedule of translocations, a habitat assessment of translocation lands, monitoring and reporting, and contingency planning (e.g., handling an injured or diseased tortoise).

**Verification:** The Translocation Plan must be approved by CDFG, USFWS, BLM, and CEC prior to the issuance of the Biological Opinion. All modifications to the approved Plan shall be made only after approval by BLM's Wildlife Biologist and the CPM, in consultation with USFWS

and CDFG. Translocation Plan implementation reporting requirements shall be included in the Translocation Plan.

### **BIO-17 Desert Tortoise Compensatory Mitigation**

To fully mitigate for habitat loss and potential take of desert tortoises, the Applicant would provide compensatory mitigation for impacts to 6,215 acres of occupied desert tortoise habitat. Impacts to the area south of the BNSF railroad tracks would be mitigated at a 1:1 ratio. Impacts to the area north of the BNSF railroad tracks would be mitigated at a 3:1 ratio. The BLM's compensatory mitigation plan (fee based) would serve as the entire 1:1 mitigation ratio below the railroad tracks and one-third of the 3:1 mitigation ratio required to satisfy CESA above the railroad tracks. See Table 4-22, below. This fee would be used for habitat enhancement activities as outlined below.

**Table 4-22 Desert Tortoise Compensation Acreage Summary**

<b>Location</b>	<b>Project Impact Acreage</b>	<b>Mitigation Ratio</b>	<b>Compensation Acreage</b>
South of BNSF RR	2,140 acres	1:1	2,140 acres
North of BNSF RR	4,075 acres	3:1	12,225 acres
Total	6,215 acres		14,365 acres

Source: CEC 2010

The BLM, CDFG, and CEC would require the Applicant to compensate for the loss of tortoise habitat as outlined above. For the BLM's portion of the compensation, the Applicant would deposit funds based on the price to acquire land (i.e., funding sufficient to acquire 8,230 acres) into an account managed by the National Fish and Wildlife Foundation (NFWF); these funds would be used for enhancement of desert tortoise habitat within the Ord-Rodman DWMA. This 1:1 component of the total compensatory mitigation would be provided in fee to the BLM based on the July 23, 2010 REAT Fee Schedule (total \$28,845,586; refer to Table 4-23 for a breakdown of the costs associated with the REAT Fee Schedule). The costs presented here are the REAT team's best estimates for costs. The REAT-NFWF MOA allows for the REAT agencies to require additional funding to be deposited into the project-specific account if they find the money is not adequate to implement the required biological mitigation.

**Table 4-23 Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown for use with the REAT-NFWF Mitigation Account [Table Note 1]**

	<b>Task</b>	<b>Cost</b>
1	Land acquisition	\$1,000 per acre [Table Note 2]
2	Level 1 ESA	\$3,000 per parcel [Table Note 3]

	<b>Task</b>	<b>Cost</b>
3	Appraisal	\$5,000 per parcel
4	Initial site work – clean-up, enhancement, restoration	\$250 per acre [Table Note 4]
5	Closing and escrow costs – 2 transactions at \$2,500 each; landowner to third party and third party to agency [Table Note 5]	\$5,000 for 2 transactions
6	Biological survey for determining mitigation value of land (habitat based with species specific augmentation)	\$5,000 per parcel
7	Third party administrative costs. Includes staff time to work with agencies and landowners; develop management plan; oversee land transaction; organization reporting and due diligence; review of acquisition documents; assembling acres to acquire.	10% of land acquisition cost (see line 1)
8	Agency costs to review and determine accepting land donation – includes 2 physical inspections; review and approval of the Level 1 ESA; review of all the title documents; drafting deed and deed restrictions; issue escrow instructions; mapping the parcels...	15% of land acquisition costs (see line 1) x 1.17 (17% of the 15% for overhead)
	Subtotal – Acquisition and Initial Site Work	
—	—	—
9	Long-term Management and Maintenance – includes land management, enforcement and defense of easement or title (short and long term), region-wide raven management, monitoring	\$1,450 per acre [Table Note 6]
—	—	—
	NFWF Fees	
10	Establish the project specific sub-account [Table Note 7]	\$12,000
11	Pre-proposal Modified RFP or RFP processing [Table Note 8]	\$30,000
12	NFWF management fee for acquisition and initial site work	3% of subtotal
13	NFWF management fee for LTMM	1% of LTMM
	Total for deposit into the Project Specific Sub-Account	\$

Table Source: BLM.

**Table General Note:** If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

**Table Note 1:** All costs are best estimates as of summer 2010. Actual costs will be determined at the time of the transactions and may change the funding needed to implement the required mitigation obligation. Regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation (MOA V.I.).

*Table Note 2:* Generalized estimate taking into consideration a likely jump in land costs due to demand and an 18 – 24 month window to acquire the land after agency decisions are made. If the agencies, developer, or third party has better, credible information on land costs in the specific area where project specific mitigation lands are likely to be purchased, that data overrides this general estimate. Note: regardless of the estimates, the developer is responsible for providing adequate funding to implement the required mitigation.

*Table Note 3:* For the purposes of determining costs, a parcel is 40 acres (based on input from the BLM California Desert District).

*Table Note 4:* Based on information for California Department of Fish and Game.

*Table Note 5:* Two transactions at \$2,500 each: landowner to third party, third party to agency. The transactions will likely be separated in time.

*Table Note 6:* Estimate for purposes of calculating general costs. The actual long-term management and maintenance costs will be determined using a Property Assessment Report tailored to the specific acquisition.

*Table Note 7:* Each renewable energy project will be a separate sub-account within the REAT-NFWF account, regardless of the number of required mitigation actions per project.

*Table Note 8:* If determined necessary by the REAT agencies if multiple third parties have expressed interest; for transparency and objective selection of third party to carryout acquisition.

*Table Key:* ESA = Environmental Site Assessment; LTMM = Long-Term Management and Maintenance; NFWF = National Fish and Wildlife Foundation, REAT = Renewable Energy Action Team; RFP = Request for Proposal

Habitat enhancement actions for this project would include but not be limited to: construction of 40 miles of tortoise-proof fence along State Route 247 from Barstow to Lucerne Valley to prevent desert tortoises from entering the roadway, with the primary focus area being Barstow to Stoddard Ridge; and installation of 60 miles of barrier fencing (post and cable) along Camp Rock road to prevent unauthorized vehicular use of important tortoise habitat within the desert wildlife management area. The Ord-Rodman DWMA has 392 miles of closed routes, 280 miles of open routes to be signed, and 172 miles of undesignated routes to be signed or closed. At least 100 miles of these routes would be rehabilitated. The enhancement funds may be used to cover environmental review and implementation of the above activities, including the hiring of contractors to carry out the activities. Additionally, habitat enhancement via exotic weed control, fencing along I-40, safing of mines that tortoise are at risk of falling into, and funding of a headstart program for desert tortoise that would be developed in coordination with the USFWS's Desert Tortoise Recovery Office may also be implemented with these funds.

The portion of the compensation required by the CDFG/CEC would be used to acquire desert tortoise habitat in the Ord-Rodman, Superior-Cronese, or Fremont-Kramer DWMAs. The CDFG/CEC would provide the details as to how this land acquisition shall take place, including the need for enhancement and management fees, in their own permitting documents.

Funds that the Applicant provides to satisfy BLM's mitigation requirements for the Project will partially satisfy the requirements of this mitigation measure, up to a maximum of 6,215 acres of the 14,365-acre requirement, adjusted to reflect the final project footprint. Mitigation to BLM is expected to be in the form of a payment, which BLM would use to implement habitat enhancement measures and other activities. The remainder of the mitigation requirement, at least 8,150 acres based on an additional 2:1 compensation ratio for the 4,075 project site acres

north of the BNSF railroad tracks (adjusted to reflect the final project footprint), shall be acquired, protected, improved, maintained and managed as specified in this mitigation measure.

The actual costs to comply with this mitigation measure 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 Property Analysis Report (PAR, 3.d., below). The 14,365-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. Regardless of actual cost, the Applicant shall be responsible for implementing all aspects of this mitigation measure.

The requirements for the acquisition, initial improvement, protection, and long term management of the 14,365 acres of compensation lands shall include the following:

- (1) Selection Criteria for Compensation Lands. The compensation lands selected for acquisition to meet Energy Commission and CESA requirements shall be equal to or better than the quality and function of the habitat impacted and:
  - (a) be within the Western Mojave 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 contiguous and biologically connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover;
  - (e) not have a history of intensive recreational use or other disturbance that might cause future erosional damage or other habitat damage, and 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; and

- (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 Applicant 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 Conditions. The Applicant shall comply with the following conditions relating to acquisition of the compensation lands after the CPM, in consultation with CDFG, BLM and the USFWS, have approved the proposed compensation lands:
- (a) *Preliminary Report.* The Applicant, 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 Applicant 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 nonprofit 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 approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. 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 Applicant 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 Habitat Improvement Fund.* The Applicant 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 are estimated at \$250 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 Applicant 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 Applicant shall provide money to establish an account with a 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 mitigation measure), the Applicant shall either provide initial payment of

\$20,829,250 calculated at \$1,450 an acre for 14,365 acres or the Applicant shall include \$20,829,250 to reflect this amount in the security that is provided to the Energy Commission under section 3.h. of this mitigation measure. 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 Applicant 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 Applicant. The Applicant 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 CPM, in consultation with CDFG, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

The Project owner shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following:

1. Interest generated from the initial capital 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 approved by CDFG designed to protect or improve the habitat values of the compensation lands.
2. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CPM, in consultation with CDFG, or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG

takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates NFWF or another entity to manage the long-term maintenance and management fee for CDFG.

3. Pooling Funds. A CPM- approved non-profit organization qualified to hold long-term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the fund with other funds for the operation, management, and protection of the compensation lands for local populations of desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFG and CPM.
  4. Reimbursement Fund. The Applicant shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other State or State-approved federal agency reviews; and overhead related to providing compensation lands.
- (f) *Other Expenses*. In addition to the costs listed above, the Applicant shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to title and document review costs, expenses incurred from other state agency reviews, and 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 Applicant shall prepare a Management Plan for the compensation lands in consultation with the entity that will be managing the lands. The Management Plan shall reflect site specific enhancement measures on the acquired compensation lands. The plan shall be submitted for approval of the CPM, in consultation with CDFG, BLM and USFWS.
- (h) *Mitigation Security*. The Applicant shall provide financial assurances to the CPM with copies of the document(s) to BLM, CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement any of these mitigation measures that are not completed prior to the start of ground-disturbing activities described in Section A of this mitigation measure. The CPM may use money from the Security solely for implementation of the requirements of this mitigation measure. The CPM's use of the security to implement these measures may not fully satisfy the Applicant's obligations.

Any amount of the Security that is not used to carry out mitigation shall be returned to the Applicant upon successful completion of the associated requirements in this mitigation measure. 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 submitting the Security to the CPM, the Applicant shall obtain the CPM’s approval, in consultation with CDFG, BLM and the USFWS, of the form of the Security. Security for the requirements of this mitigation measure shall be provided in the amount of \$49,223,057.50 (or \$50,295,164.23 if the Applicant elects to use the REAT Account with NFWF pursuant to paragraph 3.h.i. of this mitigation measure, below). The Security is calculated in part, from the items that follow but adjusted as specified below. However, regardless of the amount of the security or actual cost of implementation, the Applicant shall be responsible for implementing all aspects of this mitigation measure.

1. Land acquisition costs for compensation land, calculated at \$1,000/acre;
  2. Site assessments, appraisals, biological surveys, transaction closing and escrow costs, calculated as \$18,000 total per parcel (presuming 40-acres per parcel)
  3. Initial site clean-up, restoration, or enhancement, calculated at \$250/acre;
  4. Third-party and agency administrative transaction costs and overhead, calculated as percentages of land cost;
  5. Long-term management and maintenance fund, calculated at \$1,450 per acre;
  6. NFWF fees to establish a project-specific account; manage the sub-account for acquisition and initial site work; and manage the sub-account for long term management and maintenance.
- (i) The Applicant may elect to comply with the requirements in this mitigation measure 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 Applicant 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

mitigation measure) 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 Applicant, the Applicant 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 Applicant.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a nongovernmental 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 Applicant shall provide the CPM with written notice of intent to start ground disturbance at least 30 days prior to the start of ground-disturbing activities on the project site. Funding for compensatory mitigation would be phased commensurate with project impacts; the phased funding agreement is still being developed through coordination with the regulatory agencies and the Applicant.

### **BIO-18 Raven Monitoring, Management, and Control Plan**

To minimize the proposed projects impacts on desert tortoise from increased predation by common ravens, the Applicant shall develop a site-specific raven management plan with the goal of ensuring that the project does not attract common ravens or provide subsidies during all phases of development and use, including construction, operation and maintenance, and decommissioning. This plan will be approved by CDFG, BLM, USFWS, and CEC. The Raven Monitoring, Management, and Control Plan (Raven Plan) will: identify conditions associated with the project that might provide raven subsidies or attractants; describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities; describe control practices for ravens; address monitoring and nest removal during construction and for the life of the project; and discuss reporting requirements. To mitigate for this proposed project 's portion of the cumulative and indirect effect of increasing the raven population in the desert region, a fee will be collected to contribute to an account established with the National

Fish and Wildlife Foundation (NFWF) to implement a regional raven management plan that will implement recommendations in the USFWS Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise (Raven EA; USFWS 2008b). The account was established under a Memorandum of Agreement between the Renewable Energy Action Team (REAT) Agencies (i.e. BLM, CDFG, USFWS, and Californian Energy Commission) and NFWF to manage the funds that will be used to implement the regional raven management plan. The Raven Environmental Assessment identifies several activities to reduce raven predation on desert tortoise, including reduction of human-provided subsidies (e.g., food, water, sheltering and nesting sites), education and outreach, common raven nest removal, common raven removal, and evaluation of effectiveness and adaptive management. The fee for cumulative and indirect effects is part of the CDFG requirements for their consistency determination. The Applicant shall contribute a one-time fee of \$105 per acre of disturbance to 6,215 acres of desert tortoise habitat impacted by this project. An additional 2 percent (\$13,052) will be required to cover the costs of fund management. This total fee of \$665,627 will fund the project's portion of the regional raven management plan for the 30 year life of the project.

The Applicant shall design and implement a Raven Monitoring, Management, and Control Plan (Raven Plan) that is consistent with the most current USFWS approved raven management guidelines and that meets the approval of the USFWS, CDFG, and the CPM. Any subsequent modifications to the approved Raven Plan shall be made only with approval of the CPM in consultation with USFWS and CDFG. 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 to be proposed in the Raven Plan. Regardless of raven monitoring results, the Applicant shall be responsible for all other aspects of the Raven Plan, including avoidance and minimization of project-related trash, water sources, or perch/roost sites that could contribute to increased raven numbers.

**Verification:** The Raven Plan must be approved by BLM, CEC, USFWS and CDFG prior to the initiation of any ground disturbing events. The regional raven management fee also must be deposited prior to the initiation of ground disturbing events.

### **BIO-19 Pre-Construction Nest Surveys and Impact Avoidance Measures for Migratory Birds**

Pre-construction nest surveys shall be conducted each year during the construction phase of the project if construction activities will occur during the breeding period (from January 1 through August 1). The Designated Biologist or Biological Monitor conducting the surveys shall be

experienced bird surveyors who have demonstrated experience conducting nest searches; are knowledgeable of the nesting habitats of species that may nest on the site; and are familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993).

Surveys shall be conducted in accordance with the following guidelines:

- (1) Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the plant site and linear facilities;
- (2) At least two pre-construction 100-percent coverage surveys shall be conducted of each proposed construction area, separated by a minimum 10-day interval. One of the surveys shall be conducted within the 10 days preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed one week in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;
- (3) If active nests are detected during the survey, a 500 foot no-disturbance buffer zone shall be implemented and a monitoring plan shall be developed. This protected area surrounding the nest may be adjusted by the Designated Biologist in consultation with CDFG, BLM, USFWS, and CPM. Nest locations shall be mapped using GPS technology and the location data provided in completion reports (below) to the CPM and BLM Wildlife Biologist; and
- (4) The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed. Monitoring shall avoid disturbing the nests or causing an increased risk of predation. Activities that might, in the opinion of the Designated Biologist and in consultation with the CPM and BLM, disturb nesting activities shall be prohibited within the buffer zone until such a determination is made.

**Verification:** Upon completion of the surveys, and prior to initiating any vegetation removal or ground-disturbing activities (i.e., no more than 10 days prior to the start of such activities), the Applicant shall provide the CPM and BLM a letter-report describing the methods and 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.

### **BIO-20 Mitigation for Impacts to Golden Eagles**

To address potential project impacts to golden eagles, the Applicant shall develop an Avian Protection Plan in consultation with USFWS, BLM, CDFG, and CEC. See BIO-22 regarding specifications for the Avian Protection Plan.

**Verification:** Prior to the initiation of any ground-disturbing activities, the Avian Protection Plan must be approved by USFWS, BLM, CDFG, and CEC.

### **BIO-21 Burrowing Owl Impact Avoidance and Minimization Measures**

The Applicant 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) Passive 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 Applicant 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) Passive relocation sites shall be in areas of suitable habitat for burrowing owl nesting, and be characterized by minimal human disturbance and access. Relative cover of non-native plants within the proposed relocation sites shall not exceed the relative cover of nonnative plants in the adjacent habitats;
  - (d) Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project Disturbance Area.
- (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 Applicant shall acquire, in fee or in easement, 19.5 acres of land for each burrowing owl that is displaced by construction of the Project. This compensation acreage of 19.5 acres per single bird or pair of nesting owls assumes that there is no evidence that the compensation lands are occupied by burrowing owls. If burrowing owls are observed to occupy the compensation lands, then only 9.75 acres per single bird or pair is required, per CDFG (1995) guidelines. If the compensation lands are contiguous to currently occupied habitat, then the replacement ratio will be 13.0 acres per pair or single bird. The Applicant 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. In lieu of acquiring lands itself, the Applicant may satisfy the requirements of this mitigation measure 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 Mitigation Measure BIO-17.

- (a) *Criteria for Burrowing Owl Mitigation Lands.* The terms and conditions of this acquisition or easement shall be as described in BIO-17 [Desert Tortoise Compensatory Mitigation], with the additional criteria to include: 1) the 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 burrowing owl mitigation lands may be included with the desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the burrowing owl mitigation land is separate from the acquisition required for desert tortoise compensation lands, the Applicant shall fulfill the requirements described below.
- (b) *Security.* If burrowing owl mitigation land is separate from the acreage required for desert tortoise compensation lands the Applicant 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 Applicant 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 this mitigation measure. 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. The estimated costs of enhancement and endowment. The final amount due will be determined by the PAR analysis conducted pursuant to BIO-17.

**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 Applicant 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 Applicant 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 Applicant 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 Applicant shall do all of the following if relocation of one or more burrowing owls is required:

- (1) 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.
- (2) No less than 90 days prior to acquisition of the burrowing owl compensation lands, the Applicant, 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 Applicant shall submit a PAR or PAR-like analysis for the parcels for review and approval by the CPM, CDFG and USFWS.
- (3) Within 90 days of the land or easement purchase, as determined by the date on the title, the Applicant 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.
- (4) No later than 30 days prior to the start of construction-related ground disturbing activities, the Applicant shall provide written verification of Security in accordance with this mitigation measure.
- (5) No later than 18 months after the start of construction-related ground disturbance activities, the Applicant 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.
- (6) 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.

### **BIO-22 Avian Protection Plan/Monitoring Bird Impacts from Solar Technology**

The Applicant shall prepare and implement an Avian Protection Plan to monitor bird collisions with facility features (study described below). The Applicant 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. The Plan shall include adaptive management strategies that include the placement of bird flight diverters, aerial markers, or other strategies to minimize collisions with the SunCatcher units.

The Avian Protection Plan shall include a Bird Monitoring Study to monitor the death and injury of birds from collisions with facility features such as reflective mirror-like surfaces and from heat, and bright light from concentrating sunlight. The study design shall be approved by BLM's Wildlife Biologist and the CPM in consultation with CDFG and USFWS, and shall be incorporated into the project's BRMIMP and implemented. The Bird Monitoring Study shall be based upon prior studies by McCrary et al. (1986) or other applicable literature, and shall include detailed specifications on data and carcass collection protocol and a rationale justifying the proposed schedule of carcass searches. The study shall also include seasonal trials to assess bias from carcass removal by scavengers as well as searcher bias and proposed disposition of dead or injured birds.

**Verification:** No more than 30 days following the publication of the Energy Commission License Decision or BLM's Record of Decision/ROW Issuance, whichever comes first, the Applicant shall submit to the CPM, BLM's Wildlife Biologist, USFWS and CDFG a final Avian Protection Plan. Modifications to the Avian Protection Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM.

For one year following the beginning of power plant operation, the Designated Biologist shall submit quarterly reports to BLM's Wildlife Biologist, CPM, CDFG, and USFWS describing the methods, dates, durations, and results of monitoring. The quarterly reports shall provide a detailed description of any project-related bird or wildlife deaths or injuries detected during the monitoring study or at any other time. Following the completion of the fourth quarter of monitoring the Designated Biologist shall prepare an Annual Report that summarizes the year's data, analyzes any project-related bird fatalities or injuries detected, and provides recommendations for future monitoring and any adaptive management actions needed. The Annual Report shall be provided to the CPM, BLM's Wildlife Biologist, CDFG, and USFWS. Quarterly reporting shall continue until BLM's Wildlife Biologist and 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 the Bird Monitoring Study is determined by BLM's Wildlife Biologist and the CPM to be complete, the Applicant or contractor shall prepare a paper that describes the study design and monitoring results to be submitted to the CPM, BLM's Wildlife Biologist, CDFG, USFWS, and a peer-reviewed scientific journal. Proof of submittal shall be provided to BLM's Wildlife Biologist and the CPM within one year of concluding the monitoring study.

### **BIO-23 Nelson’s Bighorn Sheep Mitigation**

The Designated Biologist or Biological Monitor shall be responsible for daily binocular scans of the project area and surrounding hills and bajadas to search for Nelson’s bighorn sheep during construction activities. At any time bighorn sheep are seen within 2000 feet of any active construction site, the Designated Biologist or Biological Monitor shall monitor their activity until the animals leave the area. If the bighorn sheep approach within 500 feet of any active construction site, then construction shall cease until the animals have moved farther than 500 feet away from construction activities, even if construction is occurring within an area that had been fenced with tortoise exclusion fencing. This buffer may be modified with the approval of the CPM, BLM, and CDFG. In addition, the Applicant shall provide resource agency staff and private conservation foundation staff and volunteers permanent access to the Cady Mountains via Hector Road or another suitable route for any activities related to Nelson’s bighorn sheep monitoring or management.

**Verification:** Impact minimization measures and implementation methods for Nelson’s bighorn sheep and their implementation methods shall be included in the final BRMIMP and implemented during construction and operation of the project. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist to the CEC and BLM.

### **BIO-24 American Badger and Desert Kit Fox Impact Avoidance and Minimization Measures**

Prior to ground disturbance the Applicant shall conduct pre-construction surveys for American badgers and desert kit fox. These surveys may be conducted 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 90 feet of all project facilities, utility corridors, and access roads. 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 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.

Occupied badger and kit fox dens shall be flagged and ground-disturbing activities avoided within 50 feet of the occupied den. Maternity dens shall be avoided during the pup-rearing season (15 February through 1 July) and a minimum 200-foot disturbance-free buffer established. Buffers may be modified with the concurrence of CDFG and CPM. Maternity dens shall be flagged for avoidance, identified on construction maps, and a biological monitor shall be present during construction.

If avoidance of a non-maternity den is not feasible, badgers shall be relocated or allowed to escape the project area (e.g., by providing a temporary monitored opening in the tortoise exclusion fence and directing the animal toward the opening with temporary plastic construction fencing). If necessary, dens will be slowly excavated (either by hand or mechanized equipment under the direct supervision of the biologist, removing no more than 4 inches at a time) before or after the rearing season (15 February through 1 July). Any relocation of badgers or kit foxes shall occur only after consultation with the CDFG and CPM. A written report documenting the badger removal shall be provided to the CPM within 30 days of relocation. In the event that passive relocation techniques fail for badgers, the Applicant will contact CDFG to explore other relocation options, which may include trapping.

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

### **BIO-25 Bat Impact Avoidance and Minimization Measures**

The BLM would require the development of a Bat Protection Plan and implementation of project mitigation measures by the Applicant to address potential impacts to bats. The Applicant shall conduct a survey for roosting bats prior to any ground disturbance activities in all areas within 200 feet of rocky outcrops or the existing BNSF railroad trestles. The Applicant shall also conduct surveys for roosting bats during the maternity season (1 March to 31 July) and winter surveys for hibernation roosts within 300 feet of project activities at the existing railroad trestles and rocky outcrops. These areas shall be surveyed by a qualified bat biologist, who shall be approved by the Designated Biologist. Surveys shall include a minimum of one day and one evening visit. If active maternity roosts or hibernacula are found, the rock outcrop or trestle occupied by the roost shall be avoided (i.e., not removed) by the project, if feasible. If avoidance of the maternity roost is not feasible, the bat biologist shall survey (through the use of radio telemetry or other CDFG/CPM/BLM-approved methods) for nearby alternative maternity colony sites. If the bat biologist determines in consultation with and with the approval of the CDFG, BLM Wildlife Biologist, and CPM that there are alternative roost sites used by the maternity colony and young are not present, then no further action is required. However, if there are no alternative roost sites used by the maternity colony, provision of substitute roosting bat habitat is

required. If active maternity roosts are absent, but a hibernaculum (i.e., a non-maternity roost) is present, then exclusion of bats prior to demolition of roosts is required.

- (1) Protection of significant roosts. All maternity and hibernation roosts containing more than 10 Townsend's big-eared bats or California leaf-nosed bats, or 25 bats of any other species, are considered significant roosts by the BLM. Any significant roosts that are found shall be protected on-site.
- (2) Provision of substitute roosting bat habitat. If a maternity roost will be impacted by the project, and no alternative maternity roosts are in use within 1 mile of the site, substitute roosting habitat for the maternity colony shall be provided on, or in close proximity to, the project site no less than three months prior to the eviction of the colony. Alternative roost sites will be constructed in accordance with the specific bats' requirements in coordination with CDFG, BLM Wildlife Biologist, and the CPM. Alternative roost sites must be of comparable size and proximal in location to the impacted colony. The CDFG shall also be notified of any hibernacula or active nurseries within the construction zone.
- (3) Exclude bats prior to demolition of roosts. If non-breeding bat hibernacula are found in rocky outcrops scheduled to be removed or in crevices in rock outcrops within the grading footprint, the individuals shall be safely evicted, according to timing and under the direction of the qualified bat biologist, by opening the roosting area to allow airflow through the cavity or other means determined appropriate by the bat biologist (e.g., installation of one-way doors). In situations requiring one-way doors, a minimum of one week shall pass after doors are installed and temperatures should be sufficiently warm for bats to exit the roost. This action should allow all bats to leave during the course of one week. Roosts that need to be removed in situations where the use of one-way doors is not necessary in the judgment of the qualified bat biologist shall first be disturbed by various means at the direction of the bat biologist at dusk to allow bats to escape during the darker hours, and the roost tree shall be removed or the grading shall occur the next day (i.e., there shall be no less or more than one night between initial disturbance and the grading or tree removal).

If an active maternity roost is located in an area to be impacted by the project, and alternative roosting habitat is available, the demolition of the roost site must commence before maternity colonies form (i.e., prior to 1 March) or after young are flying (i.e., after 31 July) using the exclusion techniques described above. The Applicant shall not disturb or remove non-significant roosts during the winter hibernation season.

**Verification:** The Applicant shall submit a report to the CPM, the BLM Wildlife Biologist, and the CDFG within 30 days of completion of roosting bat surveys and any subsequent mitigation. The report shall describe survey methods, results, mitigation measures implemented, and the results of the mitigation.

## **BIO-26 Streambed Impact Minimization and Compensation Measures**

The CEC has identified requirements for streambed impact minimization and compensation measures in their Supplemental Staff Assessment (CEC 2010X); however this is not a mitigation requirement that is proposed by the BLM. If modified by the CEC in the future, the modifications would be carried forward by the BLM.

The Applicant shall implement the following measures to avoid, minimize and mitigate for direct and indirect impacts to jurisdictional waters of the State and to satisfy requirements of California Fish and Game Code sections 1600 and 1607. Throughout this mitigation measure, “jurisdictional” refers to streambeds or acreages of streambed meeting CDFG criteria as waters of the State.

### **Section A: Acquire Off-Site State Waters:**

The Applicant shall acquire, in fee or in easement, a parcel or parcels of land that includes no fewer than 288.8 acres of State jurisdictional waters. At least 9.9 acres must contain microphyll woodland. Prior to construction the applicant shall map the vegetation with emphasis on desert wash, including microphyll woodland, communities within the drainages subject to project disturbance and provide a map to the CPM, CDFG and BLM. Impacts to 3.3 acres of catclaw acacia or smoke tree habitat lost will be mitigated at a minimum 3:1 ratio. The parcel or parcels comprising the 288.8 acres of ephemeral washes shall include the same types of vegetation as mapped in the project footprint.

This compensation acreage may be included (“nested”) within the acreage acquired and managed as desert tortoise habitat compensation (Mitigation Measure BIO-17) only if:

- Adequate acreage of qualifying state-jurisdictional streambed delineated within the desert tortoise compensation lands;
- The desert tortoise habitat compensation lands are acquired and dedicated as permanent conservation lands within 18 months of the start of project construction.

If these two criteria are not met, then the Applicant shall provide no fewer than 288.8 acres of state-jurisdictional streambed compensation lands independent of any compensation land required under other mitigation measures (adjusted to reflect the final project footprint and expert’s delineation of streambed on the compensation lands), and shall also provide funding for

the initial improvement and long-term maintenance and management of the acquired lands, and to comply with other related requirements of this mitigation measure. Costs of these requirements cannot be estimated in advance because jurisdictional streambed would make up only a small portion of any acquired parcel and might vary widely among available parcels. In general, however, it is anticipated that total costs would include per-acre cost of the land itself at approximately \$1,000, pre-acquisition liability surveys, appraisal fees, and other transaction costs, appraisal fees at \$3,000 per parcel, \$250 per acre for initial habitat improvement, BLM internal costs for transfer of land, and \$1,450 per acre for long-term management, and (if applicable) NFWF management fees. The terms and conditions of this acquisition or easement shall be as described in Mitigation Measure BIO-17. Mitigation for impacts to State waters shall occur within the surrounding watersheds, as close to the project site as possible.

The Applicant may elect to comply with the requirements in this mitigation measure 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 Applicant must make an initial deposit to the REAT Account in an amount equal to the estimated costs 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 Applicant, the Applicant 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 Applicant.

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.

**Management Plan for Acquired Lands:** The Applicant shall prepare and submit to Energy Commission 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.

Where applicable, the management plan should be integrated with desert tortoise compensation land habitat management planning requirements as described in BIO-17.

**Section B: On-site Measures:**

- (1) Copies of Requirements, Stop Work Authority. The Applicant shall provide a copy of the Streambed Impact Minimization and Compensation Measures to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order after giving notice to the Applicant, if the CPM, in consultation with CDFG, determines that the Applicant is not in compliance with any of the requirements of this mitigation measure, including but not limited to the existence of any of the following:
  - (a) The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;
  - (b) New information becomes available that was not known to the Energy Commission at the time of project certification; or
  - (c) The project or project activities as described in the Supplemental Staff Assessment/Final Environmental Impact Statement have changed.
- (2) Best Management Practices. The Applicant shall comply with the following mitigation measures to protect drainages near the Project Disturbance Area:
  - (a) The Applicant shall not operate vehicles or equipment in ponded or flowing water except as described in this mitigation measure.
  - (b) With the exception of the retention basins and drainage control system installed for the project the installation of bridges, culverts, or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade.
  - (c) When any activity requires moving of equipment across a flowing drainage, such operations shall be conducted without substantially increasing stream turbidity.
  - (d) Vehicles driven across ephemeral drainages when water is present shall be completely clean of petroleum residue and water levels shall be below the vehicles' axles.

- (e) The Applicant shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.
- (f) The Applicant 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.
- (g) The Applicant 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 Applicant to ensure compliance.
- (h) Spoil sites shall not 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.
- (i) 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 by the Applicant or any party working under contract or with the permission of the Applicant, shall be removed immediately.
- (j) 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.
- (k) When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.
- (l) 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.
- (m) Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to a drainage shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak. Clean up equipment such as booms, absorbent pads, and skimmers, shall be on site prior to the start of construction.

- (n) The cleanup of all spills shall begin immediately. The CDFG, BLM Wildlife Biologist, and CPM shall be notified immediately by the Applicant of any spills and shall be consulted regarding clean-up procedures.
- (3) Non-Native Vegetation Removal. The owner shall remove any non-native vegetation (Consistent with the Weed Management Plan, see Mitigation Measure BIO-11) from any on-site portion of any drainage that requires the placement of a bridge, culvert or other structure. Removal shall be done at least twice annually (Spring/Summer) throughout the life of the Project.
- (4) Reporting of Special-Status Species. If any special-status species are observed on or in proximity to the project site, or during project surveys, the Applicant shall submit California Natural Diversity Data Base (CNDDDB) forms and maps to the CNDDDB within five working days of the sightings and provide the regional CDFG office with copies of the CNDDDB forms and survey maps. The CNDDDB form is available online at <http://www.dfg.ca.gov/whdab/pdfs/natspec.pdf>. This information shall be mailed within five days to: California Department of Fish and Game, Natural DiversityData Base, 1807 13th Street, Suite 202, Sacramento, CA 95814, (916)324-3812. A copy of this information shall also be mailed within five daysto CDFG, BLM Wildlife Biologist, and the CPM.
- (5) Notification. Prior to any activities that cross or have the potential to impact any jurisdictional drainage, the Applicant shall provide a detailed map to the CDFG, BLM Wildlife Biologist, and CPM in a GIS format that identifies all potential crossings of jurisdictional habitats including retention basins, detention basins, reconfigured channels and culverts. The maps shall identify the type of crossing proposed by the owner such as bridges, culverts, or other mechanism and the best management practices that would be employed. The Applicant shall notify the CPM, BLM Wildlife Biologist, and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas and at least five days prior to completion of project activities in jurisdictional areas. The Applicant shall notify the CPM, BLM Wildlife Biologist, and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of the 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, BLM Wildlife Biologist, and CDFG no later than 7 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 described below. A copy of the notifying change of conditions report shall be included in the annual reports.

- (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 nonnative, 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 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.

**Verification:** No fewer than 30 days prior to the start of any site or related facilities mobilization activities, the Applicant shall implement these measures. No fewer than 30 days prior to the start of work potentially affecting waters of the State, the Applicant shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM and BLM Wildlife Biologist that the above best management practices will be implemented and provide a discussion of work in waters of the State in Compliance Reports for the duration of the project.

Within 30 days after completion of the first year of project construction, the Applicant shall provide to the CPM for review and approval a report identifying that appropriate mitigation lands have been obtained, verification of the acreage of state jurisdictional streambeds on the compensation lands (to be delineated using methodology identical to the delineation of on-site jurisdictional streambeds), a draft Management Plan for review and approval by the CPM and CDFG, and verification on ongoing enhancement techniques, and a summary of all modifications made to the existing channels on the project site.

### **BIO-27 Evaporation Pond Design, Monitoring, and Management Plan**

The Applicant shall install netting over the evaporation ponds and design and implement an Evaporation Pond Design, Monitoring, and Management Plan (Evaporation Pond Plan) to be

based upon the draft Evaporation Pond Plan submitted by the applicant. The Plan shall meet the approval of the USFWS, CDFG, BLM's Wildlife Biologist, and the CPM. The goal of the Evaporation Pond Plan shall be to avoid the potential for wildlife mortality associated with the evaporation ponds. The Evaporation Pond Plan shall include: a discussion of the objectives of the Evaporation Pond Plan; a description of project design features such as side slope specifications, freeboard and depth requirements, covering, and fencing; a discussion on the placement of the evaporation pond as to reduce the potential of collision or electrocution of wildlife near the transmission line; avian, pond, and water quality monitoring for selenium and other Title 20 compounds, management actions such as bird deterrence/hazing and water level management, triggers for those management actions; and annual reporting requirements.

**Verification:** At least 30 days prior to start of any project-related ground disturbance activities, the Applicant shall provide the CPM, BLM's Wildlife Biologist, USFWS, and CDFG with the final version of the Evaporation Pond Plan that has been reviewed and approved by the USFWS, CDFG, and CEC. The CPM and BLM's Wildlife Biologist would determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Evaporation Pond Plan must be made only after consultation with the CEC, USFWS, and CDFG. The Applicant shall notify the CPM and BLM's Wildlife Biologist no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Evaporation Pond Plan.

Within 30 days after completion of evaporation pond construction, the Applicant shall provide to the CPM for review and approval a report identifying which items of the Evaporation Pond Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and as-built drawings of the evaporation ponds. Throughout the life of the project, the Applicant shall provide annual reports on results of the previous year's evaporation plan monitoring, including but not limited to description and summary of wildlife mortality, water quality, and management actions taken or proposed.

### **BIO-28 Channel Decommissioning and Reclamation Plan**

Upon project closure, the Applicant shall implement a final Decommissioning and Reclamation Plan to remove the engineered diversion channels, detention basins, and other sediment control features from the project site. The goal of the plan shall be to restore the site's topography and hydrology to a relatively natural condition and to establish native plant communities within the Project Disturbance Area. The Channel Decommissioning and Reclamation Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities. The plan and cost estimate shall be consistent with the guidelines in BLM's 43 CFR 3809.550 et seq., subject to review and revisions from BLM's Wildlife Biologist and the CPM in consultation with USFWS and CDFG.

**Verification:** No less than 90 days from publication of the Energy Commission Decision or the Record of Decision, whichever comes first, the Applicant shall provide to BLM's Wildlife Biologist and the CPM an agency-approved final Channel Decommissioning and Reclamation Plan. Modifications to the approved Channel Decommissioning Plan shall be made only after approval from BLM's Wildlife Biologist and the CPM, in consultation with USFWS, and CDFG.

No more than 10 days prior to initiating project-related ground disturbance activities the Applicant shall provide financial assurances to BLM's Wildlife Biologist and the CPM to guarantee that an adequate level of funding would be available to implement measures described in the Channel Decommissioning and Reclamation Plan, pursuant to 43 CFR 3809.550 et seq.

### **BIO-29 Closure Plan Measures**

The Applicant shall implement and incorporate into the facility closure plan measures to address the local biological resources related to facility closure. A funding mechanism shall be developed in consultation with the CEC to ensure sufficient funds are available for revegetation, reclamation, and decommissioning. The facility closure plan shall address biological resources related mitigation measures. In addition to these measures, the plan must include the following:

- (1) Removal of transmission conductors when they are no longer used and useful;
- (2) Removal of all aboveground and subsurface power plant site facilities and related facilities;
- (3) Methods for restoring wildlife habitat and promoting the re-establishment of native plant and wildlife species;
- (4) Revegetation of the project site and other disturbed areas utilizing appropriate methods for establishing native vegetation; components of the revegetation plan, including performance standards and monitoring, shall be as described in Mitigation Measure BIO-10;
- (5) A cost estimate to complete closure-related activities, to be based upon decommissioning costs required under 43 CFR 3809.550 et seq.
- (6) An implementation and monitoring plan to ensure successful and satisfactory completion of every element of the Facility Closure Plan.

In addition, the Applicant shall secure funding to ensure implementation of the plan and provide to the CPM and BLM Wildlife Biologist written evidence of the dedicated funding mechanism(s). The financial assurances may be in the form of an irrevocable letter of credit, a performance

bond, a pledged savings account, or another equivalent form of security, as approved by the CPM and BLM Wildlife Biologist.

**Verification:** Prior to initiating ground-disturbing project activities, the Applicant shall provide financial assurances (as described in this mitigation measure, above) to the CPM and BLM Wildlife Biologist to guarantee that an adequate level of funding will be available to implement decommissioning and closure activities described above.

At least 12 months prior to commencement of planned closure activities, the Applicant shall address all biological resources-related issues associated with facility closure, and provide final measures, in a Biological Resources Element. The draft planned permanent or unplanned closure measures shall be submitted to the CPM, BLM Wildlife Biologist, CDFG, and USFWS. After revision, final measures shall comprise the Biological Resources Element, which shall include the items listed above as well as written evidence of the dedicated funding mechanism(s) for these measures. The final Biological Resources Element shall become part of the facility closure plan, which is submitted to the CPM and BLM Wildlife Biologist within 90 days of the permanent closure or another period of time agreed to by the CPM and BLM Wildlife Biologist.

In the event of an unplanned permanent closure, or an indeterminate suspension of operations, the Applicant shall notify the CPM and BLM Wildlife Biologist, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan (see Compliance Mitigation Measures).

Upon facility closure, the Applicant shall implement measures in the Biological Resources Element and provide written status updates on all closure activities to the CPM and BLM Wildlife Biologist at a frequency determined by the CPM and BLM Wildlife Biologist.

### **BIO-30 In-Lieu Fee Mitigation**

The CEC has identified an option for in-lieu fee mitigation in their Supplemental Staff Assessment (CEC 2010X); however this is not a mitigation requirement that is proposed by the BLM. If modified by the CEC in the future, the modifications would be carried forward by the BLM.

The Applicant may choose to satisfy certain compensatory mitigation obligations identified in this Decision by paying an in lieu fee to the Department of Fish and Game pursuant to Fish and Game code sections 2069 and 2099, 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 Applicant shall notify the Commission that it would like a determination that the in-lieu fee proposal meets CEQA and CESA requirements.

### **BIO-31 Implementation of Terms and Conditions Associated with the U.S. Fish and Wildlife Service’s Biological Opinion**

All terms and conditions associated with the USFWS Biological Opinion shall be implemented by the Applicant.

### **BIO-32 Implementation of Terms and Conditions Associated with the California Department of Fish and Game’s Incidental Take Permit**

All terms and conditions associated with the CDFG Incidental Take Permit shall be implemented by the Applicant.

#### **4.3.4.2 Proposed BMPs from the Supplemental Biological Assessment**

The following BMPs were proposed in the Supplemental Biological Assessment. These BMPs will be modified and finalized after the issuance of the USFWS’s Biological Opinion that includes the Terms and Conditions for the project.

- (1) A Desert Tortoise Translocation Plan shall be developed by Calico Solar, and must be approved by BLM and the wildlife agencies, and be completed and approved by USFWS prior to issuance of a Biological Opinion. This plan will include the following details at a minimum: translocation protocol; health assessments for all tortoises handled; disease testing of individuals that would be translocated greater than 500 meters; translocation habitat assessment and suitability; assessment of desert tortoise population and health in the area receiving translocated tortoise. Pre-construction surveys would be conducted to locate and test all desert tortoises that would be translocated greater than 500 meters from the area where they are collected to the translocation location outside of the Project site. Testing would entail bloodwork to determine whether any desert tortoises suffer from upper respiratory tract disease (URTD) and would include radio tagging each desert tortoise found to aid in subsequent relocation after blood test results are available. Desert tortoises from Phase One would be held in temporary holding pens in the Pisgah Crater ACEC, which has been identified and approved as the short-distance translocation area. Those desert tortoises found to be healthy would be released into this translocation area. Tortoises found within 500 meters of the boundary of the detention basin area of Phase 1 would be moved into the desert tortoise linkage area. Approximately 12 tortoises are located within 500 meters of the boundary of the Phase 1 detention basin areas and can be moved without requiring blood testing; however, the number of tortoises that would be placed in the linkage would be limited to avoid raising the tortoise density of the linkage above 10% of its

current density (4.5 tortoises per kilometer). Any additional individuals that are detected in the detention basins would be placed in temporary holding pens within the short-distance translocation area and once they are found to be healthy would be released.

- (2) Two desert tortoises were detected in an area that was recently identified as an environmentally sensitive area on the west side of NAP Area 2 and has been excluded from the Project footprint. To avoid and minimize loss of tortoise in this recently excluded area, the Applicant proposes to relocate the tortoise found in this area by following the methods identified in the approved Desert Tortoise Translocation Plan. These tortoises would be relocated greater than 500 meters from this location, which would require blood testing prior to moving them to the long-distance translocation site. The Applicant proposes to install temporary fencing around the Project line (on the west side of NAP Area 2) that surrounds this environmentally sensitive area while waiting for blood test results to avoid moving the tortoise more than one time. The fencing would be removed once the tortoises are relocated to the long-distance translocation areas in Spring 2010. An unknown (but small) number of tortoises reside in the NAP Area 2, and these tortoises would be blood tested and translocated to the long-distance translocation site if the individuals are found disease free. Since these tortoises are on private lands in NAP 2, these tortoise would be identified and translocated to the extent that land owner approval can be obtained.
- (3) A temporary exclusionary fence would be constructed around the construction area in occupied desert tortoise habitat, pre-construction clearance surveys to remove tortoise from the construction area would be conducted, and roving biological monitors that would monitor the various construction crews in the active construction areas would be assigned. Biological monitoring would also be present during access road improvements in occupied desert tortoise habitat. The temporary exclusionary fencing would be in place for over one year; therefore, in compliance with USFWS guidelines, a 4-strand wire exclusion fence that is made of galvanized material or an ERTEC polymer matrix would be placed during construction and removed after construction has been completed. This type of fencing is usually used for permanent fencing, thus providing the level of protection needed for the extended length of Project construction, which is expected to be approximately 4 years.
- (4) A permanent security fence would surround the Project site. To continue to allow access to the public lands north of the Project site, the perimeter road surrounding the Project site would be left open to the public. A permanent tortoise exclusionary fence would be constructed on the outside of this perimeter road to minimize the

potential for tortoise mortality from traffic. Where there are intersections with other roads, the fence would remain on the outside of the perimeter road (creating a 'T' of fencing on the outside of each road) thereby allowing uninterrupted use of the road. The exclusionary fence would be consistent with USFWS design criteria as described above.

- (5) Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing exclusion areas, 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 and temporary fencing shall be inspected monthly 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. All 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. If fencing is not repaired within 48 hours, the BLM Wildlife Biologist shall be notified within 5 business days to determine if additional remedial action is required, such as the need for conducting additional clearance surveys within the Project footprint.
- (6) In addition to the exclusionary fencing, cattle guards would be placed where the perimeter access road meets the permanent security fencing near the southeast and northeast boundaries of Section 9, and in two locations where additional breaks are needed in the permanent security fence for access to the NAP 1 Area. Consistent with BLM and CDFG requirements, mitigation for loss of desert tortoise habitat would be achieved by a combination of habitat acquisition and habitat enhancement. The lands to be acquired and the specific habitat enhancement actions have not presently been determined. These specifics shall be developed through discussions among BLM, CDFG, and USFWS. Acquired lands would be purchased either by the applicant or the applicant can deposit funds with the National Fish and Wildlife Foundation (NFWF) in conformance with a Memorandum of Agreement (MOA) being developed by the wildlife agencies. If these lands are acquired through the NFWF MOA, a compensation fee would be assessed based on current fair market appraised value for the specific geographic area in which the acquisition occurs. The acquired lands shall occur in desert tortoise habitat with equivalent function and value. The replacement habitat is intended to benefit the population of tortoises adversely affected by the project, and shall be located within the same Desert Tortoise Recovery Unit (as identified in the 2009 draft Recovery

Plan) with comparable or better habitat value. The BLM, USFWS, and CDFG shall coordinate to reach mutual agreement on the selection and ownership/management of acquired lands.

- (7) If acquisition funds are provided to NFWF, the compensation (1) funds would be provided prior to Project construction, (2) lands would be acquired prior to completion of Project construction, and (3) lands would be conserved in perpetuity by a legal mechanism agreed to by the three agencies. If the conservation lands are acquired directly by the applicant, then steps #2 and #3 would apply.
- (8) Regardless of the acquisition method (by applicant or NFWF), the Applicant would establish a management fund for the agency that owns and manages the acquired lands. The management fund would consist of an interest-bearing account, with the amount of non-wasting capital commensurate to generate sufficient interest to fund all monitoring, management, and protection of the acquired lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and other actions designed to protect or improve the habitat values of the acquired lands. A Property Analysis Record ([http://cnlm.org/cms/index.php?option=com\\_content&task=view&id=21&Itemid=155](http://cnlm.org/cms/index.php?option=com_content&task=view&id=21&Itemid=155)), or comparable method, would be conducted by the Applicant and Agencies, to determine the management needs and costs described above, which then would be used to calculate the amount of capital needed for the management fund. This management fund would be held and managed by NFWF. A portion of the lost desert tortoise habitat may be offset by habitat enhancement activities. The proportion of the habitat loss to be offset by habitat enhancement activities shall be determined through discussions among the BLM, CDFG, USFWS and the Applicant. Funds for implementing these management actions, as determined by the wildlife agencies, shall be deposited in the same NFWF fund described above.
- (9) Speed limits within the Project site would be restricted to less than 25 miles per hour (mph) during construction and on non-public access roads in areas surrounding the Project Site during operation of the Project. All construction and operations personnel would be limited to this speed limit unless the speed limit is posted on public paved roads.
- (10) Lighting would be focused in toward the project site and downward to avoid lighting habitats beyond the project perimeter fencing.
- (11) A Raven Monitoring, Management, and Control Plan must be approved by BLM, CDFG and USFWS prior to the initiation of any earth disturbing events. Monitoring for the presence of ravens and other potential human subsidized predators of

special status wildlife and implement a management plan if predator densities substantially increase in the vicinity of the facility. A pre-construction survey of the project site would be conducted to document the baseline level of raven occupation in the project vicinity. BMPs would be instituted to minimize the subsidization of ravens. BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

- (12) Calico Solar Weed Management Plan, which must be approved by the wildlife agencies (CDFG, USFWS and BLM), would be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re-establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration. Herbicides that may be used include post-emergent herbicide formulations such as Accord SP with the active ingredient glyphosate, and pre-emergent herbicide formulations such as Korvar I DF with the active ingredients bromacil and/or diuron. These herbicides have shown empirically proven low toxicity to test animals, and are approved by BLM and USFWS.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## **4.4 Climate Change**

This section describes potential impacts of the Proposed Action and alternatives pertaining to climate change and was modified from information included in Section C.1, Air Quality in the SA/DEIS.

On April 2, 2007, the U.S. Supreme Court found that GHGs are pollutants that must be covered by the federal CAA. In response, on September 30, 2009, the EPA proposed to apply Prevention of Significant Deterioration (PSD) requirements to facilities whose CO<sub>2</sub>E emissions exceed 25,000 tons per year. The following analysis presents information on GHG emissions related to electricity generation and evaluates potential emissions from the Calico Solar Project.

### 4.4.1 Methodology

This section was prepared based on guidance provided for EIS preparation, by DOI SO 3289 (signed September 14, 2009), which requires each bureau and office of the DOI to consider and analyze potential climate change impacts when making decisions regarding potential use of resources under the DOI’s purview. Climate change analyses consist of several factors, including GHGs, land use management practices, the albedo effect, and other factors. The tools necessary to quantify climatic impacts are presently unavailable. As a consequence, impact assessment of specific effects of anthropogenic activities cannot be determined quantitatively. Additionally, specific levels of significance have not yet been established. Therefore, climate change analysis for the purpose of this document is limited to accounting and disclosing of factors that contribute to climate change. Qualitative and/or quantitative evaluation of potential contributing factors within the planning area is included where appropriate and practicable.

As part of its supporting documentation for the Draft Scoping Plan, the CARB released an updated version of the GHG inventory for California (CARB 2010). Figure 4-1 is a graph that shows the total GHG emissions for California for 1990, the GHG emissions average for 2002–2004, and the projected GHG emissions for 2020 if no action is taken.

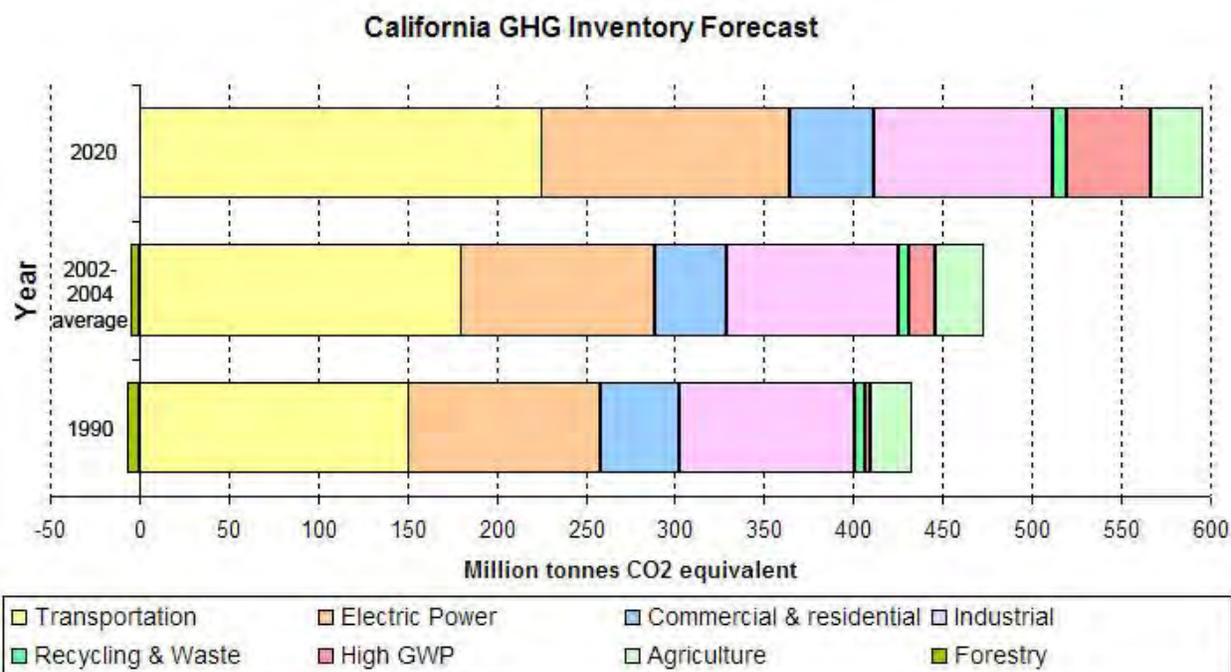


Figure Source: <http://www.arb.ca.gov/cc/inventory/data/forecast.htm> (accessed June 2, 2010).

**Figure 4-1 California GHG Inventory Forecast**

## 4.4.2 Direct and Indirect Impacts

### 4.4.2.1 Alternative 1: Proposed Action

The generation of electricity can produce GHG with the criteria air pollutants that have been traditionally regulated under the federal and state CAAs. For fossil-fuel-fired power plants, GHG emissions primarily include CO<sub>2</sub>, with much smaller amounts of N<sub>2</sub>O, and CH<sub>4</sub>, which is often from unburned natural gas. For solar-energy-generation projects, the stationary source GHG emissions are much smaller than for fossil-fuel-fired power plants, but the associated maintenance vehicle emissions are higher.

Other sources of GHG emissions include SF<sub>6</sub> from high-voltage equipment and HFCs and PFCs from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO<sub>2</sub> emissions from carbon-based fuels. Other sources of GHG emissions are small and also are more likely to be easily controlled, reused, or recycled, but they are nevertheless documented in this analysis since some of the compounds have high climate change potential.

While the Calico Solar Project would emit some GHGs, the contribution to the system build-out of renewable resources to meet the goals of the 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 interconnected generation resources. Operation of one power plant, like the Calico Solar Project, affects all other power plants in the interconnected system. The operation of the Calico Solar Project would affect the overall electricity system operation and GHG emissions in several ways:

- Calico Solar Project would provide low-GHG, renewable generation.
- Calico Solar Project would facilitate to some degree the replacement of high GHG emitting (for example, out-of-state coal) electricity generation that must be phased out to meet the State's 2006 Emissions Performance Standard.
- Calico Solar Project 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. Construction of the Calico Solar Project would generate GHG emissions. To date, there is no study that quantitatively assesses all of the GHG emissions associated with each phase of the construction of an individual development or project. Overall, the following activities associated with the Calico Solar Project could directly or indirectly contribute to the generation of GHG emissions:

- **Removal of Vegetation:** The net removal of vegetation for construction results in a loss of the carbon sequestration in plants. However, re-vegetation would result in additional carbon sequestration and would lower the carbon footprint of the Calico Solar Project.
- **Disturbance of Soils:** Desert soils are believed to have a carbon sequestering capability. Disturbance of the soil surface is thought to disrupt this capability.
- **Construction Activities:** During construction of the Calico Solar Project, GHG would be emitted during the operation of construction equipment and from worker and vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Furthermore, CH<sub>4</sub> is emitted during the fueling of heavy equipment.
- **Gas, Electric, and Water Use:** Natural gas use results in the emissions of two GHGs: CH<sub>4</sub> (the major component of natural gas) and CO<sub>2</sub> from the combustion of natural gas. California's water conveyance system is energy-intensive. Preliminary estimates indicate that the total energy used to pump and treat water exceeds 6.5 percent of the total electricity used in the State per year (CEC 2004).
- **Solid Waste Disposal:** Solid waste generated by construction of the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHG to varying degrees. Landfilling, the most common waste management practice, results in the release of CH<sub>4</sub> from the anaerobic decomposition of organic materials. CH<sub>4</sub> is a GHG that is 25 times more potent than CO<sub>2</sub>. However, landfill CH<sub>4</sub> can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.
- **Motor Vehicle Use:** Transportation associated with construction and maintenance of the Proposed Action would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips and heavy-duty construction equipment.

The Proposed Action would have a net generating capacity of approximately 850 MW. Construction of industrial facilities such as power plants requires coordination of substantial amounts of equipment and personnel. The concentrated on-site activities would result in short-term, adverse effects from increases in vehicle and equipment emissions that include GHG. The estimated GHG emissions for a peak construction day for the Calico Solar Project are provided in Table 4-24.

**Table 4-24 Proposed Action Estimated GHG Emissions for Project Construction**

<b>Construction Element</b>	<b>Annual CO<sub>2</sub>E (metric tons) [Table Notes 1 and 2]</b>
On-site construction equipment	4,988.20
On-site delivery trucks	1,679.36
On-site construction/worker/security vehicles	1,805.69
Off-site worker/security vehicles	13,954.82
Off-site delivery trucks	17,028.23
On-site/off-site train for water delivery	2,115.71
<b>Total construction emissions</b>	<b>41,571.01</b>

*Table Source:* BLM and CEC 2010, Appendix AIR-1, William Walters, P.E.

*Table Note 1:* One metric ton equals 1.1 short tons of 2,204.6 pounds or 1,000 kilograms.

*Table Note 2:* Over 99 percent of CO<sub>2</sub>E emissions are from these combustion sources.

*Table Key:* GHG = greenhouse gases; CO<sub>2</sub>E = carbon dioxide equivalent.

These emissions would be produced at different levels throughout construction. GHG emissions produced during construction can be mitigated to some degree by longer intervals between maintenance and rehabilitation events. While construction would result in a slight increase in GHG emissions during construction, it is anticipated that any increase in GHG emissions due to construction would be offset by the net reduction in GHG emissions from this solar power plant replacing nonrenewable energy power plants.

Operation of the Calico Solar Project would result in GHG emissions from the facility maintenance fleet and employee trips, water delivery, emergency fire pump engine, and sulfur hexafluoride emissions from new electrical component equipment. The estimated operations GHG emissions for the Calico Solar Project on an annual basis are shown in Table 4-25.

**Table 4-25 Proposed Action Estimated GHG Emissions for Project Operation**

<b>Operating Element</b>	<b>Annual CO<sub>2</sub>E (metric tons) [Table Note 1]</b>
On-site stationary equipment combustion [Table Note 2]	0.82
On-site vehicle combustion [Table Note 2]	1,634.51
On-site train for water delivery [Table Note 2]	153.75
Off-site vehicle combustion [Table Note 2]	1,174.54
Off-site train for water delivery [Table Note 2]	140.19

<b>Operating Element</b>	<b>Annual CO<sub>2</sub>E (metric tons) [Table Note 1]</b>
Equipment leakage (SF <sub>6</sub> )	384.42
<b>Total operation emissions</b>	<b>3,488.22</b>
<b>Facility production [Table Note 3]</b>	<b>1,840,000 megawatt-hours per year</b>
<b>Facility GHG performance</b>	<b>0.00190 metric tons of CO<sub>2</sub>E produced per megawatt-hour</b>

*Table Source:* BLM and CEC 2010, Appendix AIR-1, William Walters, P.E.

*Table Note 1:* One metric ton (MT) equals 1.1 short tons of 2,204.6 pounds or 1,000 kilograms.

*Table Note 2:* Over 99 percent of CO<sub>2</sub>E emissions are from these combustion sources.

*Table Note 3:* Approximately a 25 percent capacity factor.

*Table Key:* GHG = greenhouse gases; CO<sub>2</sub>E = carbon dioxide equivalent; SF<sub>6</sub> = sulfur hexafluoride.

Electricity generation GHG emissions are generally dominated by CO<sub>2</sub> emissions from carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For the Proposed Action, the primary fuel, solar energy, is GHG-free, however there would still be direct and indirect gasoline and diesel fuel use in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, water transport, and a 335-horsepower diesel-fueled emergency engine. An additional source of GHG emissions for the Proposed Action would be SF<sub>6</sub> from electrical equipment leakage.

The Proposed Action would not be developed within a forested area, resulting in no effects on forest resources. However, it has been documented that desert soils can have a carbon storage capacity (between 5-40 tons per acre, UNEP 2010), which, although it is minor compared to the carbon storage capacity of forested areas (102.4 tons per acre, UNEP 2010), is considered a carbon sequestration option due to the global extension of drylands (World Resources Institute 2003).

The recent scientific literature regarding the soils' capability to sequester carbon is both new and not yet fully understood, and the actual carbon storage capabilities are not known for the project site. Approximately 4,412 acres would be developed/permanently disturbed, and approximately 4,604 acres would be disturbed during construction. If none of the disturbed soils maintained a capability to sequester carbon and the soil storage capabilities are 25 tons per acre as cited in UNEP 2010, the Proposed Action would result in a decrease in carbon storage capacity of the land by approximately 115,000 tons per year. The Proposed Action would have a long-term, indirect adverse impact on the carbon storage capabilities of the soils within the project site, reducing the overall beneficial impact of the project.

The Proposed Action estimated operation emissions would be approximately 3,488 metric tons of CO<sub>2</sub>E per year directly from primary and secondary GHG emission sources. A comparison of the projected GHG emissions to the existing power plant inventory for California (107,243,302 metric tons of CO<sub>2</sub>E) shows that the emissions resulting from the Proposed Action would be 0.003 percent of total emissions. While it is expected that this project would generate some GHG emissions, 0.00190 metric tons of CO<sub>2</sub>E per MW-hour would be a very small rate compared to nonrenewable energy power plants. For instance, coal power plants generally produce 0.96 metric tons of CO<sub>2</sub>E per MW-hour and gas power plants generate 0.60 metric tons of CO<sub>2</sub>E per MW-hour.

Currently, there is no formal BLM guidance, applicable plan, policy or regulation of an agency adopted for the purpose of reducing emissions of GHG or evaluating GHG and climate change effects. However, a comparison with existing significance criteria on GHGs in California, such as the interim GHG significance thresholds of the South Coast Air Quality Management District (SCAQMD), and the existing regional emissions inventories in California indicates that potential contributions from direct GHG emissions would be considered a long-term effect. In addition, in order to reduce potential GHG emission contributions, the Applicant has proposed to incorporate the following practices as part of the design of the Proposed Action:

- Requiring the contractor to shut down equipment when idling for more than minimum periods.
- Regular maintenance to prevent equipment engine emission increases due to inefficient fuel combustion.
- Use of low-sulfur and low-aromatic fuel meeting state and federal standards for motor vehicle diesel fuel.
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tiers I, II, and III) for construction equipment, including but not limited to catalytic converter systems and particulate filter systems.

The beneficial energy and greenhouse gas impacts of renewable energy projects can also be measured by the energy payback time. Table 4-24 and Table 4-25 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 Proposed Action, 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 Calico Solar, to be on the order of 5 months (Greenpeace 2005); and the project life for Calico Solar is estimated to be 30 years. Therefore, the proposed project's GHG emissions reduction potential from energy displacement

would be substantial. Overall, the Proposed Action would have a long-term, beneficial impact on climate change.

### **CDCA Plan Amendment**

The CDCA Plan does not address climate change.

#### **4.4.2.2 Alternative 1a: Agency Preferred Alternative**

Under the Agency Preferred Alternative, the impacts would be similar to the Proposed Action. The Agency Preferred Alternative would result in a slight reduction in ground disturbance due to the decreased project footprint. However, the same number of SunCatchers would be installed. The reduction in ground disturbance would result from a decrease in project-related roads totaling an approximate disturbance of 4,351 acres, which is 253 acres less than the Proposed Action, increasing soil carbon storage by approximately 6,300 tons per year. This decrease in disturbance would reduce the impacts to desert soils, and reduce the degree to which carbon storage of the soils is affected. Because the renewable power generation would be the same and the adverse impact associated with the disturbance of soils would be reduced, this alternative would result in a greater benefit than the Proposed Action. Overall, this Alternative would have a long-term, beneficial impact on climate change.

### **CDCA Plan Amendment**

The CDCA Plan does not address Climate Change.

#### **4.4.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would have a net generating capacity of approximately 275 MW. This alternative would require infrastructure similar to the Proposed Action. However, because this alternative would have approximately 31 percent of the generating capacity of the Proposed Action, the operational emissions for this alternative would be proportionately lower. Table 4-26 shows the estimated operational emissions for Alternative 2.

**Table 4-26 Reduced Acreage Estimated GHG Emissions for Operations**

<b>Operating Element</b>	<b>Annual CO<sub>2</sub>E (metric tons) [Table Note 1]</b>
On-site stationary equipment combustion [Table Note 2]	0.26
On-site vehicle combustion [Table Note 2]	523.04

<b>Operating Element</b>	<b>Annual CO<sub>2</sub>E (metric tons) [Table Note 1]</b>
On-site train for water delivery [Table Note 2]	49.2
Off-site vehicle combustion [Table Note 2]	375.85
Off-site train for water delivery [Table Note 2]	44.86
Equipment leakage (SF <sub>6</sub> )	123.01
<b>Total operation emissions [Table Note 2]</b>	<b>1,116.23</b>
<b>Facility production [Table Note 3]</b>	<b>588,800 megawatt-hours per year</b>
<b>Facility GHG performance</b>	<b>0.000608 metric tons of CO<sub>2</sub>E produced per megawatt-hour</b>

*Table Source:* BLM and CEC 2010, Appendix AIR-1, William Walters, P.E.

*Table Note 1:* One metric ton (MT) equals 1.1 short tons of 2,204.6 pounds or 1,000 kilograms.

*Table Note 2:* Over 99 percent of CO<sub>2</sub>E emissions are from these combustion sources.

*Table Note 3:* Approximately a 25 percent capacity factor.

*Table Key:* GHG = greenhouse gases; CO<sub>2</sub>E = carbon dioxide equivalent; SF<sub>6</sub> = sulfur hexafluoride.

The Reduced Acreage Alternative would have a reduced impact on the desert soils due to the smaller size of the project site. The reduction in ground disturbance would result from a decrease in project-related roads totaling an approximate disturbance of 1,456 acres, which is 3,150 acres less than the Proposed Action. This decrease in disturbance would reduce the impacts to desert soils, and reduce the degree to which carbon storage of the soils is affected by approximately 78,750 tons of carbon a year. Overall, this Alternative would result in a long-term beneficial impact on climate change by providing renewable power generation.

## **CDCA Plan Amendment**

The CDCA Plan does not address Climate Change.

### **4.4.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The peak daily construction emissions for the Avoidance of Donated and Acquired Lands Alternative would be expected to be the same as those identified under Proposed Action. The operational emissions for this alternative would be expected to be approximately 85 percent of

those identified under the Proposed Action. Table 4-27 shows the estimated operation GHG emissions for Alternative 3.

**Table 4-27 Avoidance of Donated and Acquired Lands Alternative Estimated GHG Emissions for Operations**

<b>Operating Element</b>	<b>Annual CO<sub>2</sub>E (metric tons) [Table Note 1]</b>
On-site stationary equipment combustion [Table Note 2]	0.70
On-site vehicle combustion [Table Note 2]	1,389.33
On-site train for water delivery [Table Note 2]	130.69
Off-site vehicle combustion [Table Note 2]	998.36
Off-site train for water delivery [Table Note 2]	119.16
Equipment leakage (SF <sub>6</sub> )	326.76
<b>Total operation emissions [Table Note 2]</b>	<b>2,964.99</b>
<b>Facility production [Table Note 3]</b>	<b>1,564,000 megawatt-hours per year</b>
<b>Facility GHG performance</b>	<b>0.00162 metric tons of CO<sub>2</sub>E produced per megawatt-hour</b>

*Table Source:* BLM and CEC 2010, Appendix AIR-1, William Walters, P.E.

*Table Note 1:* One metric ton (MT) equals 1.1 short tons of 2,204.6 pounds or 1,000 kilograms.

*Table Note 2:* Over 99 percent of the CO<sub>2</sub>E emissions are from these combustion sources.

*Table Note 3:* Approximately a 25% capacity factor.

*Table Key:* GHG = greenhouse gases; CO<sub>2</sub>E = carbon dioxide equivalent; SF<sub>6</sub> = sulfur hexafluoride.

The Avoidance of Donated and Acquired Lands Alternative would have a reduced impact on the desert soils due to the smaller size of the project site compared to the Proposed Action. The reduction in ground disturbance would result from a decrease in project-related roads totaling an approximate disturbance of 4,328 acres, which is 276 acres less than the Proposed Action. This decrease in disturbance would reduce the impacts to desert soils by approximately 6,900 tons, and reduce the degree to which carbon storage of the soils is affected. However, the level of power generation is also much reduced. While this Alternative would result in a long-term beneficial impact on climate change by providing renewable power generation, it would be less than the Proposed Action.

## **CDCA Plan Amendment**

The CDCA Plan does not address Climate Change.

### **4.4.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under this no action alternative, the benefits of the Calico Solar Project in displacing fossil fuel fired generation and reducing associated GHG emissions from gas-fired generation would not occur. The carbon storage capabilities of the vegetation and soils would not be adversely affected. If electricity would continue to be derived by conventional fuel-based power generation in lieu of renewable resources, this alternative would result in a higher emission of greenhouse gases than the Proposed Action over the long-term.

## **CDCA Plan Amendment**

There would be no impacts associated with Alternative 4.

### **4.4.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under Alternative 5, another solar energy project could be constructed on the project site. As a result, GHG emissions and soil disturbance would result from the construction and operation of the solar technology and would likely be similar to the GHG emissions included under the Proposed Action. While different solar technologies require different levels of construction and operations maintenance; it would be expected that any form of solar development would provide similar benefits as those identified under the Propose Action. These benefits include displacing fossil fuel fired generation and reducing associated GHG emissions. As such, this alternative would likely result in GHG benefits similar to those under the Proposed Action.

## **CDCA Plan Amendment**

The CDCA Plan does not address Climate Change.

#### **4.4.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under Alternative 6, no solar energy project would be constructed on the project site, and BLM would continue to manage the site in a manner consistent with the existing land use designation in the CDCA Plan. 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 GHG emissions from the site, including carbon uptake, would not be expected to change noticeably from existing conditions. As such, this alternative would not result in the GHG benefits that would occur under the Proposed Action. This would be a long-term adverse impact on climate change based on GHG emissions that would continue to be emitted at other power-generating facilities.

#### **CDCA Plan Amendment**

The CDCA Plan does not address Climate Change.

#### **4.4.2.8 Environmentally Preferred Alternative**

The BLM has determined the Environmentally Preferred Alternative would be the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

### **4.4.3 Cumulative Impacts**

#### **4.4.3.1 Alternative 1: Proposed Action**

The GHG assessment for the Proposed Action is a cumulative impact assessment that considers past, present, and reasonably foreseeable future actions. The Proposed Action alone would not be sufficient to change global climate, but would emit GHG and, therefore, was analyzed as a potential contributor to a cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies. It is expected that the net cumulative effect of the Calico Solar Project would be to reduce the total GHG emissions, because it reduces the need for traditional power plants. Therefore, the Proposed Action would contribute incrementally to a cumulative overall reduction in GHG emissions from power plants, and would not worsen current conditions.

**4.4.3.2 Alternative 1a: Agency Preferred Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action.

**4.4.3.3 Alternative 2: Reduced Acreage Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action.

**4.4.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action.

**4.4.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

There are no cumulative impacts under Alternative 4.

**4.4.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

There are no cumulative impacts under Alternative 5.

**4.4.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

There are no cumulative impacts under Alternative 6.

**4.4.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.4.4 Mitigation, Project Design Features, BMPs, and Other Measures**

No measures related to GHG emissions are proposed because the Calico Solar Project would result in beneficial GHG impacts. The project owner would have to comply with any future applicable GHG regulations formulated by the CARB or the EPA, such as GHG reporting or emissions cap and trade markets.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

#### **4.4.5 Incomplete or Unavailable Information**

While global and national GHG inventories are established, regional and state-specific inventories are in varying levels of development; a state-wide inventory for California is presented in Section 4.4.1, but no local or regional data are available specific to the project area. Quantification techniques of impacts from GHG emissions are in development—for example, there is a good understanding of climate change impacts related to fuel usage; however, measuring and understanding effects on the rate of albedo is less comprehensive. In addition, carbon storing capacity of desert soils in general is just developing and the actual storing capability with the site is unknown. Analytical tools necessary to quantify project-related climatic impacts and carbon sequestering are presently unavailable. As a consequence, quantitative impacts of specific effects due to climate change from anthropogenic activities cannot be determined.

Since the proposed project will result in a net beneficial impact on GHG emissions and climate change, it therefore does not contribute to this cumulative effect. The understanding of how and when climate change may result in noticeable effects on the different species and habitats within the Mohave Desert is unknown and speculative at this time. Similarly, changes in hydrologic regimes for a specific area are unknown at this time. Based on these reasons, BLM has determined that discussion of climate change on hydrological regimes and biological resources are not necessary in this analysis.

### **4.5 Cultural Resources and Paleontology**

This section was developed from Section C.3, Cultural Resources and Native American Values and Section C.4, Geology and Paleontology, of the SA/DEIS (BLM and CEC 2010).

### 4.5.1 Methodology

As discussed in Section 3.5, the Applicant retained URS Corporation to complete the investigations necessary to identify and evaluate cultural resources located within the APE for direct and indirect effects. The URS team identified a total of 404 cultural resources within the original project APE. Sixty-nine archaeological resources were eliminated through project re-design during 2008-2009. The remaining 335 cultural resources within the Project APE include: 119 archaeological sites (94 prehistoric, eight historic, and 15 multi-component [including both prehistoric and historic elements] and two indeterminate rock feature sites [lack temporal data]), 206 archaeological isolates, and 10 historic built environment resources.

Based on the proposed development for this Project, 119 archaeological sites and a portion of one historic built resource are subject to direct effect. Following the completion of the survey and site recordation, three sites were determined eligible because the sites have the potential, under Criterion (d) of the NRHP, to have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4). For the same reason, these sites could be eligible for the CRHR, under Criterion 4 (Section 15064.5).

Existing paleontological information was obtained from the San Diego Natural History Museum and the Natural History Museum of Los Angeles County for the site area. Site-specific information generated by the Applicant for the Calico Solar Project was also reviewed. All research was conducted in accordance with accepted assessment protocol to determine whether any known paleontological resources exist in the general area.

### 4.5.2 Direct and Indirect Impacts

Direct effects under NEPA are those ~~which~~ are caused by the [proposed or alternative] action and [which] occur at the same time and place” (40 CFR 1508.8(a)). Indirect effects are those ~~which~~ are caused by the [proposed or alternative] action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR 1508.8(b)).

The Section 106 regulation of the NHPA narrows the range of direct effects and broadens the range of indirect effects relative to the definitions of the same terms under NEPA. The regulatory definition of ~~effect~~,” pursuant to 36 CFR 800.16(i), is that the term ~~means~~ alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP.” In practice, a ~~direct effect~~” under Section 106 is limited to the direct physical disturbance of a historic property. Effects that are immediate but not physical in character, such as visual intrusion, and reasonably foreseeable effects that may occur at some point subsequent to the implementation of the proposed undertaking are referred to in the Section 106 process as ~~indirect effects~~.”

### 4.5.2.1 Alternative 1: Proposed Action

Identification analysis is based on the two following observations:

- (1) 335 cultural resources (including 119 archaeological sites) are present within the Proposed Action alternative. Refer to Appendix E, –Newly Recorded and Updated Archaeological and Built Sites within the Proposed Action for additional details.
- (2) The BLM has determined that three of the 335 cultural resources within the APE are eligible for the NRHP. Three sites, CA-SBR-1908/H, CA-SBR-13093/H, and CA-SBR-13443/H have been determined eligible for inclusion to the National Register under criteria D/4.
- (3) The alternative is anticipated to have the following effects/impacts:
  - (a) Significant effect per NEPA.
  - (b) Adverse effect per Section 106 of the NHPA.

An indirect impact of the Proposed Action is that, during project operation, cultural resources on and in the immediate vicinity of the project site may experience increased vandalism as a result of improved access to the project site, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site.

The decommissioning of the Calico Solar Project may result in adverse impacts on non-NRHP eligible cultural resources as a result of ground disturbance, increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site or during demolition and removal of the project facilities.

### NRHP Determinations of Eligibility

Three sites, CA-SBR-1908/H, CA-SBR-13093/H, and CA-SBR-13443/H have been determined eligible for inclusion to the NRHP under criteria D/4. CA-SBR-13126 extends into the southwest boundary of the project area and has been determined eligible for the NRHP and CRHR under criteria D/4. Subsurface testing was conducted in the portion of the site within the project area. This portion of the site consists of lithic scatter with no subsurface component. It has been determined that the portion of the site within the APE is not a contributing factor to site eligibility.

The BLM has determined that the identification efforts, reports, and the consultant's recommendations for this undertaking are adequate to identify historic properties that may be located within the APE and to support BLM's decision process. Based on the information and analysis, the results of tribal consultation, and the recommendations of the professional

consultant, the BLM has made the following determinations regarding eligibility and findings of effect for cultural resources located within the APE.

The BLM has found that three historic properties will be affected by the approval of this undertaking.

The BLM, Barstow Field Office has begun consultation with the California SHPO on the agency's determinations and findings pursuant to Section V.E.2 of the *State Protocol Agreement* which provides for review of evaluations as an element of the oversight role in the *State Protocol Agreement*.

### **CDCA Plan Amendment**

The Proposed Action is consistent with the CDCA Plan guidelines and elements pertaining to cultural and paleontological resources.

#### **4.5.2.2 Alternative 1a: Agency Preferred Alternative**

- (1) Identification analysis is based on the two following observations:
  - (a) 332 cultural resources (including 116 archaeological sites) are present within the Agency Preferred alternative. Refer to Appendix E, "Newly Recorded and Updated Archaeological and Built Sites within the Proposed Action" for additional details.
  - (b) The BLM has determined that none of the 332 cultural resources are eligible for the NRHP.
- (2) The alternative is anticipated to have the following effects/impacts:
  - (a) No significant effect per NEPA.
  - (b) No adverse effect per Section 106 of the NHPA.

An indirect impact of the Agency Preferred Alternative is that, during project operation, non-NRHP-eligible or Native American tribally sensitive cultural resources on and in the immediate vicinity of the project site may experience increased vandalism as a result of improved access to the project site, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site.

The decommissioning of the Calico Solar Project may result in adverse impacts on non-NRHP eligible or Native American tribally sensitive cultural resources as a result of ground disturbance,

increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site or during demolition and removal of the project facilities.

### **NRHP Determinations of Eligibility**

Three sites, CA-SBR-1908/H, CA-SBR-13093/H, and CA-SBR-13443/H have been determined eligible for inclusion to the NRHP under criteria D/4. As a result of project re-design, these three sites are now outside the APE with a 400-foot buffer. Site CA-SBR-13126 extends into the SW boundary of the project area and has been determined eligible for the NRHP and CRHR under criteria D/4. Subsurface testing was conducted in the portion of the site within the project area. This portion of the site consists of lithic scatter with no subsurface component. It has been determined that the portion of the site within the APE is not a contributing factor to site eligibility. The BLM is issuing a finding of no adverse effect to historic properties.

The BLM has determined that the identification efforts, reports, and the consultant's recommendations for this undertaking are adequate to identify historic properties that may be located within the APE and to support BLM's decision process. Based on the information and analysis, the results of tribal consultation, and the recommendations of the professional consultant, the BLM has made the following determinations regarding eligibility and findings of effect for cultural resources located within the APE.

The BLM has found that no historic properties will be affected by the approval of this undertaking.

The BLM, Barstow Field Office has begun consultation with the California SHPO on the agency's determinations and findings pursuant to Section V.E.2 of the State Protocol Agreement which provides for review of evaluations as an element of the oversight role in the State Protocol Agreement.

### **CDCA Plan Amendment**

The Agency Preferred Alternative is consistent with the CDCA Plan guidelines and elements pertaining to cultural and paleontological resources.

#### **4.5.2.3 Alternative 2: Reduced Acreage Alternative**

- (1) Identification analysis is based on the following observations:
  - (a) There are 24 cultural resources present (11 prehistoric, 3 multi-component, 3 historic, and 7 historic built). Refer to Appendix E, ~~Newly Recorded and~~

Updated Archaeological and Built Sites within Alternative 2: Reduced Acreage  
for additional details.

- (b) The agency had determined that one cultural resource (CA-SBR-13443/H) to be eligible for the NRHP.
- (c) The potential exists for buried archaeological deposits.
- (d) The potential exists for deeply buried paleontological resources.
- (e) The alternative is anticipated to have the following effects/impacts:
- (f) Significant effect per NEPA.
- (g) Adverse effect per Section 106 of the NHPA.

One site, CA-SBR-13443/H has been determined eligible for inclusion to the NRHP under criteria D/4. The BLM has determined that the identification efforts, reports, and the consultant's recommendations for this undertaking are adequate to identify historic properties that may be located within the APE and to support BLM's decision process. Based on the information and analysis, the results of tribal consultation, and the recommendations of the professional consultant, the BLM has made the following determinations regarding eligibility and findings of effect for cultural resources located within the APE.

The BLM has found that one historic property will be affected by the approval of this undertaking.

The BLM, Barstow Field Office has begun consultation with the California SHPO on the agency's determinations and findings pursuant to Section V.E.2 of the State Protocol Agreement which provides for review of evaluations as an element of the oversight role in the State Protocol Agreement

### **CDCA Plan Amendment**

The Reduced Acreage Alternative is consistent with the CDCA Plan guidelines and elements pertaining to cultural and paleontological resources.

#### **4.5.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

- (1) Identification analysis is based on the following observations:

- (a) There are 122 cultural resources present. Refer to Appendix E, “Newly Recorded and Updated Archaeological and Built Sites within Alternative 3: Avoidance of Donated and Acquired Lands.”
- (b) The BLM has determined that two of the 122 cultural resources (CA-SBR-1908/H and CA-SBR-13093/H) are eligible for the NRHP. These sites could be adversely affected by approval of this alternative. One archaeological site (CA-SBR-13126/H) is partly inside the APE and primarily outside the APE. The site was determined eligible because the site has the potential, under Criterion (D) of the NRHP, to have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4). For the same reason, this site could be eligible for the CRHR, under Criterion 4 (Section 15064.5); however, the portion of the site within the APE has been recommended as non-contributing and would not be affected by approval of this alternative. Therefore, two cultural resources that have been determined by the BLM to be eligible to the NRHP could be affected with approval of this alternative.
- (c) The potential exists for buried archaeological deposits.
- (d) The potential exists for deeply buried paleontological resources.
- (e) The alternative is anticipated to have the following effects/impacts:
- (f) Significant effect per NEPA.
- (g) Adverse effect per Section 106 of the NHPA.

### **NRHP Determinations of Eligibility**

Two sites, CA-SBR-1908/H and SBR-13093/H, have been determined eligible for inclusion to the National Register under criteria D/4.

The BLM has determined that the identification efforts, reports, and the consultant’s recommendations for this undertaking are adequate to identify historic properties that may be located within the APE and to support BLM’s decision process. Based on the information and analysis, the results of tribal consultation, and the recommendations of the professional consultant, the BLM has made the following determinations regarding eligibility and findings of effect for cultural resources located within the APE.

The BLM has found that two historic properties will be affected by the approval of this alternative.

The BLM, Barstow Field Office has begun consultation with the California SHPO on the agency's determinations and findings pursuant to Section V.E.2 of the State Protocol Agreement which provides for review of evaluations as an element of the oversight role in the State Protocol Agreement.

### **CDCA Plan Amendment**

The Avoidance of Donated and Acquired Lands Alternative is consistent with the CDCA Plan guidelines and elements pertaining to cultural and paleontological resources.

#### **4.5.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

There would be no impacts on cultural resources, and existing conditions would be maintained. The project site would continue to be managed pursuant to the current CDCA Plan.

#### **4.5.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

There would be no immediate impacts on cultural resources on the project site. However, amendment of the CDCA Plan to allow for another solar power project on the project site could result in impacts similar to Proposed Action if another project is proposed.

#### **4.5.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

There would be no impacts on cultural resources. Amendment of the CDCA Plan to prohibit other solar energy project on the project site would prevent impacts similar to those of the Proposed Action, but would allow for other uses of the project site under the management of the CDCA Plan.

#### **4.5.2.8 Environmentally Preferred Alternative**

The BLM has determined that the Environmentally Preferred Alternative would be the same as the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

### 4.5.3 Cumulative Impacts

Under NEPA, a cumulative impact is the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Cumulatively significant impacts are taken into consideration as an aspect of the intensity of a significant effect (40 CFR 1508.27(b)(7)).

The Section 106 regulation makes explicit reference to cumulative effects only in the context of a discussion of the criteria of adverse effect (36 CFR 800.5(a)(1)). Cumulative effects are largely undifferentiated as an aspect of the potential effects of an undertaking. Such effects are enumerated and resolved in conjunction with the consideration of direct and indirect effects.

This project is defined within a geographic area that has been identified by the BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under NEPA. Even if the cumulative projects described have not yet completed the required environmental processes, they were considered in the cumulative impacts analyses in this FEIS.

### Geographic Scope of Analysis

The geographic area of influence considered for cumulative impacts on cultural resources is the Newbury Springs/Ludlow area.

### Effects of Past and Present Projects

For this analysis, the following projects or developments are considered most relevant to effects on cultural resources. Because cultural resources are non-renewable, the removal or destruction of any resource results in a net loss of resources. Cultural resources in the geographic area have been affected by past and currently approved projects as follows:

Existing development in the Newbury Springs/Ludlow area and the surrounding areas has resulted in the removal or destruction of cultural resources, which has resulted in a net loss of resources in these areas:

- Twentynine Palms
- SEGS I and II
- CACTUS (formerly Solar One and Solar Two)

- Mine 2 miles west of project site along I-40
- Mine 14 miles west of project site along I-40

Previous and existing development in the immediate project APE and surrounding area also have resulted in the removal or destruction of cultural resources, which has resulted in a net loss of resources in these areas:

- Old National Trails Road
- Route 66
- Pisgah Substation
- Pisgah 2077 installation with adjacent road and landing strip
- SCE 12-kV transmission line and maintenance road
- The BNSF railroad and maintenance road and facilities
- PG&E pipeline and maintenance roads
- Mojave Pipeline and maintenance roads
- Interstate 40
- Hector Road
- Pisgah Crater Road
- Historic gravel mining during an undetermined time period
- BLM access roads
- Recreation Activities, BLM

### **Effects of Reasonably Foreseeable Future Projects**

Cultural resources are also expected to be affected by the following reasonably foreseeable future projects in the Newbury Springs/Ludlow area as follows:

- SCE Pisgah Substation Expansion
- Pisgah-Lugo transmission upgrade

- Twentynine Palms Expansion
- Broadwell Bright Source (CACA 48850)
- Wind project (CACA 48629)
- Wind Project (CACA 48667)
- Wind project (CACA 48472)
- Twin Mountain Rock Venture
- Solar thermal (CACA 49429)
- Proposed National Monument (former Catellus Lands)
- BLM Renewable Energy Study Areas

#### **4.5.3.1 Alternative 1: Proposed Action**

The construction of the Calico Solar Project is not expected to result in adverse effects to any historic properties. The construction of some or all of the foreseeable projects that are not yet built may also result in permanent impacts as a result of the removal and/or destruction of cultural resources on the sites for those projects. As a result, the construction of the Calico Solar Project and other foreseeable cumulative projects would contribute to permanent long-term adverse impacts as a result of the removal and/or destruction of resources on those sites and an overall net reduction in cultural resources in the area.

With regard to NRHP-eligible cultural resources, this action provisionally would have direct impact to three cultural resources (CA-SBR-1908/H, CA-SBR-13093/H, and CA-SBR-13443/H) that the agency determined eligible for the NRHP.

Indirect impacts on cultural resources including increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles may be cumulative as a result of more people coming into the area in connection with those new land uses. As a result, the Calico Solar Project and the other area projects may contribute to a cumulative adverse impact on cultural resources.

#### **4.5.3.2 Alternative 1a: Agency Preferred Alternative**

The construction of the Agency Preferred Alternative is not expected to result in adverse effects to any historic properties; however, there may be impacts on the project site during ground

disturbance and other construction activities. The construction of some or all of the foreseeable projects that are not yet built may also result in permanent impacts as a result of the removal and/or destruction of cultural resources on the sites for those projects. As a result, the construction of the Calico Solar Project and other foreseeable cumulative projects would contribute to permanent long-term adverse impacts as a result of the removal and/or destruction of resources on those sites and an overall net reduction in cultural resources in the area.

With regard to NRHP-eligible cultural resources, the Applicant has decided to realign the project's boundary and in doing so has removed approximately 2,015 acres that are no longer in the project. This action provisionally protects and preserves three cultural resources (CA-SBR-1908/H, CA-SBR-13093/H, and CA-SBR-13443/H) (that the agency has determined are eligible for the NRHP that are no longer in the area of direct impact (construction foot-print) of the project APE because of project redesign.

Indirect impacts on sensitive cultural resources including increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles may be cumulative as a result of more people coming into the area in connection with those new land uses. As a result, the Calico Solar Project and the other area projects may contribute to a cumulative adverse impact on cultural resources.

#### **4.5.3.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would contribute to impacts on cultural and paleontological resources during construction, operations, and decommissioning similar to the Agency Preferred Alternative, except that less land on the project site would be disturbed under this Alternative than under the Agency Preferred Alternative.

#### **4.5.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative would contribute to impacts on cultural and paleontological resources during construction, operations, and decommissioning similar to the Agency Preferred Alternative, except that more land on the project site would be disturbed under this Alternative than under the Agency Preferred Alternative.

#### **4.5.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

The No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment Alternative would not contribute to impacts on cultural and paleontological resources.

#### **4.5.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

The LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow other Solar Energy Projects on the Project Site Alternative would contribute to impacts on cultural and paleontological resources during construction, operations, and decommissioning similar to Alternative 1: Proposed Action.

#### **4.5.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Alternative 6 would not contribute to cumulative impacts on cultural and paleontological resources.

#### **4.5.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

### **4.5.4 Mitigation, Project Design Features, BMPs, and Other Measures**

As the BLM has determined that the project would have no adverse effect on historic properties, no mitigation is necessary.

#### **4.5.4.1 Monitoring of Construction**

All ground disturbing activities during implementation of the undertaking shall be monitored by qualified archaeologists and representatives from interested Native American Indian tribes. All monitoring shall be based on a Monitoring and Discovery Plan prepared in consultation with tribes and approved by the BLM.

Native American burials and related items discovered on BLM-administered lands during implementation of the construction shall be treated in accordance with the requirements of the NAGPRA. The BLM will consult with concerned Indian tribes, tribal organizations, or individuals in accordance with the requirements of §§ 3(c) and 3(d) of the NAGPRA and implementing

regulations found at 43 CFR Part 10 to address the treatment of Native American burials and related cultural items that may be discovered during implementation of undertaking.

In consultation with the tribes, the BLM shall seek to develop a written plan of action pursuant to 43 CFR 10.5(e) to manage the inadvertent discovery or intentional excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony. The BLM shall ensure that Native American burials and related cultural items on private lands are treated in accordance with the requirements of Sections 5097.98 and 5097.991 of the California Public Resources Code, and Section 7050.5(c) of the California Health and Human Safety Code.

#### **4.5.4.2 Native American Government-to-Government Consultation**

With the filing of the application for a right-of-way, the BLM took the lead for formal tribal consultation pursuant to the NHPA as well as other laws and regulations. The BLM initiated formal government-to-government consultation in the early stages of project planning by letter on November 5, 2008, and has followed up with an additional letter and other information since then. To date, eight tribes have been identified and invited to consult on this project. General informational meetings about the project were held on November 10, 2009. The BLM has responded to four requests for formal meetings with the following tribes: the San Manuel Band of Mission Indians, Twentynine Palms Band of Mission Indians, Fort Mojave Indian Tribe, and the Chemehuevi Reservation. The BLM has received some written comments from tribal governments.

A field visit to the Calico Solar project site took place on June 13, 2010 and was attended by members of the San Manuel Band of Mission Indians, Fort Mojave Indian Tribe, Twenty-nine Palms Band of Mission Indians, and the Chemehuevi Reservation.

#### **4.5.4.3 Protocol – Discovery of Human Remains in California**

ARPA 16 USC 470 & 43 CFR 7], [NAGPRA 25 USC 3001 & 43 CFR 10] and [Public Lands, Interior 43 CFR 8365.1-7]) require a defined protocol if human remains are discovered in the State of California regardless if the remains are modern or archaeological.

Upon discovery of human remains in California, all work in the area must cease immediately, nothing may be disturbed and the area is to be secured. The County Coroner's Office of the county where the remains are located must be called. The Coroner has two working days to examine the remains after notification. The appropriate land manager/owner or the site shall also be called and informed of the discovery.

If the remains are located on federal lands, federal land managers/federal law enforcement/federal archaeologist are to be informed as well because of complementary

jurisdiction issues. It is very important that the suspected remains and the area around them remain undisturbed and the proper authorities be called to the scene as soon as possible as it could be a crime scene.

The Coroner will determine if the bones are historic/archaeological or a modern legal case.

### **Modern Remains**

If the Coroner's Office determines the remains are of modern origin, the appropriate law enforcement officials will be called by the Coroner and conduct the required procedures. Work will not resume until law enforcement has released the area.

### **Archaeological Remains**

If the remains are determined to be archaeological in origin and there is no legal question, the protocol changes depending on whether the discovery site is located on federally or non-federally owned/managed lands.

### **Remains Discovered on Federally Owned/Managed Lands**

After the Coroner has determined the remains are archaeological or historic and there is no legal question, the appropriate Field Office Archaeologist must be called. The archaeologist will initiate the proper procedures under ARPA and/or NAGPRA. If the remains can be determined to be Native American, the steps as outlined in NAGPRA, 43 CFR 10.6 Inadvertent discoveries, must be followed.

### **Remains Discovered on Non-Federally Owned/Managed Lands**

After the Coroner has determined the remains on non-federally owned/managed lands are archaeological and there is no legal question, the Coroner will make recommendations concerning the treatment and disposition of the remains to the person responsible for the excavation, or to his or her authorized representative. If the Coroner believes the remains to be those of a Native American he/she shall contact by telephone within 24 hours, the California NAHC. The NAHC will immediately notify the person it believes to be the most likely descendant of the remains. The most likely descendant has 48 hours to make recommendations to the land owner for treatment or disposition of the human remains. If the descendant does not make recommendations within 48 hours, the land owner shall reinter the remains in an area of the property secure from further disturbance. If the land owner does not accept the descendant's recommendations, the owner or the descendants may request mediation by the NAHC.

## **4.6 Fire and Fuels**

This section describes the potential impacts of the proposed project on wildland fire regimes and potential fuel sources for wildland fires. This resource information was partially discussed in Section C.15, Worker Safety and Fire Protection, of the SA/DEIS.

### **4.6.1 Methodology**

This analysis examined potential impacts on fire regimes in the vicinity of the Calico Solar Project. The potential for change in total fuel type, condition, and load are the primary impact components analyzed. In addition, changes in fire potential due to changes in human access to the project area are analyzed.

### **4.6.2 Direct and Indirect Impacts**

#### **4.6.2.1 Alternative 1: Proposed Action**

Influence on vegetation due to development could change the characteristics and makeup of the desert in the project vicinity. Removal of existing vegetation along with invasive weed containment and control activities could reduce the potential for unwanted wildland fire and reduce the opportunity for invasive weeds to colonize the area during project construction and operation. The highest potential for an increase in wildland fire potential on the project site would occur after project decommissioning due to the ground disturbing activities creating more favorable conditions for fire-tolerant invasive species to colonize the area.

Additional human use in the area would increase the potential for ignition in and around the project site as well as opportunities for introduction of invasive species. Current use of the area by ORV/recreational users is minimal. Up to 731 personnel are expected during peak construction activities and approximately 136 full time personnel would be employed when the facility is fully operational (Tessera Solar 2010).

Implementation of the Proposed Action would include conversion of approximately 8,230 acres of land that currently has had little to no fire events, to an environment that could alter the current fire regime to one of higher frequency and intensity fires by altering the types of fuels and fuel load introduced by land disturbance and human influence.

The Proposed Action could introduce invasive weeds that could alter the fire regime in this area having a major impact on fire frequency and intensity. Weeds spread most readily in disturbed, graded, or cultivated soils. Without control, weeds already present in the project vicinity would increase their abundance due to project construction and construction vehicles could

inadvertently import new invasive species from off-site. These opportunities for invasive species to be introduced and proliferate in the environment would have an adverse direct impact on the existing fire regime or FRCC for this area.

The Non-Native Invasive Weed Management Plan is scheduled to be finalized and submitted to agencies in July of 2010. If all applicable management practices are followed to for weed and invasive species management there would still be direct adverse affects in the long-term, to the existing non-fire adapted environment. Even if the disturbed lands were reseeded with native species, the opportunity for invasive species to infiltrate is high.

The Proposed Action would increase potential for wildland fire ignition sources through human presence and facility operations on and around the site due to construction and operation activities. The increase in potential for ignition would be an additive impact on the potential change in wildland fuel (or models) due to the large number of possible ignition sources. It is estimated that approximately 700 personnel would be on site during the peak of construction. Operational levels during a 24-hour period are estimated to be approximately 170 personnel. There would be an increase in opportunities for ignition of combustible materials that would be stored on site such as fuel oil, gases and waste generated by construction and operations. Ignition of these sources could transfer to the natural environment outside of the project area if not contained quickly. Appendix M Emergency Action/Fire Prevention Plan of the Plan of Development addresses a wide range of action measures to reduce and react to onsite emergencies. If measures are implemented and followed in this plan, the impact from human ignition sources would be minor.

### **CDCA Plan Amendment**

The multiple-use guidelines from the CDCA Plan that pertain to fire management would not be affected.

#### **4.6.2.2 Alternative 1a: Agency Preferred Alternative**

Implementation of the Agency Preferred Alternative would include conversion of approximately 6,215 acres, or 76 percent, of the lands affected by the Proposed Action. This alternative would have direct impacts similar to, but somewhat less than the, 8,230 acres affected by the Proposed Action. Specifically, the amount of disturbed land would be reduced, which would decrease the area that could be infiltrated by invasive species, but potential ignition sources would be the same as that of the Proposed Action since construction and operation activities would be the same.

## **CDCA Plan Amendment**

The multiple-use guidelines from the CDCA Plan that pertain to fire management would not be affected.

### **4.6.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would include conversion of approximately 2,600 acres or 31 percent of the lands affected by the Proposed Action. The effects would be similar to, but proportionally less than, the 8,230 acres affected by the Proposed Action. Specifically, the amount of disturbed land would be less, which would result in less area vulnerable to infiltration by invasive species. Since construction activities would be completed within 52 months, with a maximum expected construction labor force of 731 personnel, and operation activities would have 182 personnel, potential ignition sources during construction and operation would be less than the Proposed Action.

## **CDCA Plan Amendment**

The multiple-use guidelines from the CDCA Plan that pertain to fire management would not be affected.

### **4.6.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Implementation of Avoidance of Donated and Acquired Lands Alternative would include conversion of approximately 7,050 acres, or 85 percent, of the lands affected by the Proposed Action. This alternative would have direct impacts similar to, but proportionally less than, the 8,230 acres affected by the Proposed Action. Specifically, the amount of disturbed land would be less, which would result in less area vulnerable to infiltration by invasive species but potential ignition sources would be the same as that of the Proposed Action since construction and operation activities would be the same.

## **CDCA Plan Amendment**

The multiple-use guidelines from the CDCA Plan that pertain to fire management would not be affected.

#### **4.6.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative, the impacts identified under the Proposed Action would not occur as a result of the development of the Calico Solar Project. Without development of the Calico Project there would be no impact on the current fire regime due to disturbance from construction and operations. However, because the CDCA Plan would not be amended and the area would be managed consistent with current CDCA direction there is a potential that other solar projects would be developed within the area, resulting in similar impacts on fire regimes as those identified in the Proposed Action.

#### **4.6.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the impacts identified under the Proposed Action would not occur as a result of the development of the Calico Solar Project. Without development of the Calico Project there would be no impact on the current fire regime due to disturbance from construction and operations. However, because the CDCA Plan would be amended to allow other solar energy projects it is likely that other solar projects would be developed within the area, resulting in similar impacts on fire regimes as those identified in the Proposed Action.

### **CDCA Plan Amendment**

The multiple-use guidelines from the CDCA Plan that pertain to fire management would not be affected.

#### **4.6.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the impacts identified under the Proposed Action would not occur as a result of the development of the Calico Solar Project. Without development of the Calico Project there would be no impact on the current fire regime due to disturbance from construction and operations. Because the CDCA Plan would be amended to prohibit other solar energy projects it is likely that the current fire regime would continue in its current state unless acted upon by another type of development other than solar energy.

## **CDCA Plan Amendment**

The multiple-use guidelines from the CDCA Plan that pertain to fire management would not be affected.

### **4.6.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

## **4.6.3 Cumulative Impacts**

### **4.6.3.1 Alternative 1: Proposed Action**

The geographic area considered for cumulative impacts on fire and fuels resources is confined to the BLM Barstow Fire Management Area. Cumulative impacts from reasonably foreseeable future actions on BLM administered lands would result in similar impacts on fire regimes as those identified in the action alternatives. Altering current fire regimes in the Barstow Fire Management Area could have an adverse long-term effect on the sufficiency of current and future fire suppression resources. If fire suppression needs increase as a result of increased fire activity due to alteration of fire regimes, those resources would be strained, causing an adverse long-term impact on response needs elsewhere. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the action alternatives would contribute incrementally to an adverse impact on effects due to fire.

### **4.6.3.2 Alternative 1a: Agency Preferred Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action.

### **4.6.3.3 Alternative 2: Reduced Acreage Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action

### **4.6.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Cumulative impacts would be the same as those identified under the Proposed Action

#### **4.6.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

There would be no cumulative impacts associated with the No Action Alternative.

#### **4.6.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

There would be no cumulative impacts associated with this LUP amendment alternative.

#### **4.6.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

There would be no cumulative impacts associated with this LUP amendment alternative.

#### **4.6.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.6.4 Mitigation, Project Design Features, BMPs, and Other Measures**

The following mitigation measures are recommended for the proposed Calico Solar Project.

Implementation of a Weed Management Plan that includes management practices that would reduce fire danger on and off site (see mitigation measures in Section 4.3, Biology)

Implementation of Fire Prevention Plan that includes fire extinguishers in vehicles and facility buildings for response to onsite fire emergencies as well as fire hydrants and mobile fire response team with the ability to respond to ignitions away from structures (see mitigation measures in 4.11, Public Health and Safety and Hazardous Materials)

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional

Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## **4.7 Geology, Soils, and Mineral Resources**

The geology and mineral resources discussions of this section were developed from Section C.4, Geology and Paleontology, of the SA/DEIS. The soils discussion was developed from Section C.7, Soils and Water, of the SA/DEIS. Impacts on paleontological resources are discussed in Section 4.5, Cultural Resources and Paleontology, in this document.

### **4.7.1 Methodology**

The BLM has reviewed geological and mineral resource maps for the surrounding area, as well as site-specific information provided by the Applicant to determine if any geological or mineralogical resources exist in the area, and if the proposed project operations could adversely affect geological or mineralogical resources.

The geologic hazards evaluation was based on the review of available geologic maps, reports and related data on the Calico Solar Project site. Geological information was obtained from the CGS, CDMG, now known as CGS, the USGS, the American Geophysical Union, the Geologic Society of America, and other organizations.

### **4.7.2 Direct and Indirect Impacts**

This section discusses soils and soil characteristics from the standpoint of mineral resources and geologic hazards present on the project site. No separate discussion of impacts on soils or soil erosion is presented in this section. Impacts from soil erosion are discussed in Sections 4.17 of the FEIS.

#### **4.7.2.1 Alternative 1: Proposed Action**

##### **Soils**

Under the Proposed Action, long-term disturbance to soils would occur from the clearing of vegetation and the grading for project features, compaction within the project footprint, and from the improvement and construction of roads in the Project Area. Long-term disturbance would occur on approximately 4,411 acres. Short-term disturbance to soils would occur from the installation of fence lines and buried hydrogen and water supply lines and from temporary

access roads. Short-term disturbance would occur on approximately 4,602 acres. Impacts on soils would include the loss of soil production from topsoil loss, loss of desert pavement and cryptobiotic soils, erosion, and compaction, the latter of which leads to the loss in the ability for water to infiltrate the soils.

A summary of surface disturbance for the Propose Action is shown in Table 4-28.

**Table 4-28 Proposed Action Estimated Temporary and Permanent Land Disturbance**

<b>Project Component Item</b>	<b>Construction Disturbance Area (acres)</b>	<b>Operations Permanent Disturbance Area (acres)</b>	<b>Proposed Length (miles)</b>	<b>Comments</b>
<b>Off-Site Development</b>				
Off-site access road	4.5	3.6	1.3	30-foot width for roads and drainage
Off-site transmission line	1.0	Included below	0.1	50-foot each side of center
Tower Structures	Included above	1.0		35-45 towers x 1,024 square feet per tower
Off-Site electrical and communications overhead service	0.3	Included below	0.1	12 feet each side of center
Poles	Included above	26 square feet		2 poles; 13 square feet per pole
<b>Subtotal</b>	<b>5.8 acres</b>	<b>4.6 acres</b>		
<b>On-Site Balance-of-Plant Development</b>				
Construction staging and construction administration area	Part of main services complex (15)	Not applicable		Not applicable
On-site construction laydown	Included above	Not applicable		Not applicable
Site boundary fence line	48.0	28.0	39.0	10-foot width construction access; 3 feet each side of fence
Site unpaved access roads	48.5	48.5	13.0	30-foot width for roadway and drainage
Site unpaved perimeter roads	105.0	105	39.0	22 feet wide
Main services complex, parking and services	52.0	52		
<b>On-Site Wet and Dry Utilities Access</b>				
Water pipeline	3.2	Not applicable	1703 feet	10 feet each side of center

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
Electrical communications and overhead service	7.3	Not applicable	3.0	10 feet each side of center
Calico Solar Substation	5.2	5.2		650 feet by 350 feet
Transmission line	23.0	Not applicable	2.0	50 feet each side of center
Transmission access road	Included above	2.8	2.0	12 feet wide
Transmission tower structures	Included above	0.5 to 0.7		28; 1,024 square feet per tower
34.5-kV overhead runs to Calico Solar Substation	2.0	Not applicable		10.95 miles by 12-foot wide with a significant portion overlapping other construction disturbed areas (75%)
Poles	Included above	26 square feet		
34.5-kV runs to overhead lines	2.7	Not applicable		
Subtotal	296.9 acres	242.2 acres		
<b>Solar Field Development = 567 by 1.5MW Solar Groups [Table Note 1]</b>				
North-south access routes	558.0	558.0	242.0	
East-west access routes	306.0	306.0	148.0	
<b>Electrical Collection System/Hydrogen</b>				
600 V underground	50.0	Not applicable	576.0	
34.5-kV underground	35.0	Not applicable	45.0	
Underground hydrogen lines (if centralized system is used)	50.0	Not applicable	576.0	
<b>SunCatcher Installation</b>				
North-south access/SunCatcher	800.0	800.0		
East-west access/SunCatcher	2,500.0	2,500.0		
<b>Subtotal</b>	<b>4,299 acres</b>	<b>4,164 acres</b>		
<b>Total Area</b>	<b>4,602 acres</b>	<b>4,411 acres</b>		

Table Source: Adapted from Tessera Solar 2010 and unpublished data.

Table General Note: If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the*

*California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California, dated August 2010.*

*Table Note 1: Assumes 850MW net development of 34,000 SunCatchers.*

*Table Note 2: During installation of the SunCatchers, only 70 percent of the total land would be disturbed. The modularity of the SunCatcher design and off-site manufacturing would enable a phased deployment, thereby minimizing the proportion of the overall site that is disturbed at any given time during construction.*

*Table Note 3: The plan site layout minimizes traffic road operations of the project.*

*Table Key: % = percent; kV = kilovolt; MW = megawatt; V = volts.*

## **Mineral Resources**

The evaluation of the impacts of the proposed project and alternatives on mineral resources is based on whether they would directly or indirectly interfere with active mining claims or operations, or would result in reducing or eliminating the availability of important mineral resources.

The project site for the Proposed Action is not located within an established MRZ of the California Mineral Land and Classification System, and no economically viable mineral deposits are known to be present at the site therefore there would be no adverse direct or indirect impacts.

## **Geologic Hazards**

### ***Faulting and Seismicity***

Ground shaking represents the main geologic hazard at this site. The effect of this potential hazard on the project site can be effectively mitigated through facility design by incorporating recommendations contained in the project geotechnical report included in the POD (Tessera Solar 2010).

### ***Volcanic Hazards***

The proposed Calico Solar Project site is located immediately northwest of the Sleeping Beauty volcanic area, an approximately 36-square-mile area of Miocene age dacitic to basaltic flows, pyroclastic rocks, and volcanoclastic sediments (Glazner 1980). The Sleeping Beauty area is considered part of the regional Amboy Crater–Lavic Lake volcanic hazard area, an approximately 6,000-square-mile area within the Mojave Desert designated by the USGS because of the presence of Holocene lava flows, cinder cone formation, and tephra eruptions (Miller 1989).

The Amboy Crater – Lavic Lake volcanic hazard area is considered to be subject to future formation of cinder cones, volcanic ash falls, lava flows, and phreatic explosions. The USGS

indicates the proposed Calico Solar Project lies in an area which has been and will again be subjected to ash and cinder falls associated with nearby dormant basaltic or basaltic-andesitic vents. The recurrence interval for eruptions from vents in the Amboy Crater–Lavic Lake hazard area has not been predicted but is anticipated to be greater than 1,000 years, therefore the likelihood of volcanic activity to significantly affect operation of the proposed Calico Solar Project is low. Eruptive activity would likely be limited to ashfall which would have a minor, short-lived effect on the project. This would involve having to shut down and probably cover the generators to prevent damage from the abrasive ash and having to clean the SunCatcher mirrors once the eruption was over. Mirrors would need to be cleaned periodically as part of normal plant operation and maintenance. While the likelihood of volcanic eruptions occurring during the life of the project is low, eruptions could extend over a period of months, or could re-occur, resulting in more significant impacts on project operation.

### ***Liquefaction***

Liquefaction is a condition in which a saturated cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. However, the potential for liquefaction of strata deeper than approximately 40 feet below surface is considered negligible due to the increased confining pressure and because geologic strata at this depth are generally too compact to liquefy. The reported deep ground water table (greater than 300 feet) would indicate no potential for liquefaction. Soil characteristics reported in the project-specific geotechnical report (URS 2008) indicate strata beneath the site are also generally too dense to liquefy. Liquefaction potential on the Calico Solar Project site was addressed in the project geotechnical report.

### ***Dynamic Compaction***

Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density). The decrease in volume can result in settlement of overlying structural improvements. Site specific geotechnical investigation indicates the alluvial deposits in the project site subsurface are generally too dense to allow significant dynamic compaction (URS 2008).

### ***Hydrocompaction***

Hydrocompaction (also known as hydrocollapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse

of the soil structure. Site specific geotechnical investigation indicates the subsurface alluvial deposits that underlie the project site are generally too dense to experience significant hydro-compaction (URS 2008).

### ***Subsidence***

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation or fill loads. Site-specific geotechnical investigation indicates the alluvial deposits which underlie the site are generally at a medium-dense to very dense consistency and therefore are considered unlikely to cause excessive settlement (subsidence) due to foundation loading.

Regional ground subsidence is typically caused by petroleum or ground water withdrawal that increases the effective unit weight of the soil profile, which in turn increases the effective stress on the deeper soils. This results in consolidation or settlement of the underlying soils. No petroleum or natural gas withdrawals are taking place in the site vicinity and ground water pumping for day-to-day site operations would be low and unlikely to cause localized subsidence. Minor regional subsidence, likely due to ground water withdrawal in the Mojave River area, has been documented as far east as Troy Lake, immediately west of the proposed project site. However, negative impacts on the project due to subsidence from tectonism or from petroleum, natural gas, or future ground water production are considered very unlikely.

### ***Expansive Soils***

Soil expansion occurs when clay-rich soils with an affinity for water exist in place at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. The alluvium and volcanic rocks which form most of the site subsurface are not considered to be expansive.

### ***Landslides***

The proposed project site slopes gently to the southwest at a gradient of approximately 2.5 percent. Due to the low site gradient and the absence of topographically high ground in the vicinity the potential for landslide impacts on the site is considered to be negligible.

## CDCA Plan Amendment

The multiple-use guidelines and elements from the CDCA Plan that pertain to mineral resources would not be affected.

### 4.7.2.2 Alternative 1a: Agency Preferred Alternative

#### Soils

The soils impacts would be similar to those identified under the Proposed Action except that there would be long-term impacts on 4,151 acres and short-term impact on 4,337 acres as shown in Table 4-29.

**Table 4-29 Agency Preferred Alternative Estimated Temporary and Permanent Land Disturbance**

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
<b>Off-Site Development</b>				
Off-site access road	4.5	3.6	1.3	30-foot width for roads and drainage
Off-site transmission line	1.0	Included below	0.10	50 foot each side of center
Tower Structures	Included above	1.0		35-45 towers x 1,024 square feet per tower
Off-Site electrical and communications overhead service	0.3	Included below	539 feet	12 feet each side of center
Poles	Included above	26 square feet		2 poles; 13 square feet per pole
<b>Subtotal</b>	<b>5.8 acres</b>	<b>4.6 acres</b>		
<b>On-Site Balance-of-Plant Development</b>				
Construction staging and construction administration area	Part of main services complex (15.0)	Not applicable		Not applicable
On-site construction laydown	Included above	Not applicable		Not applicable
Site boundary fence line	36.0	21.5	29.5	10-foot width construction access; 3 feet each side of fence

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
Site unpaved access roads	36.4	36.4	10.0	30-foot width for roadway and drainage
Site unpaved perimeter roads	78.7	78.7	29.5	22 feet wide
Main services complex, parking and services	52.0	52.0		
<b>On-Site Wet and Dry Utilities Access</b>				
Water pipeline	3.2	Not applicable	1703 feet	10 feet each side of center
Electrical communications and overhead service	7.3	Not applicable	3.0	10 feet each side of center
Calico Solar Substation	5.2	5.2		650 feet by 350 feet
Transmission line	23.0	Not applicable	2.0	50 feet each side of center
Transmission access road	Included above	2.8	2.0	12 feet wide
Transmission tower structures	Included above	0.5 to 0.7		28 towers; 1,024 square feet per tower
34.5-kV overhead runs to Calico Solar Substation	2.0	Not applicable		10.95 miles by 12-foot wide with a significant portion overlapping other construction disturbed areas (75%)
Poles	Included above	26 square feet		
34.5-kV runs to overhead lines	2.7	Not applicable		
<b>Subtotal</b>	<b>246.5 acres</b>	<b>197 acres</b>		
<b>Solar Field Development = 567 by 1.5MW Solar Groups [Table Note 1]</b>				
North-south access routes	419.0	419.0	182.0	
East-west access routes	230.0	230.0	111.0	
<b>Electrical Collection System/Hydrogen</b>				
600 V underground	50.0	Not applicable	576.0	
34.5-kV underground	35.0	Not applicable	45.0	
Underground hydrogen lines (if centralized system is used)	50.0	Not applicable	576.0	

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
<b>SunCatcher Installation</b>				
North-south access/SunCatcher	800.0	800.0		
East-west access/SunCatcher	2,500.0	2,500.0		
<b>Subtotal</b>	<b>4,084 acres</b>	<b>3,949 acres</b>		
<b>Total Area</b>	<b>4,337 acres</b>	<b>4,151 acres</b>		

Table Source: Tessera Solar 2010.

Table General Note: If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

Table Note 1: Assumes 850MW net development of 34,000 SunCatchers.

Table Note 2: During installation of the SunCatchers, only 70 percent of the total land would be disturbed. The modularity of the SunCatcher design and off-site manufacturing would enable a phased deployment, thereby minimizing the proportion of the overall site that is disturbed at any given time during construction.

Table Note 3: The plan site layout minimizes traffic road operations of the project.

Table Key: kV = kilovolts; MW = megawatts; V = volts.

## Mineral Resources

Because there are no known viable mineralogical resources within the Agency Preferred Alternative project site impacts on mineral resource would be the same as those identified under the Proposed Action.

## Geological Hazards

The geological hazards for the Agency Preferred Alternative are the same as those identified under the Proposed Action.

## CDCA Plan Amendment

There is no designated MRZ within the Proposed Action project site. The Proposed Action is consistent with the guidelines and elements of the CDCA Plan.

### 4.7.2.3 Alternative 2: Reduced Acreage Alternative

#### Soils

The soils impacts would be similar to those identified under the Proposed Action except that there would be long-term impacts on 1,371 acres and short-term impact on 1,454 acres as shown in Table 4-30.

**Table 4-30 Reduced Acreage Alternative Estimated Temporary and Permanent Land Disturbance**

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
<b>Off-Site Development</b>				
Off-site access road	1.4	1.2	1.3	30-foot width for roads and drainage
Off-site transmission line	1.0	Included below	0.1	50-foot each side of center
Tower Structures	Included above	1.0		35-45 towers x 1,024 square feet per tower
Off-Site electrical and communications overhead service	0.3	Included below	0.1	12 feet each side of center
Poles	Included above	26 square feet		2 poles; 13 square feet per pole
<b>Subtotal</b>	<b>2.7 acres</b>	<b>2.2 acres</b>		
<b>On-Site Balance-of-Plant Development</b>				
Construction staging and construction administration area	Part of main services complex (15.0)	Not applicable		Not applicable
On-site construction laydown	Included above	Not applicable		Not applicable
Site boundary fence line	11.5	7.0	9.4	10-foot width construction access; 3 feet each side of fence
Site unpaved access roads	12.0	12.0	3.2	30-foot width for roadway and drainage
Unpaved perimeter roads	25.0	25.0	9.4	22 feet wide
Main services complex, parking and services	52.0	52.0		

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
<b>On-Site Wet and Dry Utilities Access</b>				
Water pipeline	3.2	Not applicable	1703 feet	10 feet each side of center
Electrical communications and overhead service	7.3	Not applicable	3.0	10 feet each side of center
Calico Solar Substation	5.2	5.2		650 feet by 350 feet
Transmission line	23.0	Not applicable	2.0	50 feet each side of center
Transmission access road	Included above	2.8	2.0	12 feet wide
Transmission tower structures	Included above	0.5 to 0.7		28 towers; 1,024 square feet per tower
34.5-kV overhead runs to Calico Solar Substation	2.0	Not applicable		10.95 miles by 12-foot wide with a significant portion overlapping other construction disturbed areas (75%)
Poles	Included above	26 square feet		
34.5-kV runs to overhead lines	2.7	Not applicable		
<b>Subtotal</b>	<b>144 acres</b>	<b>105 acres</b>		
<b>Solar Field Development = 567 by 1.5MW Solar Groups [Table Note 1]</b>				
North-south access routes	134.0	134.0	58.0	
East-west access routes	74.0	74.0	36.0	
<b>Electrical Collection System/Hydrogen</b>				
600 V underground	16.0	Not applicable	576.0	
34.5-kV underground	11.0	Not applicable	45.0	
Underground hydrogen lines (if centralized system is used)	16.0	Not applicable	576.0	
<b>SunCatcher Installation</b>				
North-south access/SunCatcher	256.0	256.0		
East-west access/SunCatcher	800.0	800.0		
<b>Subtotal</b>	<b>1,307 acres</b>	<b>1,264 acres</b>		
<b>Total Area</b>	<b>1,454 acres</b>	<b>1,371 acres</b>		

Table Source: Tessera Solar 2010 and unpublished data.

*Table General Note:* If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

*Table Note 1:* Assumes 850MW net development of 34,000 SunCatchers.

*Table Note 2:* During installation of the SunCatchers, only 70 percent of the total land would be disturbed. The modularity of the SunCatcher design and off-site manufacturing would enable a phased deployment, thereby minimizing the proportion of the overall site that is disturbed at any given time during construction.

*Table Note 3:* The plan site layout minimizes traffic road operations of the project.

*Table Key:* kV = kilovolt; MW = megawatt; V = volts.

## **Mineral Resources**

Because there are no known viable mineralogical resources within the Reduced Acreage Alternative project site impacts on mineral resources would be the same as those identified under the Proposed Action

## **Geologic Hazards**

The geological hazards for the Agency Preferred Alternative are the same as those identified under the Proposed Action.

## **CDCA Plan Amendment**

There is no designated MRZ within the Proposed Action project site. The Proposed Action is consistent with the guidelines and elements of the CDCA Plan.

### **4.7.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

#### **Soils**

The soils impacts would be similar to those identified under the Proposed Action except that there would be long-term impacts on 4,167 acres and short-term impact on 4,354 acres as shown in Table 4-31.

**Table 4-31 Avoidance of Donated Lands Alternative Estimated Temporary and Permanent Land Disturbance**

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
<b>Off-Site Development</b>				
Off-site access road	4.5	3.6	1.3	30-foot width for roads and drainage
Off-site transmission line	1.0	Included below	0.1	50 foot each side of center
Tower Structures	Included above	1.0		35-45 towers x 1,024 square feet per tower
Off-Site electrical and communications overhead service	0.3	Included below	0.1	12 feet each side of center
Poles	Included above	26 square feet		2 poles; 13 square feet per pole
<b>Subtotal</b>	<b>5.8 acres</b>	<b>4.6 acres</b>		
<b>On-Site Balance-of-Plant Development</b>				
Construction staging and construction administration area	Part of main services complex (15.0)	Not applicable		Not applicable
On-site construction laydown	Included above	Not applicable		Not applicable
Site boundary fence line	40.0	24.0	33.0	10-foot width construction access; 3 feet each side of fence
Site unpaved access roads	41.0	41.0	11.0	30-foot width for roadway and drainage
Site unpaved perimeter roads	88.0	88.0	33.0	22 feet wide
Main services complex, parking and services	52.0	52.0		
<b>On-Site Wet and Dry Utilities Access</b>				
Water pipeline	3.2	Not applicable	1,703 feet	10 feet each side of center
Electrical communications and overhead service	7.3	Not applicable	3.0	10 feet each side of center
Calico Solar Substation	5.2	5.2		650 feet by 350 feet
Transmission line	23.0	Not applicable	2.0	50 feet each side of center
Transmission access road	Included above	2.8	2.0	12 feet wide
Transmission tower structures	Included above	0.5 to 0.7		40 to 60 towers; 1,024 square feet per tower

Project Component Item	Construction Disturbance Area (acres)	Operations Permanent Disturbance Area (acres)	Proposed Length (miles)	Comments
34.5-kV overhead runs to Calico Solar Substation	2.0	Not applicable		10.95 miles by 12-foot wide with a significant portion overlapping other construction disturbed areas (75%)
Poles	Included above	26 square feet		
34.5-kV runs to overhead lines	2.7	Not applicable		
<b>Subtotal</b>	<b>264.4 acres</b>	<b>213.7 acres</b>		
<b>Solar Field Development = 567 by 1.5MW Solar Groups [Table Note 1]</b>				
North-south access routes	419.0	419.0	58.0	
East-west access routes	230.0	230.0	36.0	
<b>Electrical Collection System/Hydrogen</b>				
600 V underground	16.0	Not applicable	184.0	
34.5-kV underground	11.0	Not applicable	14.0	
Underground hydrogen lines (if centralized system is used)	16.0	Not applicable	184.0	
<b>SunCatcher Installation</b>				
North-south access/SunCatcher	800	800		
East-west access/SunCatcher	2,500	2,500		
<b>Subtotal</b>	<b>4,084 acres</b>	<b>3,949 acres</b>		
<b>Total Area</b>	<b>4,354 acres</b>	<b>4,167 acres</b>		

*Table Source:* Tessera Solar 2010 and unpublished data.

*Table General Note:* If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

*Table Note 1:* Assumes 850MW net development of 34,000 SunCatchers.

*Table Note 2:* During installation of the SunCatchers, only 70 percent of the total land would be disturbed. The modularity of the SunCatcher design and off-site manufacturing would enable a phased deployment, thereby minimizing the proportion of the overall site that is disturbed at any given time during construction.

*Table Note 3:* The plan site layout minimizes traffic road operations of the project.

*Table Key:* kV = kilovolt; MW = megawatt; V = volts.

## **Mineral Resources**

Because there are no known viable mineralogical resources within the Avoidance of Donated and Acquired Lands Alternative project site impacts on mineral resources would be the same as those identified under the Proposed Action

## **Geologic Hazards**

The geological hazards for the Avoidance of Donated and Acquired Lands Alternative are the same as those identified under the Proposed Action.

## **CDCA Plan Amendment**

There is no designated MRZ within the Avoidance of Donated and Acquired Lands Alternative project site. The Avoidance of Donated and Acquired Lands Alternative is consistent with the guidelines and elements of the CDCA Plan.

### **4.7.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Approval of the No Action Alternative would result in the avoidance of risks associated with geologic hazards at the proposed project site, and there would be no impacts on soils or mineral resources.

## **CDCA Plan Amendment**

The CDCA Plan would not be amended and land on which the project is proposed would remain available to other uses that are consistent with the CDCA Plan.

### **4.7.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Projects on the Project Site**

Approval of Alternative 5 would result in the avoidance of risks associated with geologic hazards at the proposed project site, and there would be no impacts on soils or mineral resources.

## **CDCA Plan Amendment**

The CDCA Plan would be amended to allow future solar projects to be developed on the 8,230-acre project site. The multiple-use guidelines and elements from the CDCA Plan that pertain to mineral resources would not be affected.

### **4.7.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Projects on the Project Site**

Approval of Alternative 6 would result in the avoidance of risks associated with geologic hazards at the proposed project site, and there would be no impacts on soils or mineral resources.

## **CDCA Plan Amendment**

The CDCA Plan would be amended to prohibit future solar projects to be developed on the 8,230-acre project site. The project site would continue to be managed under the amended CDCA Plan. The multiple-use guidelines and elements from the CDCA Plan that pertain to mineral resources would not be affected.

### **4.7.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

## **4.7.3 Cumulative Impacts**

The geographic area of influence for cumulative impacts on Geology, Soils and Mineral resources is the Newberry Springs/Ludlow area, which includes portions of the West Central Mojave Desert soil survey and the Twentynine Palms soils survey area. The past present and reasonably foreseeable future actions in the Newberry Springs/Ludlow area are identified in Figure A-21 and are listed in Tables 4-4 and 4-5 in Section 4.1.

Because there are no indirect or direct impacts on mineral resources there are no cumulative impacts. Additionally, because none of the alternatives would affect the potential for geologic hazards to occur there are no cumulative impacts related to geologic hazards. Cumulative impacts to soils are discussed below.

### **4.7.3.1 Proposed Action**

#### **Soils**

The past and present land uses within the analysis area have had a direct effect on the soils from clearing vegetation; diminished soil productivity from topsoil loss; erosion; and compaction, which leads to inability of water to infiltrate the soils.

Construction and operation of the Calico Solar Project under the Proposed Action would contribute to the disturbance of soils over the next 30 years, increasing the potential for topsoil loss, loss of desert pavement and cryptobiotic soils, erosion, compaction, and loss of productivity. Under the Proposed Action, soil disturbance to 4,596 acres would occur during construction and 4,262 acres would occur during operations.

The past present and reasonably future actions in the Newberry Springs/Ludlow area would occupy, and have the potential to adversely affect, soils on approximately 1.1 million acres. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the 8,230 acre Proposed Action would contribute incrementally to an adverse impact on soil resources.

### **4.7.3.2 Alternative 1a: Agency Preferred Alternative**

#### **Soils**

Cumulative impacts on soils for the Agency Preferred Alternative would be the same as those identified under the Proposed Action except that, under this alternative, soil disturbance to a decreased area (4,337 acres during construction and 4,151 acres during operations) would occur.

### **4.7.3.3 Alternative 2: Reduced Acreage Alternative**

#### **Soils**

Cumulative impacts on soils for the Reduced Acreage Alternative would be the same as those identified under the Proposed Actions except that under this alternative, soil disturbance to a decreased area (1,454 acres during construction and 1,371 acres during operations) would occur.

#### **4.7.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

##### **Soils**

Cumulative impacts on soils for the Avoidance of Donated and Acquired Lands Alternative would be the same as those identified under the Proposed Actions except that under this alternative, soil disturbance to a decreased area (4,354 acres during construction and 4,167 acres during operations) would occur.

#### **4.7.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there are no direct or indirect impacts under the No Action Alternative, there would be no cumulative impacts to geology, soils or mineral resources.

#### **4.7.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts under Alternative 5, there would be no cumulative impacts to geology, soils or mineral resources.

#### **4.7.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts under Alternative 6, there would be no cumulative impacts to geology, soils or mineral resources.

#### **4.7.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.7.4 Mitigation, Project Design Features, BMPs, and Other Measures**

Because there would be no adverse impacts on geology or mineral resources, no mitigation or BMPs are proposed. Mitigation measures for erosion control are discussed in Section 4.17, Hydrology and Water Resources.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

### **4.8 Grazing and Wild Horses and Burros**

This section was developed from Section C.8, Land Use, Recreation and Wilderness of the SA/DEIS. This section addresses issues related to agriculture, rangeland resources, wild horses and burros from the proposed Calico Solar Project.

#### **4.8.1 Methodology**

The potential reduction of designated agricultural lands and/or rangelands, and potential impacts on wild horses and burros or their habitat are the primary impacts in this analysis.

Any action that would change the land use from an agricultural use to any non-agricultural use would be considered to have an adverse effect on agricultural lands. The BLM monitors grazing allotments to ensure long-term rangeland health, and any action that reduces the amount of available rangeland or reduces rangeland health would be considered an adverse effect on grazing. Potential impacts include a reduction in foraging quality, reduction in the size of a grazing allotment, or the loss of a grazing allotment. Loss or fragmentation of habitat, displacement, disruption of movement, or any other harm or harassment to the health and welfare of wild horses and burros would be considered an adverse effect.

## **4.8.2 Direct and Indirect Impacts**

### **4.8.2.1 Alternative 1: Proposed Action**

#### **Agricultural Lands**

There are no agricultural lands within the project area therefore there are no direct or indirect impacts.

#### **Rangelands**

The majority of the project site is located within the Cady Mountains allotment, which is designated by BLM as available for grazing livestock (Figure A-6) (BLM 2009a, BLM 2009d). The Proposed Action would convert land within the Cady Mountains allotment to another use. Presently, there is no active grazing occurring on the Cady Mountain allotment. Construction and operation of any of the action alternatives would result in the loss of grazing land within the Cady Mountain rangeland allotment. However, there would be a negligible direct impact from the Proposed Action within the project site because of the low quality of grazing vegetation present and the fact that grazing is not currently occurring and is unlikely to occur on the project site in the foreseeable future.

#### **Wild Horses and Burros**

The Proposed Action is not within the boundaries of any established HAs or HMAs (Figure A-6). Horses and burros were not observed on the project site during any of the pre-project biological surveys conducted by the Applicant, and are not likely to occur within the project site. Given the absence of designated HAs or HMAs, or any observations of wild horses and burros in the project vicinity, none of the action alternatives would have any impact on wild horses and burros.

#### **CDCA Plan Amendment**

The multiple-use guidelines and elements from the CDCA Plan that pertain to livestock grazing and wild horses and burros would not be affected.

### **4.8.2.2 Alternative 1a: Agency Preferred Alternative**

Similar to the Proposed Action, the Agency Preferred Alternative would have no direct or indirect impacts on agriculture, and negligible impacts on rangelands and wild horses and

burros, since none of these activities are presently occurring, or likely to occur in the foreseeable future, within the project site.

### **CDCA Plan Amendment**

The multiple-use guidelines and elements from the CDCA Plan that pertain to livestock grazing and wild horses and burros would not be affected.

#### **4.8.2.3 Alternative 2: Reduced Acreage Alternative**

Similar to the Proposed Action, the Reduced Acreage Alternative would have no direct or indirect impacts on agriculture, and negligible impacts on rangelands and wild horses and burros, since none of these activities are presently occurring, or likely to occur in the foreseeable future, within the project site.

### **CDCA Plan Amendment**

The multiple-use guidelines and elements from the CDCA Plan that pertain to livestock grazing and wild horses and burros would not be affected.

#### **4.8.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Similar to the Proposed Action, the Avoidance of Donated and Acquired Lands Alternative would have no direct or indirect impacts on agriculture, and negligible impacts on rangelands and wild horses and burros, since none of these activities are presently occurring, or are likely to occur in the foreseeable future, within the project site.

### **CDCA Plan Amendment**

The multiple-use guidelines and elements from the CDCA Plan that pertain to livestock grazing and wild horses and burros would not be affected.

#### **4.8.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative, the project site would remain in its existing condition. As a result, no loss or degradation of rangelands would occur, and the land would still be available to

wild horses and burros. Due to the absence of agricultural land in the area, no loss or degradation of agricultural lands would occur under this alternative.

### **CDCA Plan Amendment**

Under the No Action alternative, the BLM would deny the Calico Solar Project ROW grant and there would be no CDCA Plan Amendment.

#### **4.8.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, the impacts identified under the Proposed Action would not occur as a result of the development of the Calico Solar Project. Without development of the Calico Project there would be no direct or indirect impacts on agriculture, rangelands or wild horses and burros. Because the CDCA Plan would be amended to allow other solar energy projects it is likely that other solar projects would be developed within the area. However, due to the lack of agriculture, grazing, and wild horses and burros within the project site, negligible impacts on rangelands and wild horses and burros would occur. Due to the absence of agricultural land in the area, no loss or degradation of agricultural lands would occur under this alternative.

### **CDCA Plan Amendment**

The multiple-use guidelines and elements from the CDCA Plan that pertain to livestock grazing and wild horses and burros would not be affected.

#### **4.8.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, no impacts on this resource would occur as a result of the development of the Calico Solar Project. Because the CDCA Plan would be amended to prohibit other solar energy projects it is likely that the current conditions would continue unless acted upon by another type of development other than solar energy

## **CDCA Plan Amendment**

The multiple-use guidelines and elements from the CDCA Plan that pertain to livestock grazing and wild horses and burros would not be affected.

### **4.8.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

## **4.8.3 Cumulative Impacts**

### **4.8.3.1 Alternative 1: Proposed Action**

Under the Proposed Action there would be no direct or indirect impacts on grazing, wild horses or burros. Therefore, there would be no cumulative impacts resulting from the Proposed Action.

### **4.8.3.2 Alternative 1a: Agency Preferred Alternative**

Under this alternative there would be no direct or indirect impacts on grazing, wild horses, or burros. Therefore, there would be no cumulative impacts resulting from the Agency Preferred Alternative.

### **4.8.3.3 Alternative 2: Reduced Acreage Alternative**

Under this alternative there would be no direct or indirect impacts on grazing, wild horses, or burros. Therefore, there would be no cumulative impacts resulting from the Reduced Acreage Alternative.

### **4.8.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Under this alternative there would be no direct or indirect impacts on grazing, wild horses, or burros. Therefore, there would be no cumulative impacts resulting from the Avoidance of Donated and Acquired Lands Alternative.

#### **4.8.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

There would be no cumulative impacts resulting from the No Action Alternative.

#### **4.8.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

There would be no cumulative impacts resulting from Alternative 5.

#### **4.8.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

There would be no cumulative impacts resulting from Alternative 6.

#### **4.8.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.8.4 Mitigation, Project Design Features, BMPs, and Other Measures**

No mitigation is required for the protection of agricultural land, rangeland, or wild horses and burros.

### **4.9 Land Use**

This section evaluates the impacts from the proposed Calico Solar Project on land use. It was developed from Section C.8 Land Use, Recreation and Wilderness of the SA/DEIS.

### **4.9.1 Methodology**

The BLM's evaluation of the environmental effects of the Proposed Action and alternatives on land use includes an assessment of the context and intensity of the impacts, as defined in the CEQ regulations for implementing NEPA (40 CFR Part 1508.27). Section C.8 of the SA/DEIS evaluated the effects of the proposed project on land uses including Agricultural Lands and Rangeland Management; Wilderness, ACEC and Recreation; and Horses and Burros. Those subjects are addressed in Section 4.8, *Grazing and Wild Horses and Burros*; Section 4.12, *Recreation*; and Section 4.14, *Special Designations of this FEIS*.

### **4.9.2 Direct and Indirect Impacts**

The conversion of approximately 8,230 acres of open public land to support the proposed project's components and activities would directly disrupt recreational and future grazing activities in the project area as all public uses of the project site would be closed. Additionally, this change in land use would indirectly affect recreation and vehicular access to nearby areas in the project vicinity.

#### **4.9.2.1 Alternative 1: Proposed Action**

Approval of the Proposed Action would result in the occupation and fencing of the entire project site for solar power generation, to the exclusion of other public land uses, other than existing ROWs, within the 8,230-acre project site.

Although there are no current grazing leases in the project area, project approval would preclude future grazing access. The project area would have perimeter fencing, which would exclude casual vehicular and pedestrian use of and travel through the area on designated BLM open routes. Access to the Cady Mountains and other destinations in the vicinity would be adversely affected. Specific BLM routes that would be affected are discussed in Section 4.15, *Traffic and Transportation*. The owners of existing BLM ROWs and unpatented mining claims would continue to have access to and use of their facilities within the project area, although access through the perimeter fencing would need to be arranged with the project Applicant.

If the Proposed Action is approved, approximately 1,180 acres of donated and acquired lands would be directly affected by surface occupancy for construction and operation of the project.

If the Proposed Action is approved, no existing grazing permits would be affected, existing ROWs would remain, and construction of project perimeter roads would provide alternate routes to accommodate travel around the project site for access to private properties, the Cady Mountains and other area destinations. Because of the incorporation of acquired and donated

lands within the project site, and the exclusive use of the 8,230-acre project site, the land use impacts of the Proposed Action would be direct, adverse, and long term.

### **Donated and Acquired Lands Impacts**

The Proposed Action would result in surface disturbing activities on the 1,180 acres of lands donated to the BLM by the Wildlands Conservancy and acquired by the BLM with LWCF funding. Direct and Indirect impacts to the 1,180 acres of donated and acquired lands in the Agency Preferred Alternative would be adverse and long term.

### **CDCA Plan Amendment**

Approval of the Proposed Action would require amendment of the CDCA Plan to add the project site to the CDCA Plan as an approved power plant site in the CDCA.

#### **4.9.2.2 Alternative 1a: Agency Preferred Alternative**

The general land use impacts of the Agency Preferred Alternative would be substantially similar to the Proposed Action, except that the project area would be reduced in size. Approval of this alternative would commit approximately 6,215 acres of open public land to the generation of solar power to the exclusion of other public land uses, except for existing ROWs. The direct and indirect impacts to land uses on the project site from the Agency Preferred Alternative would be adverse and long term because they would have an appreciable effect on the land resource in the project vicinity.

### **Donated and Acquired Lands Impacts**

Approval of the Agency Preferred Alternative would result in surface disturbing activities on 766 acres of donated and acquired lands, 414 acres fewer than the Proposed Action (1,180 acres). Direct and Indirect impacts to the 766 acres of donated and acquired lands in the Agency Preferred Alternative would be adverse and long-term.

### **CDCA Plan Amendment**

Approval of the Agency Preferred Alternative would require amendment of the CDCA Plan to add the project site to the CDCA Plan as an approved power plant site in the CDCA.

### **4.9.2.3 Alternative 2: Reduced Acreage Alternative**

The general land use impacts of the Reduced Acreage Alternative would be similar to, but substantially smaller in scope than, those of the Proposed Action, occupying approximately 31 percent of the area of the Proposed Action project site. Approval of this alternative would commit approximately 2,600 acres of open public land to the generation of solar power to the exclusion of other public land uses, except for existing ROWs. The direct and indirect impacts to land uses on the project site from the Reduced Acreage Alternative would be adverse and long-term because it would have an appreciable effect on the land resource in the project vicinity.

#### **Donated and Acquired Lands Impacts**

The Reduced Acreage alternative project site excludes all donated and acquired lands. Therefore, no direct or impacts would occur to donated or acquired lands.

#### **CDCA Plan Amendment**

Approval of the Reduced Acreage Alternative would require amendment of the CDCA Plan to add the project site to the CDCA Plan as an approved power plant site in the CDCA.

### **4.9.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Approval of the Avoidance of Donated and Acquired Lands Alternative would result in general land use impacts similar to those of the Proposed Action. Approval of this alternative would commit approximately 7,050 acres of open public land to the generation of solar power to the exclusion of other public land uses, except existing ROWs. No donated or acquired lands would be occupied for power generation or ancillary activities.

The direct and indirect impacts to land uses from the Avoidance of Donated and Acquired Lands Alternative would be adverse and long term because it would have an appreciable effect on the land resource in the project vicinity.

#### **Donated and Acquired Lands Impacts**

The Avoidance of Donated and Acquired Lands alternative project site excludes all donated and acquired lands. Therefore, no direct or indirect impacts would occur to donated or acquired lands.

## **CDCA Plan Amendment**

Approval of the Avoidance of Donated and Acquired Lands Alternative would require amendment of the CDCA Plan to add the project site to the CDCA Plan as an approved power plant site in the CDCA.

### **4.9.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Approval of the No Action Alternative would maintain the land use status quo, and would therefore have no impacts on land use within the project area. The Calico Solar Project would be denied and the lands would continue to be managed for multiple uses pursuant to the CDCA Plan. Therefore, there would be no direct or indirect impacts to land use.

### **4.9.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Approval of this LUP Amendment Alternative would not result in any short-term direct or indirect impacts to land use in the project area. However, amendment of the CDCA Plan to create an approved solar energy power plant site would allow for consideration of future solar energy projects on the project site, which could encourage submission of future ROW grant applications for solar energy projects which could result in effects similar to those of the Proposed Action.

### **4.9.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Approval of this LUP Amendment Alternative would not result in any short-term direct or indirect impacts to land use in the project area. Amendment of the CDCA Plan to prohibit consideration of future solar energy projects would allow for consideration of other land uses on the project site.

### **4.9.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

### **4.9.3 Cumulative Impacts**

The geographic scope for the analysis of cumulative land use impacts includes the 25 million-acre CDCA Plan area.

#### **4.9.3.1 Alternative 1: Proposed Action**

The BLM California Desert District has applications for renewable energy projects on federal land in the District that encompasses more than two million acres (Figure A-19). Other renewable energy projects are also proposed on state and private lands in the CDCA Plan area. Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable energy projects currently proposed in California.

The combined sizes and locations of such large-scale projects, taken together, have the potential to disrupt the movement of recreationists and grazers across the California desert landscape and the potential to fragment previously interconnected habitats. The 8,230 acre Proposed Action would constitute only a small portion (less than one percent) of the area proposed for development for renewable energy in the cumulative impacts assessment area but, when considered along with past, present, and reasonably foreseeable future actions, approval of the Proposed Action, or any of the action alternatives, would contribute incrementally to the impacts of development of renewable energy projects in the CDCA.

#### **4.9.3.2 Alternative 1a: Agency Preferred Alternative**

The cumulative impacts for the Agency Preferred Alternative would be the same as those identified under the Proposed Action.

#### **4.9.3.3 Alternative 2: Reduced Acreage Alternative**

The cumulative impacts for the Reduced Acreage Alternative would be the same as those identified under the Proposed Action.

#### **4.9.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The cumulative impacts for the Avoidance of Donated and Acquired Lands Alternative would be the same as those identified under the Proposed Action.

#### **4.9.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there are no direct or indirect impacts, there would be no cumulative impacts under this alternative.

#### **4.9.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts, there would be no cumulative impacts under this alternative.

#### **4.9.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts, there would be no cumulative impacts under this alternative.

#### **4.9.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.9.4 Mitigation, Project Design Features, BMPs, and Other Measures**

No land use mitigation measures are proposed. However, when developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## **4.10 Noise and Vibration**

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Calico Solar Project. It was developed from Section C.9 Noise and Vibration of the SA/DEIS.

### **4.10.1 Methodology**

The Applicant performed noise modeling to determine the project's noise impacts on sensitive receivers (SES 2008). This is found in Section 3.10.4, Ambient Noise Measurement.

### **4.10.2 Direct and Indirect Impacts**

#### **4.10.2.1 Alternative 1: Proposed Action**

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant. The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receivers combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause adverse impacts.

In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The groundborne energy of vibration has the potential to cause structural damage and annoyance. Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. To allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The Applicant predicted the noise impacts of project construction on the nearest sensitive receivers (SES 2008). Assembly and installation of solar collectors (SunCatchers) for the project is expected to be performed in blocks around the site with additional, more substantial structural construction taking place at the Main Services Complex centrally located on the site. The applicant has estimated that the noise resulting from construction of the collector block closest to the receiver south of the project border, SR1, would be no more than 74 dBA at the receiver. Similarly, noise resulting from the construction of the collector blocks closest to location SR2 would be no more than 60 dBA. A maximum construction noise level for all other project construction (such as roads and buildings) is estimated to be no more than 55 dBA  $L_{eq}$  at SR1, and 58 dBA  $L_{eq}$  at SR2. Overall construction noise would, therefore, be no more than 74 dBA at

location SR1 and 62 dBA at location SR2). A comparison of construction noise estimates to measured ambient conditions is summarized in Table 4-32.

**Table 4-32 Predicted Power Plant Construction Noise Impacts**

Receiver	Highest Construction Noise Level (dBA L <sub>eq</sub> ) [Table Note 1]	Measured Existing Ambient (dBA L <sub>eq</sub> ) [Table Note 2]	Cumulative (dBA L <sub>eq</sub> )	Change (dBA)
SR1—south residence	74	65 daytime	75 daytime	+10 daytime
SR1—south residence	74	63 nighttime	74 nighttime	+11 nighttime
SR2—east residence	62	41 daytime	62 daytime	+21 daytime
SR2—east residence	62	38 nighttime	62 nighttime	+24 nighttime

*Table Note 1:* SES 2008, AFC § 5.12.2.1, Tables 5.12-4 and 5.12-5; and staff calculations.

*Table Note 2:* SES 2008, AFC Appendix CC-3, Tables CC-3-1 through CC-3-3; and staff calculations of average of daytime and nighttime hours.

*Table Key:* dBA = A-weighted decibel; L<sub>eq</sub> = equivalent continuous sound level; SR = sensitive receiver.

The San Bernardino County Development Code limits noise levels at residential receivers to no more than 55 dBA L<sub>eq</sub>. The Code exempts construction noise from these limits during the daytime hours of 7:00 a.m. to 7:00 p.m. except Sundays and federal holidays.

## Power Plant Site

To evaluate construction noise impacts, predicted noise levels are compared to the ambient noise levels. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L<sub>eq</sub> (energy average) metric.

The Applicant estimates that construction of the Proposed Action would take place in two phases over a period of 52 months, which is significantly longer than the 12 to 16 month construction period of a traditional power plant. However, the construction of the Proposed Action would be conducted modularly, each module taking approximately 4 months to construct. Thus, maximum construction noise would occur during the construction of the module closest to the receiver for a duration of 4 months and would decrease as construction activity moved on to the next module, farther from the receiver. Construction for the Proposed Action would therefore still constitute a temporary noise impact.

Aggregate construction noise may be expected to reach levels as high as 62 dBA L<sub>eq</sub> at the sensitive receiver east of the project, SR2, for a period of approximately 4 months; an increase of 21 dBA during daytime hours (see Table 4-32). Such an increase represents a quadrupling of noise level at the receiver and would generally be considered an adverse impact. The projected construction noise levels, however, are most likely conservative, calculated from manufacturers' estimated data and engine power sound generation formulae; actual noise levels may be less

than predicted. Since noisy construction work would be restricted to daytime hours it is believed that the noise levels would be noticeable but tolerable at the nearest residences.

The increase of construction noise over nighttime ambient noise levels at SR2 would be approximately 24 dBA. Such an increase represents more than a quadrupling in noise level, and at night, when people are sleeping, would be an adverse impact. However, the schedule constraints on construction presented by the San Bernardino County Development Code would reduce adverse impacts at the both noise-sensitive receivers. In the event that actual construction noise should annoy nearby residents, a noise notification process is proposed to make nearby residents aware of the project, including a Noise Complaint Process that requires the Applicant to resolve any problems caused by noise from the project.

Construction vehicle traffic would consist of workers traveling to and from the project site and haul trucks carrying equipment, supplies, and materials in and out of the project area. Haul trucks can generate noise levels as high as 80 dBA at a distance of 50 feet when travelling at 25 mph. These typical noise levels do not account for attenuation from air absorption, ground effects, and shielding from intervening topography or structures.

### ***Linear Facilities***

Linear facilities include new electrical transmission lines interconnecting a proposed new onsite substation to the transmission system on the project's eastern boundary. The transmission lines would extend past the project site boundaries only minimally and would not pass any sensitive receivers. While construction noise levels for linear facilities would be noticeable, construction on linear facilities proceeds rapidly, so no particular area is exposed to noise for more than a few days.

### ***Pile Driving***

The Applicant does not explicitly state that pile driving would be necessary for construction of the Proposed Action, however analysis of the potential noise impacts of pile driving during the construction process was evaluated. If pile driving is required for construction of the project, the noise from this operation could be expected to reach 104 dBA at a distance of 50 feet. Pile driving noise would thus be projected to reach levels of 76 dBA at SR1 and 60 dBA at SR2, based on noise propagation rates identified above. Added to the existing daytime ambient levels of 65 and 41 dBA  $L_{eq}$  at SR1 and SR2, respectively, this would combine to produce an increase of 11 dBA over ambient noise levels at SR1 and 19 dBA over ambient at SR2 (Table 4-33). While this would produce a noticeable impact, limiting pile driving to daytime hours, in conjunction with its temporary nature, would not result in adverse impacts.

**Table 4-33 Pile Driving Noise Impacts**

Receiver	Pile Driving Noise Level (dBA $L_{eq}$ )	Daytime Ambient Noise Level (dBA $L_{eq}$ )	Cumulative Level (dBA)	Change (dBA)
SR1—south residence	76	65	76	+11
SR2—east residence	60	41	60	+19

*Table Source:* SES 2008, AFC Appendix CC 3, Tables CC 3 1 through CC 3 3; SES 2009i, DR 68; and staff calculations.

*Table Key:* dBA = A-weighted decibel;  $L_{eq}$  = equivalent continuous sound level; SR = Sensitive Receiver.

## Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving, should it be employed. Vibration attenuates rapidly; it is likely that no vibration would be perceptible at any appreciable distance from the project site. Therefore, no vibration impacts are expected during the construction or operations phases of the project.

## Operation Impacts

The primary noise sources of the Proposed Action would consist of the reciprocating Stirling Engines (including generator, cooling fan and air compressor) utilized on each of the Sun Catchers that make up the project, as well as step-up transformers and a new substation. Projected noise levels are compared to applicable regulations. As seen in Table 4-34, the project's operational noise level at the nearest sensitive receiver would be no more than 57 dBA  $L_{eq}$ . While this value exceeds the noise level limits specified in the San Bernardino County Development Code (55 dBA  $L_{eq}$  for residential receivers), it follows the stipulated allowable increase in noise level given that the measured ambient level at that receiver (65 dBA  $L_{eq}$ ) is greater than the stated limit, and is thus in compliance. The project's operational noise at the second sensitive receiver would be below the specified limit.

**Table 4-34 Plant Operating Noise Compliance**

Receiver	Regulations	Regulatory Limit	Projected Noise Level (CNEL)
SR1—south residence	San Bernardino County Development Code	65 dBA $L_{eq}$ , existing daytime ambient	57 dBA
SR2—east residence	San Bernardino County Development Code	65 dBA $L_{eq}$ , existing daytime ambient	52 dBA

*Table Source:* SBC 2007, and SES 2008, AFC Table 5.12 7.

*Table Key:* CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel;  $L_{eq}$  = equivalent continuous noise level; SR = sensitive receiver.

## Noise Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, the projected power plant noise is compared to the existing ambient background ( $L_{90}$ ) noise levels at the affected sensitive receivers.

In many cases, a power plant will be intended to operate around the clock for much of the year. As a solar thermal generating facility, the Proposed Action would operate only during daytime hours, typically 15 hours per day during the summer (with fewer hours during the fall, winter, and spring), when sufficient solar insolation is available. Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is best represented by the average noise level, or  $L_{eq}$ .

The evaluation of the noise environment around the Proposed Action vicinity shows that the daytime noise environment in the Proposed Action vicinity consists of both intermittent and constant noises. Therefore the project's daytime noise levels are compared to the daytime ambient  $L_{eq}$  levels at the project's noise-sensitive receivers. As seen in Table 4-35 power plant noise levels are predicted to be no greater than 57 dBA  $L_{eq}$  and 52 dBA  $L_{eq}$  at receivers SR1 and SR2, respectively, during daytime operation.

**Table 4-35 Power Plant Noise Impacts at Nearest Sensitive Receivers**

Location	Power Plant Noise Level (dBA $L_{eq}$ ) [Table Note 1]	Ambient Noise Level (dBA $L_{eq}$ ) [Table Note 2]	Cumulative Noise Level (dBA)	Change from Ambient Level (dBA)
SR1—south residence	57	65	66	+1
SR2—east residence	52	41	52	+11

*Table Note 1:* SES 2008, AFC Table 5.12 7; and staff calculations.

*Table Note 2:* SES 2008, AFC Appendix CC 3, Tables CC 3 1 through CC 3 3; SES 2009i, DR 68, Table DR68 1.

*Table Key:* dBA = A-weighted decibel;  $L_{eq}$  = equivalent continuous sound level; SR = sensitive receiver.

When projected plant noise is added to the daytime ambient value, the combined level is higher than the ambient value at location SR1 by an inaudible amount (see Table 4-35). The combined level at location SR2 is considerably higher, by more than 10 dBA, than the ambient value and is thus considered an adverse impact. No change in ambient noise at any sensitive receiver at night would result from plant operation. Because project operating noise would only occur during daytime hours, an increase of 10 dBA or less would not have an adverse impact. In order for the combined level to be no more than 10 dBA over ambient at SR2, the project noise alone

must not exceed 51 dBA at location SR2. Thus, the applicant's predicted noise level of 52 dBA must be reduced to 51 dBA, at SR2.

Modeled noise levels of four dBA noise contours (45 dBA, 50 dBA, 55 dBA and 60 dBA) are shown on Figure A-10. Also included are LT, short-term and SR sites.

When projected plant noise is added to the daytime ambient value, the combined level is higher than the ambient value at location SR1 by an inaudible amount (see Table 4-35). The combined level at location SR2 is considerably higher, by more than 10 dBA, than the ambient value and is thus considered an adverse impact. No change in ambient noise at any sensitive receiver at night would result from plant operation. Because project operating noise would only occur during daytime hours, an increase of 10 dBA or less would not have an adverse impact. In order for the combined level to be no more than 10 dBA over ambient at SR2, the project noise alone must not exceed 51 dBA at location SR2. Thus, the applicant's predicted noise level of 52 dBA must be reduced to 51 dBA, at SR2.

Modeled noise levels of four dBA noise contours (45 dBA, 50 dBA, 55 dBA and 60 dBA) are shown on Figure A-10. Also included are LT, short-term and SR sites.

### ***Tonal Noises***

One possible source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant can avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design.

### ***Linear Facilities***

Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line and would thus be inaudible to any receivers.

### ***Vibration***

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration). The Proposed Action would be essentially comprised of a large number of solar dish generators, the operating components of each consisting of a relatively small reciprocating engine, cooling fans and air compressor. All of these pieces of equipment must be carefully balanced in order to operate. Given the distributive layout of the project it is predicted that the ground borne vibration from the Proposed Action would be undetectable by any likely receptor outside of the ROW.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. None of the project equipment would likely produce low frequency noise; thus the Proposed Action would not cause perceptible airborne vibration impacts.

### **CDCA Plan Amendment**

The CDCA Plan does not contain any guidelines or elements concerning Noise and Vibration

#### **4.10.2.2 Alternative 1a: Agency Preferred Alternative**

Noise and Vibration impacts from the Agency Preferred Alternative would be the same as those identified under the Proposed Action.

#### **4.10.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage would consist of approximately 11,000 SunCatchers. The project boundary for the alternative would be approximately 2,000 feet further away from SR2, the sensitive receiver that would be most affected by noise from the Proposed Action. The impacts for this alternative would be similar to the Proposed Action but reduced due to fewer SunCatchers.

Given the distributive nature of the operational noise produced by the chosen project technology, this alternative would correspond to lower operational noise impacts at the noise receiver located east of the project, SR2. Operational noise impacts at SR 1 are expected to be the same as that of the Proposed Action.

#### **4.10.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative would consist of an estimated 28,800 SunCatchers, approximately 85% of the Proposed Action. The noise impacts of this alternative on the nearest noise sensitive receivers could potentially be lower than the impacts of the Proposed Action, depending on the specific placement of the SunCatchers. Given that the number of Sun Catchers would be fewer and would be contained in the same project boundaries, the noise impacts on nearby sensitive receivers would be the same as or slightly less than those identified under the Proposed Action.

#### **4.10.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative, 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 Plan. There would be no change in the noise and vibration setting from existing conditions.

#### **4.10.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, it is possible that another solar energy project could be constructed on the project site. If another solar project were constructed at the site, noise impacts could potentially occur. However, without project specific information, such as the type of technology and location of facilities that would be used, specific noise impacts cannot be determined.

#### **4.10.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, 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 Plan except for the amendment. Although the CDCA Plan would be amended to make the area unavailable for future solar development, it is possible that other kinds of projects could be constructed on the site.

#### **4.10.2.8 Environmentally Preferred Alternative**

The BLM has determined that the Environmentally Preferred Alternative is the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

### **4.10.3 Cumulative Impacts**

#### **4.10.3.1 Alternative 1: Proposed Action**

The geographic scope for considering cumulative noise impacts on sensitive receivers for this project is the region immediately surrounding those receivers identified in the project application. Two additional potential projects in the vicinity of Calico Solar were identified that might propose a potential for cumulative noise impacts: an additional solar project northwest of the Calico Solar project site and a wind power facility has been proposed to the east of the Calico Solar project site. Since the potential solar project would be located on the opposite side of the Calico Solar project site from the identified noise sensitive receivers, no significant cumulative impacts from that project would be expected. Noise data from the proposed wind power facility are not available for a cumulative impacts assessment; further analysis would be necessary as data becomes available.

Additional projects outside the immediate vicinity of Calico Solar would not pose a potential for cumulative noise impacts. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the Proposed Action would not contribute incrementally to an adverse impact on the noise and vibration setting.

#### **4.10.3.2 Alternative 1a: Agency Preferred Alternative**

Cumulative impacts for this alternative would be the same as those identified under the Proposed Action.

#### **4.10.3.3 Alternative 2: Reduced Acreage Alternative**

Cumulative impacts for this alternative would be the same as those identified under the Proposed Action.

#### **4.10.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Cumulative impacts for this alternative would be the same as those identified under the Proposed Action.

#### **4.10.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there are no direct or indirect impacts under the No Action Alternative, there would be no cumulative impacts.

#### **4.10.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts under this LUP amendment alternative, there would be no cumulative impacts.

#### **4.10.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts under this LUP amendment alternative, there would be no cumulative impacts.

#### **4.10.3.8 Environmentally Preferred Alternative**

The BLM has determined that the Environmentally Preferred Alternative is the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

#### **4.10.4 Mitigation, Project Design Features, BMPs, and Other Measures**

Implementation of mitigation measures is recommended to minimize potential impacts and adhere to all permit conditions. These mitigation measures would require notification of affected residents of impending construction, establishing a noise complaint resolution process, and limiting noisy construction to daytime hours. The recommended noise related mitigation measures are:

- (1) Implementation of mitigation that would require all vehicles and equipment to be equipped with exhaust noise abatement devices, such as sound mufflers.

- (2) To minimize disturbance, mitigation should also be implemented that would limit work to daytime hours and institute timing control for all activities that are known to have high noise levels.
- (3) The transmission line should be patrolled, and damaged insulators or other transmission line materials, which could cause excessive noise, should be repaired or replaced.
- (4) At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within 2 miles of the site, by mail or other effective means, of the commencement of project construction.
- (5) At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

**Verification:** Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

- (6) The project owner shall establish a noise complaint reporting and resolution process. Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:
  - (a) Use a Noise Complaint Resolution Form or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint.
  - (b) Attempt to contact the person(s) making the noise complaint within 24 hours.
  - (c) Conduct an investigation to determine the source of noise related to the complaint.

- (d) Take all feasible measures to reduce the noise at its source if the noise is project related.
  - (e) Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction. Verification: within 5 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.
- (7) The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

**Verification:** At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to OSHA and Cal/OSHA upon request.

- (8) The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone to exceed an average of 51 dBA Leq measured at or near monitoring location SR2, and an average of 57 dBA Leq measured at or near monitoring location SR1.
- (9) No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.
- (10) When the project first achieves a sustained output of 85% or greater of rated capacity, the project owner shall conduct a 25 hour community noise survey at monitoring location SR2, or at a closer location acceptable to the CPM. This survey shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

- (a) During the period of this survey, the project owner shall also conduct a short-term survey of noise at monitoring location SL1 or at a closer location acceptable to the CPM. The short-term noise measurements at this location shall be conducted during morning, early afternoon, and evening hours.
  - (b) The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receiver locations to determine the presence of pure tones or other dominant sources of plant noise.
- (11) If the results from the noise survey indicate that the power plant noise at the affected receiver sites exceeds the above specified values, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.
- (a) If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

**Verification:** The survey shall take place within 30 days of the project first achieving a sustained output of 85% or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

- (12) Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.
- (13) Following the project's first achieving a sustained output of 80% or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.
- (a) The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095–5099 and Title 29, CFR section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

- (b) The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

**Verification:** Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal/OSHA upon request.

- (14) Heavy equipment operation, including pile driving, and noisy construction work relating to any project features shall be restricted to the times of day delineated below, unless a variance has been issued by San Bernardino County for limited nighttime construction:

- (a) Mondays through Saturdays: 7:00 a.m. to 7:00 p.m.

- (b) Sundays and Holidays: No Construction Allowed

- (15) Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

**Verification:** Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project. Prior to ground disturbance, a copy of the variance issued by the county, if one should be issued, shall be submitted to the CPM for review and approval.

- (16) In the future, upon closure of the Calico Solar Project, all operational noise from the project would cease, and no further adverse noise impacts from operation of the Calico Solar Project would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise regulations that were in existence at that time would apply. Applicable conditions of certification included in the CEC decision would also apply unless modified.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## **4.11 Public Health and Safety and Hazardous Materials**

This Section was developed from Section C.6, Public Health and Safety, and Section C.5, Hazardous Materials Management, of the SA/DEIS.

### **4.11.1 Methodology**

For this analysis, BLM examined potential impacts on public health and safety and hazardous materials concerns associated with construction and operation of the Calico Solar Project. Since the project site consists of mostly undeveloped desert land and the general population and public uses are located several miles from the project site, the public health and safety evaluation will focus on site-specific hazardous materials exposure and emergency response associated with the construction and operation of the Calico Solar Project.

The purpose of this section is to evaluate impacts on the public from the use, handling, storage, or transportation of hazardous materials, wastes generated from the construction and operation, and consider emergency services at the project site. In addition to the analysis contained in this section, other related aspects to the assessment of potential public health and safety impacts from the Calico Solar Project are considered in Section 4.2, Air Quality and Climate; Section 4.13, Socioeconomics and Environmental Justice; and Section 4.17, Hydrology and Water Resources, in this document.

### **4.11.2 Direct and Indirect Impacts**

#### **4.11.2.1 Alternative 1: Proposed Action**

##### **Hazardous Materials**

The majority of the hazardous materials that would be present at the proposed facility would be stored in either solid form or in small quantities, have low mobility, low vapor pressure, or low levels of toxicity, and therefore pose a minor potential for off-site impacts (SES 2008).

During construction, hazardous wastes would be transported to the facility via truck. The hazardous materials proposed for use include paint, cleaners, solvents, gasoline, diesel fuel, motor oil, welding gases, lubricants, and ethylene glycol. Impacts due to spills or other releases of these materials would be limited to the site because of the small quantities involved. Temporary containment berms would also be used to prevent any spill from spreading. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, ethylene glycol, and diesel fuel all have very low volatility and would represent limited off-site hazards, even in larger quantities.

During operations, hazardous chemicals such as cleaning agents, lube oil, diesel fuel, gasoline, ethylene glycol, hydrogen, and other various chemicals would be used and stored on-site (see Table 4-36 for a list of all chemicals). These chemicals required for operation would also represent limited off-site hazard due to their small quantities, low volatility, and/or low toxicity.

**Table 4-36 Hazardous Materials Proposed for Use and Storage during Operations**

Chemical	Use	Storage Location/Type	State	Storage Quantity
Insulating oil	Electrical equipment	Electrical equipment (contained in transformers and electrical switches)	Liquid	60,000 gallons initial fill
Lubricating oil	SunCatcher components	150-gallon recycle tank located in maintenance building	Liquid	40,000 gallons initial fill with usage of 21 gallons per month
Hydrogen	PCU working fluid	Generated on-site and stored in pressure vessel	Gas	7,162,148 standard cubic feet (approximately 37,243 pounds)
Acetylene	Welding	Cylinders stored in maintenance buildings	Gas	1,000 cubic feet
Oxygen	Welding	Cylinders stored in maintenance buildings	Gas	1,000 cubic feet
Ethylene glycol	PCU radiator coolant (antifreeze)	PCU radiator maintenance buildings	Liquid	40,000 gallons initial fill with usage of 21 gallons per month
Various solvents, detergents, paints, and other cleaners	Building maintenance and equipment cleaning	Three 55-gallon drums and 1-gallon containers will be stored Maintenance Buildings	Liquid	Ten 55-gallon drums; 1-gallon commercial containers
Gasoline	Maintenance vehicles	5,000-gallon AST at refueling station with containment	Liquid	5,000 gallons
Diesel fuel	Firewater pump and maintenance vehicles	Firewater skid 5,000-gallon AST refueling station with containment	Liquid	100 gallons initial fill
Sodium hypochlorite, 12.5 percent solution (bleach)	Disinfectant for potable water	Water treatment structure	Liquid	4 gallons

Table Source: SES 2008.

Table Key: AST = aboveground storage tank; PCU = power conversion unit.

Hydrogen would be the only chemical that would pose a potential risk of off-site impacts. Hydrogen would be used as the working fluid in the engines used by the proposed project. The two systems currently being evaluated are the centralized hydrogen system and the distributed hydrogen system. The centralized hydrogen system would have a maximum amount of 23,000 pounds of hydrogen on-site; the distributed would have approximately 116,000 pounds on-site. Because of the hazardous nature of hydrogen there would be potential for an off-site

consequence upon uncontrolled release. According to an analysis conducted by the Applicant and based on federal and state risk management programs (Tessera Solar 2010b), the criteria for a worst-case scenario is to evaluate the potential hazard posed by hydrogen stored at the project site. An overpressure could potentially occur and produce a hydrogen vapor cloud explosion, resulting in damage to structures and injury to people. However, the BLM believes that an unconfined hydrogen vapor cloud explosion would be unlikely and that the potential for such an incident to occur at the proposed facility would be minimal.

While the use of hydrogen at the proposed facility poses a risk of an on-site fire, the potential for an adverse impact on surrounding populations or the environment would be minimal due to the remote location. A safety management program, which would include both engineering and administrative controls, would be implemented to mitigate the potential for accidents resulting from the release of hazardous materials. The use of hydrogen at the proposed facility poses a risk of an on-site fire but no potential for an adverse impact on surrounding populations or the environment.

Plant personnel would be trained as a hazardous materials response team, and one or more spill response kits would be available on-site. In the event of a large incident involving hazardous materials, backup support would be provided by the SBCFD. The SBCFD Hazmat unit is located at Station No. 322 in Adelanto. The SBCFD is adequately staffed, trained, and equipped to respond to a fire, hazardous materials spill, or a need for EMS. However, given the great distances from Adelanto to the Calico Solar Project site, increased pressure for emergency response action could be placed on local fire protection services.

During construction, anticipated hazardous wastes include waste paint, spent construction solvents, waste cleaners, waste oil, oily rags, waste batteries, and spent welding materials. Estimated amounts of these materials that would occur are 1 cubic yard of empty containers per week; 200 gallons of oils, solvents, and adhesives approximately every 90 days; and 20 batteries per year. Empty hazardous material containers would be returned to the vendor or disposed at a hazardous waste facility; solvents, used oils, paint, oily rags, and adhesives would be recycled or disposed at a hazardous waste facility; and spent batteries would be disposed at a recycling facility (Tessera Solar 2010a).

The generation of hazardous waste requires the facility owner to obtain a hazardous waste generator identification number from the EPA prior to generating any hazardous waste during project construction and operations. Hazardous waste would be collected in containers and stored at an equipment storage area, warehouse/shop area, or storage tank on equipment skids for less than 90 days. The collected wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies, in accordance with all applicable regulations. Should any enforcement action related to construction waste management be taken or initiated by a

regulatory agency, the project owner would be required to notify the Compliance Project Manager as soon as the owner becomes aware of this action.

A Hazardous Materials Business Plan (HMBP), a Risk Management Plan (RMP), and a Spill Prevention, Control, and Countermeasures Plan (SPCC Plan) would also be prepared to incorporate state requirements for the handling of hazardous materials. The HMBP (which includes the Inventory and Site Map, an Emergency Response Plan, Owner/Operator Identification, and Employee Training), an RMP, and an SPCC Plan would be provided to the SBCFD so that it can better prepare emergency response personnel for handling emergencies that could occur at the facility. The SBCFD is the Certified Unified Program Agency (CUPA) in the project vicinity and is responsible for reviewing HMBPs and RMPs.

Given the low risk of accident and release during the transportation of hazardous materials to the site and the short travel distance between the site and I-40 along a dedicated road in a remote area, transporting materials on I-40 would not present risk of accident and release. This determination relies on the extensive regulatory program that applies to shipment of hazardous materials on California highways to ensure safe handling in general transportation (see the Federal Hazardous Materials Transportation Law 49 USC §5101 et seq., the U.S. Department of Transportation Regulations 49 CFR Subpart H §172-700, and the California Department of Motor Vehicles Regulations on Hazardous Cargo). The POD contains additional information on regulations governing the transportation of hazardous materials. Construction and operation of the Proposed Action would be in compliance with all applicable regulations for both long-term and short-term project impacts for hazardous materials.

## **Waste Management**

Site preparation and construction of the Proposed Action and its associated facilities would last approximately 52 months and generate both nonhazardous and hazardous wastes in solid and liquid forms (Tessera Solar 2010a). Before construction can begin, the project owner will be required to develop and implement a Construction Waste Management Plan to ensure that the waste will be recycled when possible and properly landfilled when necessary.

Construction activities (including construction of the substation and portable SunCatcher assembly buildings) would generate an estimated 40 cubic yards per week of nonhazardous solid wastes, consisting of scrap wood, steel, glass, plastic, and paper. Of these items, recyclable materials would be separated and removed as needed to recycling facilities. Nonrecyclable materials (for example, insulation, other plastics, food waste, roofing materials, vinyl flooring and base, carpeting, paint containers, packing materials) would be disposed at a Class III landfill. An approximately 40-cubic-yard container of nonrecyclable waste is anticipated on a weekly basis during construction of the buildings, and once a month thereafter (SES 2008f). Construction of the substation would generate an estimated 1,050 cubic yards of waste.

The SunCatcher assembly buildings would be removed from the site after construction. Decommissioning and removal of the buildings would generate approximately 80 cubic yards of waste consisting of surplus packing materials, lumber, cardboard, lighting, gaskets, and wiring. Concrete pads under the buildings would remain after the buildings are removed.

Nonhazardous liquid wastes generated during construction would include stormwater runoff, sanitary waste, and wastewater with a high dissolved solids concentration from the reverse osmosis treatment of groundwater, which would be directed to two on-site evaporation ponds (see Section 4.17.2.1). Stormwater runoff would be managed in accordance with appropriate regulations. Sanitary wastes would be pumped to tanker trucks by licensed contractors for transport to a sanitary water treatment plant. Additional information regarding the management of project wastewater is provided in the POD (Tessera Solar 2010a).

### **Emergency Response**

The proposed project would be located in an area that is currently served by the SBCFD. The need for additional emergency services offered by nearby facilities (fire, hazardous materials response, and medical care) during the construction and operation of the Proposed Action would be coordinated with the local fire protection and emergency response service providers. The SBCFD indicated that it may need additional resources to provide adequate fire protection and emergency response services during construction and operation of the project (SES 2008). Proposed safety procedures and employee training would minimize any potential unsafe work conditions and consequently reduce the need for outside response services. No adverse impacts on emergency medical services are expected with the Proposed Action.

The Proposed Action would not impact law enforcement resources within the project vicinity. According to the San Bernardino County Sheriff's Department, the local/regional department facilities would be capable of handling law enforcement issues that might occur at the project site. Unlike residential or commercial developments, power plants do not attract large numbers of people and thus require little law enforcement. Because of this factor and proposed on-site security measures, existing law enforcement resources would be adequate to provide services to the proposed project during construction and operation. No adverse impacts on law enforcement resources are expected with the Proposed Action.

### **CDCA Plan Amendment**

The Proposed Action does not propose hazardous waste disposal or treatment within the project site. On-site hazardous waste accumulation and storage will be limited to permitted 90-day temporary storage, before transport for off-site disposal. Therefore, the Proposed Action is consistent with the guidelines and elements of the CDCA Plan.

### **4.11.2.2 Alternative 1a: Agency Preferred Alternative**

#### **Hazardous Materials**

Impacts associated with the construction and operation of this alternative would be the same as those identified in the Proposed Action. Although there is a reduction in acreage, the number of proposed solar units and amount of hydrogen needed for energy production would remain the same.

#### **Waste Management**

The Agency Preferred Alternative would generate similar types and quantities of hazardous and nonhazardous wastes from construction and operation of the project as the Proposed Action. The amount of nonhazardous and hazardous solid wastes generated under the Agency Preferred Alternative that would require landfill/treatment would also be the same as the Proposed Action. Similar to the Proposed Action, off-site disposal facilities are anticipated to have sufficient capacity for project wastes and no investigation and remediation of soil and groundwater contamination would be required. Disposal methods would remain the same as for the Proposed Action.

#### **Emergency Response**

The Agency Preferred Alternative would require the same types of emergency responses from construction and operation of the project as does the Proposed Action.

#### **CDCA Plan Amendment**

The Agency Preferred Alternative does not propose hazardous waste disposal or treatment within the project site. On-site hazardous waste accumulation and storage will be limited to permitted 90-day temporary storage, before transport for off-site disposal. Therefore, the Agency Preferred Alternative is consistent with the guidelines and elements of the CDCA Plan.

### **4.11.2.3 Alternative 2: Reduced Acreage Alternative**

#### **Hazardous Materials**

The setting for this alternative would be approximately 2,600 acres, or 31 percent, of the Proposed Action. Impacts associated with the construction and operation of this alternative would be similar to those identified in the Proposed Action. The reduction in acreage would

reduce the number of proposed solar units thus reducing the amount of hydrogen needed for energy production.

### **Waste Management**

The Reduced Acreage Alternative would generate similar types of hazardous and nonhazardous wastes from construction and operation of the project. However, the quantities of waste would be reduced by 66 percent. Approximately 3,000 cubic yards of nonhazardous solid wastes and 74 cubic yards of hazardous solid wastes would be generated under a Reduced Acreage Alternative and would require landfill/treatment. Similar to the Proposed Action, off-site disposal facilities are anticipated to have sufficient capacity for project wastes and no investigation and remediation of soil and groundwater contamination would be required. Disposal methods would remain the same as for the Proposed Action.

### **Emergency Response**

The Reduced Acreage Alternative would require the same types of emergency responses from construction and operation of the project as does the Proposed Action.

### **CDCA Plan Amendment**

The Reduced Acreage Alternative does not propose hazardous waste disposal or treatment within the project site. On-site hazardous waste accumulation and storage will be limited to permitted 90-day temporary storage, before transport for off-site disposal. Therefore, the Reduced Acreage Alternative is consistent with the guidelines and elements of the CDCA Plan.

## **4.11.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

### **Hazardous Materials**

The types of construction and operational impacts of the Avoidance of Donated and Acquired Lands Alternative would be the same as those of the Proposed Action. Potential impacts of this alternative would be slightly smaller due to the reduced use, handling, storage, or transport of hazardous materials and the smaller number of SunCatchers. Construction and operation risk to workers due to the use of hydrogen would be reduced because of the reduced number of SunCatchers and therefore reduced amount of hydrogen required to be on-site. The Avoidance of Donated and Acquired Lands Alternative would not result in any change in the potential for impact associated with hazardous materials handling and storage.

## **Waste Management**

This alternative would generate the same hazardous and nonhazardous wastes from construction, demolition and operation of the project. However, the quantities of waste would be reduced by 15 percent. Approximately 7,100 cubic yards of nonhazardous solid wastes and approximately 191 cubic yards of hazardous solid wastes would be generated under this alternative and would require landfill/treatment. Similar to the Proposed Action, wastes requiring off-site disposal would be less than the remaining capacity of off-site disposal facilities, and no investigation and remediation of soil and groundwater contamination would be required. Disposal methods would remain the same as for the Proposed Action.

## **Emergency Response**

The Avoidance of Donated and Acquired Lands Alternative would require the same types of emergency responses from construction and operation of the project as does the Proposed Action and the Reduced Acreage Alternative.

## **CDCA Plan Amendment**

The Avoidance of Donated and Acquired Lands Alternative does not propose hazardous waste disposal or treatment within the project site. On-site hazardous waste accumulation and storage will be limited to permitted 90-day temporary storage, before transport for off-site disposal. Therefore, the Avoidance of Donated and Acquired Lands Alternative is consistent with the guidelines and elements of the CDCA Plan.

### **4.11.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

## **Hazardous Materials**

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under the No Action 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. Therefore, there would be no impacts due to hazardous materials. In the absence of this Project, the project site would become available to other uses that are consistent with CDCA Plan and energy developers may seek other public or private sites in the California Desert or in adjacent states that comply with State/Federal mandates.

**Waste Management**

There would be no impacts on waste management under the No Action alternative.

**Emergency Response**

There would be no impacts on emergency services under the No Action alternative.

**CDCA Plan Amendment**

There would be no impact on the CDCA Plan under the no action alternative.

**4.11.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site****Hazardous Materials**

Under Alternative 5, the proposed Calico Solar Project would not be approved, and BLM would amend the CDCA Plan to allow for other solar projects on the site. Therefore, another solar energy project could be constructed on the project site, and public health and safety and emergency response could be affected depending on the type of project and the techniques used in construction and operation.

**Waste Management**

There would be no impacts on waste management under this alternative.

**Emergency Response**

There would be no impacts on emergency services under this alternative.

**CDCA Plan Amendment**

Alternative 5 does not propose hazardous waste disposal or hazardous waste sites within the project site. Therefore, Alternative 5 is consistent with the guidelines and elements of the CDCA Plan. Any future solar project would need to be consistent with CDCA Plan guidelines and elements.

#### **4.11.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

##### **Hazardous Materials**

Under Alternative 6, 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 Plan. Because no new structures or facilities would be constructed or operated on the site, public health and safety are not expected to change noticeably from existing conditions. As such, this No Project/No Action alternative would not result in impacts on public health and safety.

##### **Waste Management**

There would be no impacts on waste management under this alternative.

##### **Emergency Response**

There would be no impacts on emergency services under this alternative.

##### **CDCA Plan Amendment**

Alternative 6 does not propose hazardous waste disposal or hazardous waste sites within the project site. Therefore, Alternative 6 is consistent with the guidelines and elements of the CDCA Plan. Any future project would need to be consistent with CDCA Plan guidelines and elements.

#### **4.11.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.11.3 Cumulative Impacts**

The geographic area of influence for Public Health and Safety would be the MDAB, which contains most of San Bernardino County and parts of Riverside County and Kern County.

### **4.11.3.1 Alternative 1: Proposed Action**

#### **Hazardous Materials**

The potential for impacts due to a simultaneous release of any of the hazardous chemicals from the proposed Calico Solar Project with other existing or foreseeable nearby facilities were examined. Because of the small amounts and low hazard of the hazardous chemicals to be stored at the facility, there would be no possibility of producing an off-site impact. Because of this determination, and the additional fact that there are no nearby facilities using large amounts of hazardous chemicals, there would be no possibility that vapor plumes would combine to produce an airborne concentration that would present a risk. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the Proposed Action would not contribute incrementally to potential adverse impacts from hazardous materials.

#### **Waste Management**

When combined with impacts of past, present, and reasonably foreseeable projects, impacts of the Calico Solar Project would result in a contribution to local and regional cumulative impacts on waste management. The amount of nonhazardous and hazardous wastes generated during construction and operation of the Calico Solar Project would add to the total quantity of hazardous and nonhazardous waste generated in San Bernardino County. However, project wastes would be generated in modest quantities, waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volume of wastes that would be generated by the project. Therefore, the waste generated by the Calico Solar Project, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the Proposed Action would not contribute incrementally result to adverse impacts from waste management impacts both locally and regionally.

#### **Emergency Response**

The need for emergency services for the Calico Solar Project would add to the total burden of the SBCFD due to the number of new solar power plants proposed for this region and the great distances involved in responding to emergencies. Response to an emergency at one solar power plant leaves a station vacant for an extended period of time and thus increases the response time to other locations. This project could have an adverse effect on the SBCFD's ability to respond to a fire or medical emergencies. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the Proposed Action would contribute incrementally to potential adverse impacts on emergency response.

#### **4.11.3.2 Alternative 1a: Agency Preferred Alternative**

The cumulative impacts of the Agency Preferred Alternative for hazardous materials, waste management, and emergency response would be similar to those identified under the Proposed Action.

#### **4.11.3.3 Alternative 2: Reduced Acreage Alternative**

The cumulative impacts of the Reduced Acreage Alternative for hazardous materials, waste management, and emergency response would be similar to those identified under the Proposed Action.

#### **4.11.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The cumulative impacts of the Avoidance of Donated and Acquired Lands Alternative for hazardous materials, waste management, and emergency response would be similar to those identified under the Proposed Action.

#### **4.11.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

There would be no impacts on hazardous materials, waste management, and emergency response under the No Action Alternative.

#### **4.11.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

There would be no impacts on hazardous materials, waste management, and emergency response under this LUP amendment alternative.

#### **4.11.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

There would be no impacts on hazardous materials, waste management, and emergency response under this LUP amendment alternative.

#### 4.11.3.8 Environmentally Preferred Alternative

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### 4.11.4 Mitigation, Project Design Features, BMPs, and Other Measures

A Safety and Health Program would be prepared by the Applicant to minimize emergencies during construction and operation of the project. Table 4-37 outlines the proposed plan and program BMPs. A full description of these can be found in Appendix D.

**Table 4-37 Safety and Health Programs Summary**

Program	Description
Construction Safety and Health Programs	<ul style="list-style-type: none"> <li>• Construction injury and illness prevention program</li> <li>• Construction fire prevention plan</li> <li>• Personal protective equipment program</li> <li>• Emergency action program and plan</li> </ul>
Operations and Maintenance Safety and Health Program	<ul style="list-style-type: none"> <li>• Injury and illness prevention program</li> <li>• Fire prevention program</li> <li>• Personal protective equipment program</li> <li>• Emergency action plan</li> </ul>
Safety and Health Program Elements	<ul style="list-style-type: none"> <li>• Injury and illness prevention program</li> <li>• Fire prevention plan</li> <li>• Personal protective equipment program</li> <li>• Emergency action plan</li> <li>• Written safety program</li> <li>• Safety training programs</li> </ul>

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## 4.12 Recreation

The Recreation Section has been developed from portions of Section C.8, Land Use, Recreation, Wilderness, of the Draft SA/DEIS to specifically address the potential impacts on recreation resources.

### **4.12.1 Methodology**

The analysis of the proposed Calico Solar Project effects includes an assessment of the context of the impacts on recreational resources and the recreational environment. Effects of the proposed project on recreation have been determined using the following criteria.

- The effects directly or indirectly disrupt activities in established federal, state, or local recreation areas or areas with recreational activity.
- The effects reduce the scenic, biological, cultural, geologic, or other important factors that contribute to the value of federal, state, local, or private recreational facilities.

### **4.12.2 Direct and Indirect Impacts**

#### **4.12.2.1 Alternative 1: Proposed Action**

This alternative would eliminate the project site from use for recreation activities resulting in adverse effects to activities such as camping, hiking, and hunting that currently occur on the site (BLM 1999). There would also be adverse effects to recreational OHV use because the proposed closure of open access routes through the project site would eliminate travel through the site and reduce connectivity in the OHV route network (see Section 4.15, Traffic and Transportation, in this document). The loss of access to the project site would reduce the overall amount of land available for recreational use in the general Mojave Valley area. The direct impacts of the Proposed Action would therefore result in short- and long-term adverse impacts on recreational resources.

Construction and operation activities of the Proposed Action would indirectly impact surrounding WAs and WSAs by diminishing the opportunities for solitude and primitive and unconfined recreation experiences in this area of the Mojave Desert. The attraction of backpacking, hiking, camping, and other primitive focused outdoor activities could be reduced in the areas within view of the project due to the increased human activity in the region and visual intrusion of an industrial facility into the existing natural desert. There are other wilderness and recreation areas surrounding the project site, which provide alternative opportunities for recreation destinations beyond the immediate vicinity of the project site and activities could relocate to those areas that retain their wilderness characteristics.

The Proposed Action would have an indirect adverse impact on the Cady Mountains WSA, Rodman Mountains Wilderness, and Pisgah Crater ACEC, by reducing scenic values and altering the recreational experience. However, the potential indirect impacts from the Proposed Action would be adverse in the short and long term because the potentially displaced activities

would be dispersed over a wide range of area in the Mohave Valley with similar recreation opportunities. Please see Section 4.9, Land Use; Section 4.14, Special Designations; Section 4.15, Traffic and Transportation; and Section 4.16, Visual Resources in this document for impacts on closely related resources.

### **CDCA Plan Amendment**

The CDCA Plan would be amended to designate the project site for solar power generation and transmission. This would preclude recreational use of the project site.

#### **4.12.2.2 Alternative 1a: Agency Preferred Alternative**

Implementation of the Agency Preferred Alternative would include conversion of approximately 6,215 acres of land from public recreational use to industrial use. This alternative would have direct impacts similar to the Proposed Action for recreation activities such as camping hiking and hunting, except over approximately 25 percent less area. However, the overall change to recreational resources from these direct impacts would be adverse in the short and long term because of the disruption of recreation activities and the change in recreation setting by the introduction of the industrial facility into the landscape. The impacts on OHV routes and access would be similar to the proposed Action because the same routes would be affected and result in the loss of network connectivity.

The indirect impacts from the Agency Preferred Alternative would be similar to those of the Proposed Action.

### **CDCA Plan Amendment**

The CDCA Plan would be amended to designate the project site for solar power generation and transmission. This would preclude recreational use of the project site.

#### **4.12.2.3 Alternative 2: Reduced Acreage Alternative**

Implementation of the Reduced Acreage Alternative would include conversion of approximately 2,600 acres of land from public recreational use to industrial use. The smaller project area would be eliminated from use for recreation and would have adverse impacts similar to the Proposed Action, but over proportionally less area. Though the impacts would occur over a smaller area, the overall change to recreational resources from these direct impacts would be adverse in the short and long term because of the disruption of recreation activities and the change in recreation setting by the introduction of the industrial facility into the landscape.

The indirect impacts from the Reduced Acreage Alternative would also be similar to those of the Proposed Action. The overall change to recreational resources from indirect impacts would be adverse in the short and long term.

### **CDCA Plan Amendment**

The CDCA Plan would be amended to designate the project site for solar power generation and transmission. This would preclude recreational use of the project site.

#### **4.12.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Implementation of the Avoidance of Donated and Acquired Lands would include conversion of approximately 7,050 acres of land from public recreational use to industrial use. This alternative would have direct impacts similar to the Proposed Action. The small reduction in acreage and location of the undeveloped areas in close proximity to the facility render virtually the same area unsuitable for recreation activities as the Proposed Action.

The indirect impacts from the Avoidance of and Acquired Lands Alternative would be similar to those of the Proposed Action.

### **CDCA Plan Amendment**

The CDCA Plan would be amended to designate the project site for solar power generation and transmission. This would preclude recreational use of the project site.

#### **4.12.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative there would be no decrease in the amount of recreational land. Current OHV roads would remain open and scenic values of surrounding recreation areas would not be altered.

### **CDCA Plan Amendment**

Under the No Action alternative, there would be no proposed project and no CDCA Plan Amendment. As such, there would no direct or indirect impacts on recreation.

#### **4.12.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Projects on the Project Site**

Under this LUP amendment alternative there would be no decrease in the amount of recreational land. Current OHV roads would remain open and scenic values of surrounding recreation areas would not be altered.

##### **CDCA Plan Amendment**

Because the CDCA Plan would be amended to allow solar energy development on the site up to 8,230 acres, another project could be constructed, subject to BLM approval. Development of another solar energy project on the site would result in similar impacts on recreation as those identified for the Proposed Action.

#### **4.12.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Projects on the Project Site**

Under this LUP amendment alternative, there would be no decrease in the amount of recreational land. Current OHV routes would remain open and scenic values of surrounding recreation areas would not be altered.

##### **CDCA Plan Amendment**

Although the Calico Solar Project would not be approved, amendment of the CDCA Plan to prohibit solar projects on the project site would not preclude development of the site for other purposes. Other projects could have impacts similar to the Proposed Action. The project site would continue to be managed to allow for recreation opportunities under the associated Multiple-Use Classes, as described in the CDCA Plan.

#### **4.12.2.8 Environmentally Preferred Alternative**

The BLM has determined the Environmentally Preferred Alternative to be the Agency Preferred Alternative. As such, the environmental consequences of this alternative would be the same as those described above for the Agency Preferred Alternative.

### **4.12.3 Cumulative Impacts**

The geographic scope for the analysis of cumulative impacts related to recreation includes the local and regional wilderness areas and recreation facilities within the desert region of San Bernardino County. This region is within the jurisdiction of BLM's Barstow and Needles District Offices, where 35 solar energy projects and 33 wind energy projects have been proposed in the vicinity of the project. This represents a worst-case scenario and it is unlikely that all of these projects would be developed. Nonetheless, multiple projects would result in the conversion of public recreation areas to industrial uses.

Development of highway access to the region has provided direct vehicular access to open desert scenery for residents throughout southern California. Highways improved the recreational experience for some users by making the area more accessible, but they have also detracted from the recreational experience of users who prefer solitude. Existing projects have removed large acreages of land from potential recreational use, resulting in a loss of area for recreational activities. These projects have also impacted user experiences from recreation areas, including specially designated areas, by adversely affecting the visual experience.

#### **4.12.3.1 Alternative 1: Proposed Action**

Existing projects and reasonably foreseeable future actions in the Newberry Springs/Ludlow area are represented in Figure A-21 and are listed in Tables 4-4 and 4-5 in Section 4.1. Combined with existing projects, reasonably foreseeable future actions would continue to result in a loss of area for recreational activities, as large areas of open recreation space are converted to industrial uses. These projects would also potentially impact user experiences from recreation areas, including specially designated areas, by adversely affecting the visual experience and by increasing recreation use in other areas as activities relocate from the project site. In addition, the attraction of hiking, camping, and other outdoor activities is likely to decrease due to the increased human activity in the region, and the consequent impact of development on user's visual experiences. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the Proposed Action would contribute incrementally to an adverse impact on recreation resources.

#### **4.12.3.2 Alternative 1a: Agency Preferred Alternative**

The cumulative impacts of the Agency Preferred Alternative on recreation would be the same as those for the Proposed Action.

#### **4.12.3.3 Alternative 2: Reduced Acreage Alternative**

The cumulative impacts of the Reduced Acreage Alternative on recreation would be the same those as for the Proposed Action.

#### **4.12.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The cumulative impacts of the Avoidance of Donated and Acquired Lands Alternative on recreation would be the same as those for the Proposed Action.

#### **4.12.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there would be no direct or indirect impacts on recreation under the No Action Alternative, there would be no cumulative impacts.

#### **4.12.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there would be no direct or indirect impacts on recreation under Alternative 5, there would be no cumulative impacts.

#### **4.12.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Because there would be no direct or indirect impacts on recreation under Alternative 6, there would be no cumulative impacts.

#### **4.12.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.12.4 Mitigation, Project Design Features, BMPs, and Other Measures**

The following mitigation measures are recommended for the Project. No mitigation measures were proposed in the SA/DEIS for the area of Recreation, except with regard to the off-site upgrades to SCE facilities.

Mitigation measures for the Proposed Action and action alternatives would include the following:

- Maintain connectivity of routes by authorizing perimeter routes around the project. (see Section 4.15 Traffic and Transportation)

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

### **4.13 Socioeconomics and Environmental Justice**

The socioeconomics impact analysis evaluates the project-induced changes on population, housing, community services and/or infrastructure, and related community issues such as environmental justice. This section also discusses the estimated economic impacts of the construction and operation of the Calico Solar Project.

#### **4.13.1 Methodology**

To determine what impacts the proposed project would have, the analysis examined whether the current status of community services and capacities can absorb the project-related impacts. A project's property taxes, sales tax, local school impact fees, or development fees can help local governments augment public services required to meet project needs. If the proposed project's impacts could appreciably strain or degrade these services, the analysis considers this to be an adverse impact and mitigation may be proposed.

In this analysis, fixed percentage criteria were used for evaluating demography for environmental justice. Substantial employment of people coming from regions outside the study area has the potential to create socioeconomic impacts. Impacts on housing, schools, community services, and cumulative impacts are based on professional judgments or input from local and state agencies.

In considering environmental justice in energy siting cases, a demographic screening analysis can be used to determine whether a low-income and/or minority population exists within the

potentially affected area of the proposed site. The potentially affected area consists of a 6-mile radius of the site and is consistent with air quality modeling of the range of a project's air quality impacts. The demographic screening is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (CEQ 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (EPA 1998). The screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations.

### **4.13.2 Direct and Indirect Impacts**

This section contains an analysis of the potential socioeconomic and environmental justice impacts associated with the Proposed Action and alternatives. The impacts analysis focuses on how the Proposed Action or alternatives will affect the population and employment, demographics, housing supply, and community services in the project vicinity.

The analysis also looks at noteworthy potential benefits of the Proposed Action and alternatives, such as the purchases and payroll of the project and employees, and increased tax revenues. For example, the dollars spent on or resulting from the construction and operation of the Calico Solar Project would have a ripple effect on the local economy. The proposed project would employ workers and purchase supplies and services for the life of the project. Employees would use salaries and wages to purchase goods and services from other businesses. Those businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local and regional economy. This effect of direct (employees' spending for local goods and services) and indirect (additional jobs, sales, and income generated) spending continues with subsequent rounds of additional spending, which is gradually diminished through savings, taxes, and expenditures made outside the area.

For purposes of this analysis, direct impacts were said to occur if the project resulted in permanent jobs and wages; expenditures due to project construction; or the spending of wages and salaries on food, housing, and other consumer goods. Indirect impacts were said to occur if the direct impacts lead to additional jobs, wages, and spending on food, housing, and other consumer goods occur.

#### **4.13.2.1 Alternative 1: Proposed Action**

##### **Population and Employment**

Population and employment impacts would occur if the Proposed Action induces substantial population growth. Induced growth is defined as workers permanently moving into the project

site because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure.

Monthly construction employment would range from 101 during month one to a maximum of 731 workers in month seven of the proposed schedule, with a total of 52 construction months (numbers based on revised Applicant information and may differ slightly from what was presented in SA/DEIS).

It is anticipated that the majority of the construction workforce already resides within San Bernardino and Riverside counties. After construction, the Calico Solar Project would employ approximately 136 full-time employees, and most would likely reside within a one-hour commute of the proposed project site (SES 2008). The Applicant expects approximately 20 operational workers to be recruited from outside the immediate project area. Construction and operation of the Proposed Action would have little impact with respect to inducing substantial population growth. According to Employment Development Department Labor Market Information; Occupational Employment Projections 2006–2016, the total labor by skill in the Riverside-San Bernardino-Ontario and Los Angeles County metropolitan statistical area is more than adequate to provide construction and operations labor for the Proposed Action. No substantial growth-inducing impacts would occur as a result of the Proposed Action.

Some beneficial short- and long-term impacts from construction and operation of the Proposed Action would occur as a result of the influx of construction and operations workers for the project. Workers would likely spend money in the local area for food, housing, and entertainment. Additionally, the Calico Solar Project would pay local, state, and federal taxes. However, given the number of employees expected for the project, these impacts would be negligible in comparison with the existing populations of the nearby communities.

Estimated gross public benefits from the Calico Solar Project include increases in sales, employment, and income in San Bernardino County and the surrounding region during construction and operation. There would be an average of approximately 400 direct project-related construction jobs over the course of 52 months of construction. During operations the workforce is estimated to be 136 jobs. The Calico Solar Project would have an estimated total capital cost of \$1 billion and a construction payroll of \$159 million annually (SES 2008). Total sales and use taxes during construction are estimated to be approximately \$700,000; during operation, the local sales tax is estimated to be \$650,000 annually. An estimated \$9.1 million would be spent locally for materials and equipment during construction, and an additional \$8.4 million would be spent annually for the local operation and maintenance budget of the Calico Solar Project.

## **Environmental Justice**

The minority and below-poverty-level populations were identified based on Year 2000 U.S. Census block group data within a 6-mile radius of the project site. The total population within the 6-mile radius of the proposed site is 1,043 persons, and the total minority population is 20 persons, or about two percent of the total population (BLM and CEC 2010). The below-poverty-level population within a 6-mile radius of the Calico Solar Project consists of 191 people or about 18 percent of the total population in that area.

The construction and operation of the Proposed Action would not result in any disproportionate socioeconomic impacts on low-income or minority populations. Gross public benefits from the Calico Solar Project include capital costs, construction and operation payroll, and sales tax from construction and operation spending.

## **Housing Supply**

Impacts on housing supply would occur if the Proposed Action creates a higher demand for housing than what is available in the project area or vicinity, or if the Proposed Action displaces existing housing within the project area or vicinity. No new housing construction would be required. Housing in San Bernardino County was at an 11.6 percent vacancy rate according to census data. Barstow, the closest city to the project site, is located approximately 37 miles to the west and its vacancy rate in 2008 was 17.1 percent. The vacancy rates of the other nearby communities including Adelanto, Apple Valley, Hesperia and Victorville were 15.1, 8.4, 6.5, and 7.7 percent, respectively (SES 2008). Given the labor forces in San Bernardino County and surrounding counties within commuting distance of the project, few employees are expected to relocate to the immediate project vicinity. Existing housing is available should any employee choose to relocate to the project vicinity. Since the proposed project would occur on BLM land, the Proposed Action would not displace any people or necessitate construction of replacement housing elsewhere; therefore, construction and operation of the Calico Solar Project would not adversely impact existing housing supply.

Because of the large labor force within commuting distance of the project, it is expected that the majority of construction and operations workers would commute to the project daily from their existing residences, and those that might in-migrate with their families could settle in the Barstow area with no expected adverse impacts on the local infrastructure or community services.

## **Social and Public Services**

### ***Education***

Because the construction labor force is expected to commute daily from the region, enrollment in local school districts is not anticipated to increase. Few workers are anticipated to permanently relocate to the project area. The potential relocation of these workers would have negligible effects on schools from the construction of the Proposed Action. However, in the unlikely scenario in which all operation workers are newly relocated to the school districts serving the project vicinity, potential new students would not exceed the capacity of existing school resources. The project is not expected to require the construction of new or physically altered school facilities. Therefore, construction and operation of the Proposed Action would have negligible impacts on school facilities.

### **CDCA Plan Amendment**

There are no multiple-use guidelines or elements from the CDCA Plan that pertain to socioeconomic resources.

#### **4.13.2.2 Alternative 1a: Agency Preferred Alternative**

The Agency Preferred Alternative would have the same construction and operations workforce and therefore the socioeconomic impacts and environmental justice considerations would be similar to the Proposed Action.

### **CDCA Plan Amendment**

There are no multiple-use guidelines or elements from the CDCA Plan that pertain to socioeconomic resources.

#### **4.13.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would require the same number of construction workers as the Proposed Action, but for a shorter time period. The Reduced Acreage Alternative would employ approximately 50 operational workers. This alternative would create a smaller fiscal impact than the Proposed Action, with less need of workers, housing, and schools. In addition, the alternative would have a smaller impact than the Proposed Action due to reduced project cost, payroll, and purchase of local construction materials/supplies.

Beneficial short- and long-term impacts from construction and operation of the Calico Solar Project to the local economy would be reduced because of the smaller project size, which would have less construction time, and result in less money spent for food, lodging, and services within the project vicinity. Similar to the Proposed Action, the Reduced Acreage Alternative is expected to have negligible environmental justice impacts.

### **CDCA Plan Amendment**

There are no multiple-use guidelines or elements from the CDCA Plan that pertain to socioeconomic resources.

#### **4.13.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative would have the same construction and operations workforce and therefore the socioeconomic impacts and environmental justice considerations would be similar to the Proposed Action.

### **CDCA Plan Amendment**

There are no multiple-use guidelines or elements from the CDCA Plan that pertain to socioeconomic resources.

#### **4.13.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there would be no amendment to the CDCA Plan and no solar project approved for the project site under the No Action Alternative, it is expected that the site would remain in its existing condition with no new structures or facilities constructed or operated. As a result, no impacts related to socioeconomics or environmental justice would occur. However, the land on which the Calico Solar Project is proposed would become available for other uses that are consistent with BLM's land use plan. The No Action Alternative is expected to have negligible environmental justice impacts.

### **CDCA Plan Amendment**

Under the No Action Alternative there would be no impacts.

#### **4.13.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

There would be no direct or indirect socioeconomic or environmental justice impacts from Alternative 5.

##### **CDCA Plan Amendment**

Under Alternative 5, the proposed CDCA Plan amendment to allow future solar development on the 8,230-acre project site could potentially result in the future construction and operation of a solar energy project that could have socioeconomic impacts. Different solar technologies require varying numbers of personnel for construction and operation; however, all solar technologies in this area would require such personnel. As such, Alternative 5 could potentially result in socioeconomic impacts similar to the Proposed Action. No disproportionate impacts on minority or below-poverty-level populations would be anticipated unless the demographic composition of the area were to change. There are no multiple-use guidelines or elements from the CDCA Plan pertaining to socioeconomic resources that would be affected.

#### **4.13.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

There would be no direct or indirect socioeconomic or environmental justice impacts from Alternative 6.

##### **CDCA Plan Amendment**

Under Alternative 6, the BLM would continue to manage the site in a manner consistent with the existing land use designation in the CDCA Plan but future solar development would be prohibited on the 8,230-acre project site. Because no solar energy facilities would be allowed to be constructed on the project site, the local area would not receive the fiscal benefits from construction and operation of a solar facility, and the associated expenditures, wages, and tax revenue. Disproportionate impacts on minority or below-poverty-level populations are not anticipated. There are no multiple-use guidelines or elements from the CDCA Plan pertain to socioeconomic resources that could be affected.

#### **4.13.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative

#### **4.13.3 Cumulative Impacts**

The geographic area of influence for socioeconomic and environmental justice is the CDCA Planning Area (Figure A-19); Tables 4-2, 4-3, 4-4 and 4-5 provide a list of the projects that were considered in this analysis.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally. An increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, and community services. Additional projects in the same area could also lead to economic benefits from the projects' investment and payroll.

##### **4.13.3.1 Alternative 1: Proposed Action**

The total construction labor force by metropolitan statistical area for the region is more than sufficient to accommodate the labor needs for construction of power generation facilities and other large industrial projects. Because of the availability of local and regional construction labor force, an influx of non-local workers and their dependents to the project vicinity is not expected. No substantial impacts on housing, schools, community services, or environmental justice are anticipated. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the Proposed Action would contribute incrementally to a beneficial impact on socioeconomics and environmental justice.

##### **4.13.3.2 Alternative 1a: Agency Preferred Alternative**

Cumulative impacts for this alternative would be the same as those identified under the Proposed Action.

##### **4.13.3.3 Alternative 2: Reduced Acreage Alternative**

Cumulative impacts for this alternative would be the same as those identified under the Proposed Action.

#### **4.13.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

Cumulative impacts for this alternative would be the same as those identified under the Proposed Action.

#### **4.13.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there are no direct or indirect impacts under the No Action Alternative, there are no cumulative impacts.

#### **4.13.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts under this LUP amendment alternative, there are no cumulative impacts.

#### **4.13.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect impacts under this LUP amendment alternative, there are no cumulative impacts.

#### **4.13.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.13.4 Mitigation, Project Design Features, BMPs, and Other Measures**

The Proposed Action or alternatives do not require any socioeconomic mitigation measures.

## 4.14 Special Designations

The Special Designations section has been developed from Section C.8, Land Use, Recreation and Wilderness, of the Draft SA/DEIS to address the potential impacts on BLM lands with land use designations that require specific management to protect resources.

### 4.14.1 Methodology

Impacts of the proposed project on WAs, WSAs, ACECs and DWMA were determined using the following criteria:

- Directly or indirectly disrupt activities, or otherwise affect the wilderness characteristics in established federal WAs or WSAs.
- Affect the scenic, biological, cultural, geologic, or other important factors that contribute to the value of WAs, WSAs, ACECs or DWMA.
- Lead to future degradation of the existing visual character or quality of the surrounding area.

Impacts of the proposed project on donated or acquired lands were determined based on consistency with the BLM policy for land use authorizations on such lands and potential impacts on the resources for which the land was acquired or accepted for donation.

### 4.14.2 Direct and Indirect Impacts

None of the action alternatives would have any portion of the project within the boundaries of a WA or WSA. There would be no direct impacts on these special-designation areas; therefore, further analysis of direct impacts is not addressed for each alternative.

The CDCA Plan amendment associated with the proposed project would not affect the wilderness characteristic values of WAs or the WSAs since the proposed project site is not located within those areas.

#### 4.14.2.1 Alternative 1: Proposed Action

##### The FLPMA WSA

Several detention basins would be constructed along the north boundary of the Proposed Action project site and within the former FLPMA WSA. These would be on the bajada between the rock

isolates and comprise approximately 50 percent or 125 acres of the Public Lands with wilderness characteristics. This construction would be very apparent and would obliterate the wilderness characteristic of naturalness on that acreage. After the project is decommissioned, reclamation of those drainage basins followed by flooding of indeterminate frequency would ameliorate those imprints of man. The vegetative community would restore to a density comparable to adjacent areas in an uncertain, but estimated to be several decades, time thereafter.

### **Cady Mountains WSA**

The Proposed Action would indirectly impact the wilderness values of the Cady Mountains WSA by changing the natural and undisturbed landscape near the WSA. In the short term, the sights, noise, dust and traffic associated with construction of the facilities would have an adverse impact on the qualities of naturalness and solitude in the southwest portion of the WSA. Though I-40, the railroad line, and transmission lines are visible from areas in the southern part of the WSA, the change in the landscape setting from mostly natural open space to developed industrial use would diminish the sense of naturalness in the landscape and reduce opportunities for solitude in this portion of the WSA. The short-term impacts would diminish the quality of the primitive and unconfined recreation experience in the areas of the WSA from which the project is visible.

In the long term, the project would have an adverse impact on wilderness characteristics only in the areas of the WSA from which the project is visible. The impacts on the visual setting would affect a small portion of the WSA and not result in long-term adverse effects when considering the size and extent of the entire WSA. Wilderness characteristics would be retained and the WSA's suitability as a Wilderness Area would not be diminished. Recreation activities could still occur in an unconfined manner, but the sense of primitive setting would be reduced. The proximity of the project to a portion of the WSA could lead to reduced use of the WSA by outdoor enthusiasts seeking solitude and a primitive experience.

The control area that has been identified for tortoise monitoring as part of the desert tortoise translocation activities extends into the western portion of the Cady Mountains WSA. No desert tortoises would be relocated to the control area; the tortoise monitoring would entail finding tortoises that currently occur within the control area, attaching radio transmitters to them, and tracking them over a period of time. Tortoise monitoring in the control area would be accomplished using open routes and on foot; therefore, there would be no impact to the WSA associated with the desert tortoise translocation activities.

## **Rodman Mountains WA**

Impacts on the Rodman Mountains WA from the proposed project would be similar to those for the Cady Mountains WSA except that they would be reduced because of the increased distance from the project site. I-40 is also located between the WA and project site, further reducing the existing sense of naturalness of the visual setting north of the WA. There would be short-term impacts on naturalness and solitude from construction activities but the activities would be less noticeable than from the Cady Mountains WSA. In the long term, there would be no impacts on opportunities for solitude and primitive and unconfined recreation because the visual setting for activities in most of the WA would not be substantially different from existing conditions. There could be increased use of the Rodman Mountains WA for wilderness related recreation because of the relocation of activities from the Cady Mountains WSA. Potential increase in use should be negligible and not impact the opportunities for solitude or otherwise increase visitor contacts for those seeking a primitive recreation experience.

## **Newberry Mountains WA**

The Proposed Action may be visible from the eastern area of the Newberry Mountains WA but the site would be approximately 12 miles from the WA boundary. Details of the project improvements would not be discernable from this distance and would appear the project would appear to be a narrow band of light color in the existing landscape. The Proposed Action would have negligible impacts on opportunities for solitude and primitive and unconfined recreation because the visual setting for activities in most of the WA would not be substantially different from existing conditions. Similar to the Rodman Mountains WA, the potential increase in use within the Newberry Mountains WA would be negligible and would not impact the opportunities for solitude or otherwise increase visitor contacts for those seeking a primitive recreation experience.

The Proposed Action would not be visible from the Kelso Dunes WA or Bristol Mountains WA. There would be no short- or long-term indirect impacts on the wilderness characteristic of naturalness. Both of these WAs could also have a slight increase in visitor use because of impacts on the Cady Mountains WSA. Similar to the Rodman Mountains WA, the potential increase in use would be negligible and not impact the opportunities for solitude or otherwise increase visitor contacts for those seeking a primitive recreation experience.

## **Pisgah Crater ACEC**

The Proposed Action could have short- and long-term indirect impacts on the Pisgah Crater ACEC because of the closure of existing OHV routes on the project site. Recreation activities could relocate from the project site to the ACEC because of the reduced access to open space resulting in adverse impacts on the resources for which the ACECs were designated. There would be negligible, adverse impacts on the southern area of the Pisgah Crater ACEC because

this area is located on the opposite side of I-40 from the project. In the northern portion of the Pisgah Crater ACEC, adjacent to the site, moderate impacts would occur because of the current connectivity of OHV routes through the ACEC and through the project site.

Additionally, increased activities could lead to direct and indirect impacts on the wildlife populations and their habitats for which the ACEC was designated. If desert tortoises are relocated into this ACEC direct impacts could result. Introduction of diseases from relocated tortoises and potential density increases that lead to over-population could adversely impact the existing tortoise population and habitat; however, the desert tortoise translocation plan will include protocols that would prevent the translocation of diseased animals and would limit translocation densities to levels which would not exceed the habitat carrying capacity. Based on the geomorphic study prepared for the project there would be potential changes in the local sand transport process that creates habitat for sensitive wildlife within the ACEC. See Section 4.3, Biological Resources, in this document for information about potential impacts to wildlife species in the ACEC.

### **Ord-Rodman Cultural Area ACEC**

There would be no impacts on the Ord-Rodman Cultural Area ACEC because the ACEC is not visible from the project site and would have no impact on the recreation experience.

### **Ord-Rodman DWMA**

If desert tortoises are translocated into the Ord Rodman DWMA, direct and indirect, adverse impacts could result from the introduction of diseases and potential density increases that lead to over-population. This could adversely impact the existing tortoise population and habitat for which the DWMA was established; however, potential impacts have been considered in the development of a draft Desert Tortoise Translocation Plan and would be mitigated during the implementation of desert tortoise translocation activities under a final Desert Tortoise Translocation Plan that is approved by the BLM, CDFG, and USFWS. Refer to Section 4.3, Biological Resources, for more detailed analysis of the impacts on desert tortoise.

### **Superior-Cronese DWMA**

The Proposed Action would have no direct or indirect impact on the Superior-Cronese DWMA as it is not proposed for siting of translocated desert tortoises. Refer to Section 4.3, Biological Resources, for more detailed analysis of the impacts on desert tortoise.

## **Donated and Acquired Lands**

The Proposed Action would include site facilities and improvements on all donated and acquired land within the project boundary. Use of the parcels would have short and long-term adverse effects on resources for which the land was acquired or accepted by donation. Also see the donated and acquired lands discussion in Section 4.9 of this FEIS.

## **CDCA Plan Amendment**

The CDCA Plan amendment to allow the Proposed Action would not affect the wilderness characteristics of the existing WAs since the site is not located within the WAs. The plan amendment could result in diminished wilderness characteristics within a limited area of the Cady Mountains WSA where the Proposed Action would be visible, and reduce the sense of naturalness and opportunities for solitude. Because the impacts would occur over a limited area the wilderness characteristics of the overall Cady Mountains WSA would be retained.

The plan amendment could result in impacts from the translocation of desert tortoises to the Ord-Rodman DWMA and the Pisgah Crater ACEC. Refer to Section 4.3, Biological Resources, for more detailed analysis of the potential impacts associated with desert tortoise translocation activities.

### **4.14.2.2 Alternative 1a: Agency Preferred Alternative**

The footprint of the Agency Preferred Alternative avoids the approximately 250 acres with wilderness characteristics within the terminated FLPMA WSA. Therefore, the wilderness characteristic of naturalness would not be affected and the wilderness characteristics of the 250 acres would be retained.

The impacts of the Agency Preferred Alternative to the wilderness characteristics of the Cady Mountains WSA would be similar to those described for the Proposed Action. The project boundary would be located approximately one mile further from the WSA, but would still be a noticeable visual intrusion in the landscape. The use of 6,215 acres for project facilities would result in short-term adverse impacts on naturalness and opportunities for solitude because construction activities would be similar to the Proposed Action. There could also be long-term adverse impacts on the opportunities for primitive and unconfined recreation experience in the southwest area of the WSA where the project would be visible.

This Alternative would have impacts on the Rodman Mountains WA similar to those described for the Proposed Action. Though the project would cover a slightly smaller area, the short-term impacts from construction and the long-term impacts on naturalness and opportunities for solitude and primitive recreation experiences would be the same degree of magnitude as the Proposed Action.

The impacts on the Newberry Mountains WA, Kelso Dunes WA, Bristol Mountains WA, Superior-Cronese DWMA, and the Ord-Rodman Cultural Area ACEC would be the same as those described for the Proposed Action. The potential for impacts to the Ord-Rodman DWMA and Pisgah Crater ACEC pertaining to proposed desert tortoise translocation would be reduced because there would be fewer desert tortoises that would need to be relocated.

### **CDCA Plan Amendment**

The CDCA Plan amendment required for the Agency Preferred Alternative would not affect the wilderness characteristics of the existing Wilderness Areas since the revised site boundary is not located within the WAs. The plan amendment would result in similar impacts on the Cady Mountains WSA, though the project would be less of a visual impact because of the increased distance to the WSA. Because the impacts would occur over a limited area, the wilderness characteristics of the overall Cady Mountains WSA would be retained. The plan amendment would result in reduced potential for impacts on the Pisgah Crater ACEC and Ord Rodman DWMA from the proposed translocation of desert tortoises because fewer tortoises would be translocated than for the Proposed Action.

#### **4.14.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative avoids the approximately 250 acres with wilderness characteristics in the terminated FLPMA WSA, and there are no surface disturbing actions on those areas. Therefore, the wilderness characteristic of naturalness would not be affected and the wilderness characteristics of the 250 acres would be retained.

The Reduced Acreage Alternative would have similar impacts on the WAs, WSAs, and ACECs in the project vicinity as the Proposed Action, except they would be somewhat reduced in scope and intensity. Short-term adverse impacts on the Cady Mountains WSA would be minor because of the reduced extent of development area and shortened time frame for construction. There would be less disruption to the sense of naturalness and there would be less impact on opportunities for solitude and primitive recreation experiences as compared to the Proposed Action. There would still be long-term adverse impacts because even though natural open space would be retained between the proposed project and the WSA, the Reduced Acreage Alternative would be highly visible and result in a noticeable permanent change to the visual setting.

Potential impacts on the Rodman Mountains WA would be reduced in scope and intensity compared to the Proposed Action. Short- and long-term impacts on wilderness characteristics would be negligible. Potential increased use of the Rodman Mountains WA because of disruptions to the wilderness experience in the Cady Mountains WSA would have no impact in the Rodman Mountains WA.

The Reduced Acreage Alternative would have impacts on wilderness characteristics similar to those described in the Proposed Action in the Newberry Mountains WA, Kelso Dunes WA, and the Bristol Mountains WA.

The Reduced Acreage Alternative would result in no impacts on the Ord-Rodman Cultural Area ACEC. Under this alternative, some existing OHV routes could remain open and the reduced project area would allow more efficient connections of OHV routes around the project site. The Pisgah Crater ACEC could have a slight increase in recreation use because of closed routes but the increase would be minimal and there would be negligible adverse impacts on the ACEC's resources. This alternative would result in fewer desert tortoises being relocated to the Ord-Rodman DWMA and Pisgah Crater ACEC than there would be under the Proposed Action or Agency Preferred Alternative, so there would be reduced potential for impacts on the existing tortoise population and habitat, and reduced risk of introducing disease.

The Reduced Acreage Alternative would not incorporate any donated or LWCF-acquired lands into the project.

### **CDCA Plan Amendment**

The CDCA Plan amendment required for the Reduced Acreage Alternative would not affect the wilderness characteristics of the existing Wilderness Areas since the revised site boundary is not located within the WAs. The plan amendment would result in reduced impacts on the Cady Mountains WSA as compared to the Proposed Action and Agency Preferred Alternatives because of the increased distance to the WSA and the wilderness characteristics of WSA would be retained. The plan amendment would result in reduced potential for impacts on the Ord-Rodman DWMA and Pisgah Crater ACEC from translocation of desert tortoises because fewer tortoises would be translocated than for the Proposed Action and Agency Preferred Alternative.

#### **4.14.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The impacts of the Avoidance of Donated and Acquired Lands Alternative to the wilderness characteristics of the released FLPMA WSA and the current Cady Mountains WSA would be the same as those described for the Proposed Action. The project boundary would extend to similar limits near the WSA. The use of 7,050 acres for project facilities would result in short-term adverse impacts on naturalness and opportunities for solitude because construction activities would be similar to the Proposed Action. There would also be long-term adverse impacts on the opportunities for primitive and unconfined recreation experience in the southwest area of the WSA where the project would be visible.

This Alternative would have impacts on the Rodman Mountains WA similar to those described for the Proposed Action. Though the project would cover a slightly smaller area, the short-term impacts from construction and the long-term impacts on naturalness and opportunities for solitude and primitive recreation experiences would be the same degree of magnitude as the Proposed Action.

The impacts on the special designated areas would be similar to those described for the Proposed Action, except that donated and LWCF-acquired lands would be excluded from the project site and therefore experience negligible impacts.

### **CDCA Plan Amendment**

Impacts on wilderness characteristics from the CDCA Plan amendment required for the Avoidance of Donated and Acquired Lands Alternative would also not affect the wilderness characteristics of the existing Wilderness Areas since the revised site boundary is not located within the WAs. The plan amendment would result in similar impacts on the Cady Mountains WSA as the Proposed Action because the distance to the project boundary would be similar. Because the impacts would occur over a limited area the wilderness characteristics of the overall Cady Mountains WSA would be retained. The plan amendment would potentially result in impacts on the Pisgah Crater ACEC and Ord-Rodman DWMA from the proposed translocation of desert tortoises similar to the Proposed Action.

#### **4.14.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative, there would be no impacts on special-designation areas.

### **CDCA Plan Amendment**

The project site would continue to be managed under the current CDCA Plan as amended and as a result, no impacts on special-designation areas from construction or operation of the proposed Calico Solar Project would occur.

#### **4.14.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this LUP amendment alternative, a future project could be developed with a different solar technology, and it is anticipated that a future project would require some level of ground disturbing activity and similar scale of solar power generation facilities. This alternative could

result in impacts on WAs, WSAs, ACECs, and DWMAAs similar to those described for the action alternatives.

### **CDCA Plan Amendment**

The CDCA plan amendment would identify that the site could be used for other solar energy projects, making approval of future project more likely since they would be considered consistent with the land use plan. A future solar energy project could result in impacts on special-designation areas similar to those described for the action alternatives.

#### **4.14.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

In this LUP amendment alternative no solar energy project would be constructed on the project site and the BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended. There would be no impacts on WAs, WSAs, ACECs, or donated or acquired lands.

### **CDCA Plan Amendment**

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 and no corresponding land disturbance. However, the site could be developed with other projects.

#### **4.14.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

### **4.14.3 Cumulative Impacts**

The geographic area of influence for the analysis of cumulative impacts related to special-designation areas includes the local and regional wilderness areas within the desert region of San Bernardino County. This section examines the potential cumulative impacts of past, present and reasonably foreseeable actions.

#### **4.14.3.1 Alternative 1: Proposed Action**

The existing and reasonably foreseeable future projects in the Newberry Springs/Ludlow area are shown on Figure A-21 and are listed in Table 4-5 and Table 4-6 contained in the introduction to this chapter. The potential combined development of approximately 1 million acres of land would result in long-term adverse effects on special-designation areas. The land use conversion of these lands to industrial scale power facilities would preclude numerous existing land uses including open space and recreational activities. The reduced access to open space would limit recreation opportunities for those seeking activities such as OHV use, competitive events, mountain biking, and recreational shooting. As recreation users seek locations for their activities there could be increased use pressure on existing WAs, WSAs, and ACECs to serve as locations for these activities. Opportunities for solitude, access to primitive settings and other wilderness recreational resources in the Mojave Desert and southern California desert region could become limited.

The ACECs could be subject to increased recreational activities that could adversely impact the resources for which they were established. The Ord-Rodman DWMA and Pisgah Crater ACEC could be the location for additional desert tortoise translocation programs required by other projects. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the action alternatives would contribute incrementally to an adverse impact on special-designation areas by reducing scenic values of wilderness areas and increasing recreational pressure on these areas in the Mojave Desert and southern California desert region.

#### **4.14.3.2 Alternative 1a: Agency Preferred Alternative**

The Agency Preferred Alternative is similar in scale and area committed to industrial use as the Proposed Action and would contribute incrementally to adverse impacts on special-designation areas as identified for the Proposed Action.

#### **4.14.3.3 Alternative 2: Reduced Acreage Alternative**

When considered in context of the reasonably foreseeable projects, the Reduced Acreage Alternative would not be noticeably different than the Proposed Action and would contribute incrementally to adverse impacts on special-designation areas as that alternative.

#### **4.14.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative is similar in scale and area committed to industrial use as the Proposed Action and would contribute incrementally to adverse impacts on special-designation areas as identified for the Proposed Action.

#### **4.14.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative there would be no Calico Solar Project, nor other potential industrial scale solar power generation project. Therefore, this alternative would not contribute to cumulative impacts.

#### **4.14.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this alternative there would be no Calico Solar Project, but other potential industrial scale power generation projects could be identified as consistent with the amended land use plan. Conversion of the project site to other solar energy development would contribute incrementally to adverse impacts on special-designation areas as identified for the Proposed Action.

#### **4.14.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this alternative there would be no Calico Solar Project, and other potential industrial scale power generation projects would not be permitted on the project site. Therefore this alternative would not contribute to cumulative impacts.

#### **4.14.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

#### **4.14.4 Mitigation, Project Design Features, BMPs, and Other Measures**

Impacts on WAs and WSAs would primarily be caused by changes to the visual setting that would affect the opportunities for primitive recreation experiences. Mitigation measures to reduce impacts on visual resources identified in Section 4.16 could reduce impacts on the WAs and WSAs. However, because of the scale of the conversion of open space to industrial use by proposed project and alternatives the mitigation measures would have a negligible effect on reducing impacts on the WAs and WSAs.

Mitigation measures to retain connectivity of OHV routes in the project vicinity would reduce impacts on the Pisgah Crater ACEC from route closures and increased recreation use of the ACEC (see Section 4.15, Traffic and Transportation, in this document).

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

### **4.15 Traffic and Transportation**

The Traffic and Transportation analysis evaluates the impacts of construction, operation and decommissioning of the Calico Solar Project on transportation and roads on the project site, and on the surrounding transportation systems and roadways. This section was developed from Section C.11 Transportation and Traffic in the SA/DEIS.

#### **4.15.1 Methodology**

The assessment of impacts on traffic and transportation are based on effects on transportation in the project area and on performance standards and thresholds established by interested agencies. The SA/DEIS analysis finds that a project may have an adverse impact if it would:

- Cause a substantial increase in traffic in relation to the existing traffic load or capacity of the street system;
- Exceed an established level of service standard applicable for the designated roads or highways;
- Alter existing patterns of circulation or the movement of people or goods or both;
- Alter waterborne, rail, or air traffic;

- Increase traffic hazards to motor vehicles, bicyclists, or pedestrians;
- Result in inadequate emergency access or parking capacity or both; or
- Conflict with existing policies, plans, or programs.

#### **4.15.1.1 Level of Service**

Evaluation of project-related impacts on the local transportation system is based on level of service (LOS) determinations. Level of service is a generally accepted measure used by traffic engineers, planners, and decision-makers to describe and quantify the congestion level on a particular roadway or intersection in terms speed, travel time and delay.

The Highway Capacity Manual 2000, published by the Transportation Research Board, Committee on Highway Capacity and Quality of Service, includes six levels of service for roadways or intersections ranging from LOS A—the best operating conditions—to LOS F—the worst. The LOS descriptions are:

- *LOS A*: Free flow, with no restrictions on maneuvering or operating speeds. Minimal or no delay.
- *LOS B*: Stable flow, with some restrictions on maneuvering or operating speeds. Nominal delays.
- *LOS C*: Stable flow, with more restrictions on speed and maneuverability. Some delays.
- *LOS D*: Approaching unstable flow. Restricted speed and maneuverability. Delays encountered at intersections.
- *LOS E*: Unstable flow, with some stoppages. Constitutes the maximum roadway capacity by definition. Extensive delays at some locations.
- *LOS F*: Forced flow, with many stoppages. Low operating speeds, extensive queuing and very extensive delays.

San Bernardino County and the State of California use the LOS criteria to assess the performance of its street and highway systems and the capacity of roadway segments. The County's and State's threshold standards policy require that LOS C or better be maintained on roadway segments under their jurisdiction.

The operations of intersections were evaluated using methodology contained in the Highway Capacity Manual (Transportation Research Board 2000). This methodology is used to assess delays at an un-signalized intersection for movements operating under traffic control—a stop sign, for example. For an intersection at which the only stop-sign is placed at a side street, delay will be reported for movements controlled by the stop sign. The delay is then assigned a corresponding letter grade to represent the overall condition of the intersection or level of service. These grades range from LOS A, free-flow, to LOS F, poor progression.

The level-of-service standards for roads in the vicinity of the Calico Solar Project as required by San Bernardino County and the State of California are as follows:

- LOS C or better on roads and conventional highways located in San Bernardino County's Desert Region, the location of the Calico Solar Project.
- LOS C or better on I-40, the primary access road to the project site.

An adverse impact would exist if the Calico Solar Project were to cause highway or intersection traffic to exceed the accepted LOS standards on a state, county, or federal roadway.

#### **4.15.2 Direct and Indirect Impacts**

##### **4.15.2.1 Alternative 1: Proposed Action**

The direct and indirect impacts of the proposed Calico Solar Project on transportation systems in the project area are examined in this section. The assessment of transportation-related impacts is based on evaluations and technical analyses designed to compare the pre-project conditions to the post-project conditions.

The following locations on the surrounding roadway network were reviewed (Figure A-12):

- I-40, west of Hector Road intersection
- I-40 west-bound ramp at Hector Road intersection
- I-40, east of Hector Road intersection
- I-40 east-bound ramp, at Hector Road intersection
- Hector Road, north of I-40, westbound ramps, east of project site
- Hector Road, south of I-40, eastbound ramps, Mesa Drive

- National Trails Highway (U.S. Route 66), west of Hector Road intersection
- National Trails Highway, east of Hector Road intersection
- Hector Road and National Trails Highway intersection

In addition, the BLM Routes that traverse the project site: AF045, AF050, AF052, AF053, AF058, AF132, AF133 were also reviewed (Figure A-13).

The direct and indirect impacts of the proposed project have been evaluated for the project construction phase and for the period of operation of the project. The largest impacts on I-40 traffic would occur during construction. Consequently, the construction impacts have been examined in detail and mitigation proposed when necessary.

### **Construction Impacts**

Anticipated traffic impacts associated with the construction of the Proposed Action were evaluated for both construction workforce traffic and construction truck traffic.

### **Construction Workforce**

The construction work force would peak at approximately 730 workers per day in month seven (2011), and will average approximately 400 workers per day over the course of construction. To evaluate the worst-case scenario, the traffic analysis assumed no workers would carpool, and all workers would arrive during the morning peak period (7:00 a.m. to 9:00 a.m.) and depart during the evening peak period (4:00 p.m. to 6:00 p.m.) (Tessera Solar 2010).

During peak construction, the daily round trips for workers would total 1,460 trips, 730 inbound in morning and 730 outbound in evening. Employees may be moved to and from the site from surrounding areas, and/or the laydown parking areas, in shuttles or other mass conveyance vehicles or both.

The construction workforce, would be drawn from the surrounding local and regional area including San Bernardino County and Riverside County, and would commute to the site. Approximately 20 percent of the workers are expected to travel from residences to the east of the project site; approximately 80 percent from the west. The following roads and intersections would be used to travel to and from the project site (Figure A-12).

- I-40, west of Hector Road intersection
- I-40, east of Hector Road intersection
- Hector Road, north of I-40

- Hector Road, south of I-40
- National Trails Highway (U.S. Route 66), west of Hector Road
- National Trails Highway (U.S. Route 66), east of Hector Road

The Hector Road intersection off I-40 would be controlled by a stop sign and has the potential to result in morning congestion on I-40 near the intersection as workers stack vehicles in the right lane to exit to the project site. With proposed mitigation, however, all roads and intersections in the project area are projected to operate at LOS C or better during peak-hour construction.

Before project construction, I-40 east and west, Hector Road, and National Trails Highway operate at acceptable levels of service ranging from LOS B for I-40 and LOS A for Hector Road and National Trails Highway. During project construction peak hours, the levels of service for roads and the intersection of I-40 via Hector Road would operate at LOS C or better with implementation of mitigation measures. With implementation of mitigation measures, Hector Road is projected to operate at LOS B or C.

All intersections used by construction traffic operate at LOS A before construction begins. During construction at peak hours, all intersections are projected to operate at acceptable levels of at least LOS C, including Hector Road, north of I-40 with implementation of mitigation (Table 4-38, Table 4-39, Table 4-40, and Table 4-41).

**Table 4-38 2011 Peak Hour Roadway Traffic Volumes Design Capacities, and Levels of Service Without Project**

Roadway Segment	Traffic Volumes	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
<b>2011 Existing Conditions without Calico</b>			<b>Morning Peak Hour</b>		<b>Evening Peak Hour</b>	
I-40, west of Hector Road	15,660	B	8.8	A	8.8	A
I-40, east of Hector Road	16,850	B	8.8	A	8.8	A
Hector Road, north of I-40	10/10	A/A	—	—	8.5	—
Hector Road, south of I-40	10/15	A/A	—	—	—	—
National Trails Highway, west of Hector Road	10/10	A/A	8.5	A	8.5	A
National Trails Highway, east of Hector Road	10/15	A/A	8.5	A	8.5	A

Roadway Segment	Traffic Volumes	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
BLM Access Road, north of I-40	Not available	Not available	—	—	—	—

*Table Source:* Adapted from BLM and CEC 2010.

*Table General Note:* If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

*Table Key:* I-40 = Interstate 40; BLM = Bureau of Land Management; LOS = Level of Service; sec/veh = seconds per vehicle.

**Table 4-39 Proposed Action 2011 Peak Hour Roadway Traffic Volumes Design Capacities, and Levels of Service With Project**

Roadway Segment	Traffic Volumes	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
<b>2011 Existing Conditions with Calico</b>			<b>Morning Peak Hour</b>		<b>Evening Peak Hour</b>	
I-40, west of Hector Road	17,000	B	15.5	C	13.1	B
I-40, east of Hector Road	17,250	B	16.5	C	11.0	B
Hector Road, north of I-40	705/775	B/C	—	—	—	—
Hector Road, south of I-40	10/15	A/A	—	—	—	—
National Trails Highway, west of Hector Road	10/10 [Table Note 2]	A/A	8.5	A	8.5	A
National Trails Highway, east of Hector Road	10/15	A/A	8.5	A	8.5	A
BLM Access Road, north of I-40	81/12	A/A	—	—	—	—

*Table Source:* Adapted from BLM and CEC 2010.

*Table General Note:* If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

*Table Key:* I-40 = Interstate 40; BLM = Bureau of Land Management; LOS = level of service; sec/veh = seconds per vehicle.

**Table 4-40 2011 Peak Hour Intersection Levels of Service Without Project**

Intersection	AM Average Delay (sec/veh)	LOS	PM Average Delay (sec/veh)	LOS
I-40, westbound ramp/Hector Road	8.8	A	8.8	A
I-40, eastbound ramp/Hector Road	8.8	A	8.8	A
Hector Road/National Trails Highway	—	—	8.5	—

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* I-40 = Interstate 40; LOS = Level of Service; sec/veh = seconds per vehicle.

**Table 4-41 2011 Peak Hour Intersection Levels of Service During Construction**

Intersection	AM Average Delay (sec/veh)	LOS	PM Average Delay (sec/veh)	LOS
I-40, westbound ramp/Hector Road	15.5	C	13.1	B
I-40, eastbound ramp/Hector Road	16.5	C	11.0	B
Hector Road/National Trails Highway	8.5	A	8.5	A

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* I-40 = Interstate 40; LOS = level of service; sec/veh = seconds per vehicle.

## Construction Truck Deliveries

During construction, the passenger car equivalent (PCE) of approximately 40 trucks are expected to arrive at and leave from the construction site each morning and evening, resulting in a total of 274 trips during the 58 month construction period. Most deliveries would occur between 7:00 a.m. and 5:00 p.m. on weekdays (Tessera Solar 2010).

Because delivery trucks would use the Hector Road intersection off I-40, which is controlled by a stop sign, mitigation measures are proposed to ensure that the arrival and departure time of delivery trucks does not occur during peak construction traffic periods.

## Emergency Services Vehicle Access

The Applicant is proposing to build a temporary access road to the project site. Mitigation measures would require the applicant to conform to California State Fire Marshal requirements for adequate access for emergency vehicles.

## Railroad Impacts

Until completion of the proposed bridge crossing the BNSF double tracks, all vehicles would cross the BNSF tracks at grade. Mitigation is proposed to address safety concerns associated with workers and other aspects of project construction.

## Operation Impacts

Operation of the proposed project would result in a smaller amount of vehicular traffic than during construction. The operational workforce is estimated to be 136 workers. The arrival and departure time of those workers would be staggered in three 8-hour shifts to cover operations on a 24 hour, 7-day-a-week basis (Tessera Solar 2010). Consequently, peak weekday traffic during shift changes would be less than 50 vehicles, even if every employee were to commute in his or her own vehicle. Delivery truck travel, as well as other nonemployee site visits, would be few and would typically occur during nonpeak shift change periods. Assuming the worst-case scenario for delivery truck traffic, an average of 12 daily round-trip truck trips would be expected. The impacts of the Calico Solar project on traffic and transportation on roads in the project vicinity would be mitigated to achieve the LOS standards of San Bernardino County and the State of California. The increase in operational traffic, based on worst-case scenarios, would be negligible and not contribute to any change in LOS on surrounding roads.

## Effects on BLM Routes

Approval of the Proposed Action would necessitate the closure of portions of a number of BLM routes in the project area that are currently open. The open routes within the project area that would have segments closed include AF045, AF052, AF053, AF058, AF298, AF132, AF133, and AF0450 (Table 4-42). The portions of the project area routes that would be closed are shown in Figure A-29.

**Table 4-42 Proposed Action: Existing and Proposed BLM Route Designations**

BLM Route ID	Length Inside Project Boundary (miles)	Existing CDCA Plan Route Designation	Authorized Officer Decision
AF045	3.23	Open	Closed
AF0450	2.65	Open	Closed
AF052	2.48	Open	Closed
AF053	2.64	Open	Closed
AF058	3.69	Open	Closed
AF132	0.58	Open	Closed
AF133	0.49	Open	Closed
AF298	4.94	Open	Closed

*Table Source:* Adapted from BLM and CEC 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

The BLM route closures in the project site would be a direct impact on recreational access to those route segments within the project site. Route closures would also cause a direct impact on access from the Hector Road interchange to the Cady Mountains and other destinations in

the vicinity of the project because travelers would be required to use alternate routes potentially resulting in longer travel time.

Routes AF045, AF050, and AF058 have been used to gain access to privately-owned lands outside the project area in Sections 8, 9, 13, 16 and 17, Township 8 North, Range 5 East. BLM routes AF132, AF133, and AF0450 have been used to gain access to privately owned properties outside the project area in Section 1, Township 8 North, Range 5 East and Section 36, Township 9 North, Range 5 East. Route closures resulting from approval of the Proposed Action would constitute a direct impact on the owners of private properties adjacent to the project area, and indirect impacts on the owners of private properties in the project vicinity.

A proposed project access road outside the project site perimeter fence would provide non-exclusive alternate access from AF 133, on the western boundary of the project site, to Sections 1 and 36 adjacent to the project site on the north, and on to AF051 on the eastern/southeastern boundary of the project site (Figure A-29). Mitigation for BLM route closures within the project site would be provided by authorizing the development of a non-exclusive use perimeter road outside the facility fence. The road would be located between the project site perimeter fence and a tortoise exclusion fence on the northern boundary of the project site.

Access to private properties in Sections 8, 9, 16 and 17 would remain from Hector Road and AF0410. A draft condition of certification under consideration by the CEC would require that the project site southern boundary fence be located no closer than 360 feet from the northern edge of I-40. An existing frontage road on the north side of I-40 would provide access to Section 13 from both the Pisgah Road interchange to the east, and the Hector Road interchange to the west.

There would be long-term adverse direct impacts on travel in the project vicinity because of BLM route closures. The closures would be for the life of the Calico Solar Project, but would be somewhat mitigated by the provision of alternate access routes to private properties and recreation and other destinations in the project vicinity.

### **CDCA Plan Amendment**

The Proposed Action is consistent with CDCA Plan guidelines and elements. Closure of open route segments and the development of the perimeter road would occur consistent with BLM IM 2008-014 (BLM 2007).

### 4.15.2.2 Alternative 1a: Agency Preferred Alternative

#### Construction and Operation Impacts

Under the Agency Preferred Alternative, construction period traffic impacts would be substantially the same as for the Proposed Action, because the number of SunCatchers constructed and the construction workforce would be the same as the Proposed Action. Truck and emergency vehicle traffic would also be the same as for the Proposed Action.

Operation impacts under the Agency Preferred Alternative would be substantially the same as for the Proposed Action, because the workforce would be the same as for the Proposed Action. Likewise, truck and emergency vehicle traffic would be the same as for the Proposed Action.

#### Effects on BLM Routes

Under the Agency Preferred Alternative, segments of eight BLM routes currently designated as open would be closed to public access within the project boundaries (Table 4-43 and Figure 2-7). The process for closure would follow BLM IM 2008-014 (BLM 2007).

**Table 4-43 Agency Preferred Alternative: BLM Route Changes**

BLM Route ID	Length Inside Project Boundary (miles)	Existing CDCA Plan Route Designation	Authorized Officer Decision
AF045	2.53	Open	Closed
AF0450	2.21	Open	Closed
AF052	2.48	Open	Closed
AF053	1.57	Open	Closed
AF058	3.69	Open	Closed
AF132	0.52	Open	Closed
AF133	0.49	Open	Closed
AF298	4.94	Open	Closed

*Table Source:* Adapted from Tessera Solar 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

Under the Agency Preferred Alternative, the Applicant would construct a new route around the perimeter of the project site which would provide nonexclusive connecting access to BLM route segments that will remain open around the project site, as shown in Figure 2-7. The perimeter road would provide alternative access to private property in the project vicinity and to other destinations.

## CDCA Plan Amendment

The Agency Preferred Alternative is consistent with CDCA Plan guidelines and elements. Closure of open route segments and the development of the perimeter road would occur consistent with BLM IM 2008-014 (BLM 2007).

### 4.15.2.3 Alternative 2: Reduced Acreage Alternative

#### Construction and Operation Impacts

The construction workforce for the Reduced Acreage Alternative would be the same as for the Proposed Action, and construction period impacts, including truck and emergency vehicle traffic would be the same as for the Proposed Action.

The implementation of the Reduce Acreage Alternative would reduce the number of workers needed for operation of the Calico Solar Project, and would therefore reduce the number of daily vehicle and truck trips. The overall traffic and transportation impacts, however, would be similar to the Proposed Action. Mitigation would still be required to keep the LOS at acceptable levels.

#### Effects On BLM Routes

The Reduced Acreage Alternative would not result in closure of BLM routes AF053, AF045, AF050, and would result in the closure of shorter segments of routes AF052, AF058, AF132, AF133, and AF298 as shown in Table 4-44. The proposed perimeter access road connections from AF133 to AF132, AF052 and AF051 would also be shorter (Figure A-30). The overall impacts of Alternative 2 on BLM routes would be fewer than the Proposed Action, but would remain adverse based on the life of the project.

**Table 4-44 Reduced Acreage Alternative: BLM Route Changes**

BLM Route ID	Length Inside Project Boundary (miles)	Existing CDCA Plan Route Designation	Authorized Officer Decision
AF052	0.90	Open	Closed
AF058	3.11	Open	Closed
AF132	0.57	Open	Closed
AF133	0.49	Open	Closed
AF298	3.76	Open	Closed

*Table Source:* Adapted from Tessera Solar 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

## CDCA Plan Amendment

The Reduced Acreage Alternative is consistent with CDCA Plan guidelines and elements. Closure of open route segments and the development of the perimeter road would occur consistent with BLM IM 2008-014 (BLM 2007).

### 4.15.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative

#### Construction and Operation Impacts

The impacts of the Avoidance of Donated and Acquired Lands Alternative on construction and operation traffic and transportation in the vicinity of the project site would be substantially the same as the Proposed Action.

#### Effects on BLM Routes

Approval of the Avoidance of Donated and Acquired Lands Alternative would result in the closure of BLM routes in the project site as shown in Figure A-31 and Table 4-45. The perimeter road would be available for non-exclusive use to mitigate the closure of BLM routes on the project site.

**Table 4-45 Avoidance of Donated and Acquired Lands Alternative: BLM Route Changes**

BLM Route ID	Length Inside Project Boundary (miles)	Existing CDCA Plan Route Designation	Authorized Officer Decision
AF045	3.23	Open	Closed
AF0450	2.65	Open	Closed
AF052	2.23	Open	Closed
AF053	2.00	Open	Closed
AF058	3.69	Open	Closed
AF132	0.58	Open	Closed
AF133	0.49	Open	Closed
AF298	4.94	Open	Closed

*Table Source:* Adapted from Tessera Solar 2010.

*Table Key:* BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ID = identification.

## **CDCA Plan Amendment**

The Avoidance of Donated and Acquired Lands Alternative is consistent with CDCA Plan guidelines and elements. Closure of open route segments and the development of the perimeter road would occur consistent with BLM IM 2008-014 (BLM 2007).

### **4.15.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under Alternative 4, no solar energy project would be constructed on the project site and the BLM would continue to manage the site consistent with the existing land use designations in the CDCA Plan. As a result, there would be no impacts on roads in the project vicinity or to BLM routes within the project site.

### **4.15.2.6 Alternative 5: LUP Plan Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under Alternative 5, the Calico Solar Project would not be constructed on the project site, and the BLM would continue to manage the site consistent with the existing land use designation in the CDCA Plan. However, because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. The decision itself would result in no impacts on traffic or BLM routes in the project area and vicinity, but would allow the possibility of a future project that could have similar impacts to the Proposed Action.

### **4.15.2.7 Alternative 6: LUP Plan Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under Alternative 6, no solar energy project would be constructed on the project site, and the BLM would continue to manage the site consistent with the existing land use designation in the CDCA Plan. No impacts on traffic, transportation or BLM routes in the project vicinity would occur.

### **4.15.2.8 Environmentally Preferred Alternative**

The BLM has determined that the Environmentally Preferred Alternative is the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

### 4.15.3 Cumulative Impacts

The geographic area of influence for the analysis of the cumulative traffic and transportation impacts associated with the Calico Solar Project includes San Bernardino County. Cumulative traffic and transportation impacts would potentially occur if more than one project in an area served by the same transportation system has an overlapping construction schedule, resulting in a traffic demand on highways that could result in a lower LOS. Lower levels of service would result in traffic delays, reduced traffic flows, and backup of traffic at signed intersections.

Potential cumulative impacts of the Calico Solar Project were analyzed in the context of other past, existing and reasonably foreseeable projects in the area served by I-40 and related road systems. In the general vicinity of the Calico Solar Project, the following projects exist, have been approved or are reasonably foreseeable:

- Proposed Abengoa Solar Project, 250 MW solar thermal
- Proposed SES Solar Three, 914 MW solar thermal
- Proposed SES Solar Six, 1,631 MW solar thermal
- Proposed Southern California Edison Pisgah Substation Expansion and Pisgah-Lugo Upgrade
- CACTUS, originally a solar plant, now converted into an observatory
- Two existing small mines within 14 miles of the project site

#### 4.15.3.1 Alternative 1: Proposed Action

Cumulative impacts on traffic and transportation could potentially occur within San Bernardino County if implementation of the Proposed Action combines with those of other local or regional projects. Cumulative impacts could also occur as a result of the development of some of the many proposed solar and wind development projects that have been or are expected to be under consideration by the BLM in the near future. Many of these projects are located within the CDCA.

Operational cumulative traffic and transportation impacts could occur if the operation of multiple projects served by the same transportation systems adds enough traffic to the highways in the area to result in reduced LOS on highways and at intersections. During operations, all of the projects listed above combined would generate a negligible amount of traffic compared to the LOS capacity of I-40.

Taken together, the cumulative traffic and transportation impacts of the Proposed Action and all past, present and reasonably foreseeable projects would result in negligible cumulative impacts because the number of workers needed for operations of all of these projects is modest compared to road capacities. Mitigation measures proposed for the construction phases of both the Abengoa Mojave (CEC) and the Calico Solar projects would result in acceptable LOS on roads and highways in the geographic area of cumulative impact.

#### **4.15.3.2 Alternative 1a: Agency Preferred Alternative**

The cumulative impacts of the Agency Preferred Alternative would be the same as for the Proposed Action.

#### **4.15.3.3 Alternative 2: Reduced Acreage Alternative**

The cumulative impacts of the Reduced Acreage Alternative would be the same as for the Proposed Action.

#### **4.15.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The cumulative impacts of the Avoidance of Donated and Acquired Lands Alternative would be the same as for the Proposed Action.

#### **4.15.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there are no direct or indirect under the No Action alternative, there would be no cumulative impacts.

#### **4.15.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect under Alternative 5, there would be no cumulative impacts.

#### **4.15.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

A Because there are no direct or indirect under Alternative 6, there would be no cumulative impacts.

#### **4.15.3.8 Environmentally Preferred Alternative**

The BLM has determined that the Environmentally Preferred Alternative is the Agency Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

#### **4.15.4 Mitigation, Project Design Features, BMPs, and Other Measures**

All of the action alternatives would include the following mitigation for traffic and transportation impacts:

- **Parking and Staging.** During construction of the Calico Solar Project and all related facilities, the project owner would develop and implement a parking and staging plan for all phases of project construction.
- **Temporary Access Road.** The temporary access road would be an all-weather road designed to allow for fire-truck and emergency vehicle access during all weather and soil conditions. The Applicant shall prepare a safety plan for ensuring that all state and federal safety requirements for railroad crossings are followed, including those required by the CPUC and the Federal Railroad Administration (FRA).
- **Alternate Access.** Project site perimeter roads would be developed and available for nonexclusive use by the Applicant and the public for access to not a part (NAP) and other lands in the project vicinity.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## **4.16 Visual Resources**

This section evaluates the potential environmental impacts of the proposed Calico Solar Project on visual resources. It was developed from Section C.13, Visual Resources, of the SA/DEIS.

### **4.16.1 Methodology**

Visual or scenic impacts are defined as the change in aesthetic value resulting from the introduction of modifications to the landscape. Because no visual resources inventory, VRM classes, or VRM class objectives exist for the Proposed Action site, the SA/DEIS evaluated potential impacts on visual resources according to standard criteria developed by the CEC.

In this assessment the methodology has been refined to identify potential changes in visual character and its constituent elements. Visual character is the overall impression created by individual elements and overall patterns. Visual elements are the attributes of objects such as form, line, color, and texture of the visible landscape. Visual patterns result from the presence/absence and arrangement of the individual elements within a landscape, and contrast is created by the introduction of features in the landscape that stand out from the existing visual elements and patterns. The existing landscape and potential impacts of the Proposed Action were evaluated in terms of the anticipated magnitude of change in landscape character, the visibility of the Proposed Action and the view of the Proposed Action from key locations.

#### **4.16.1.1 Magnitude of Change in Landscape Character**

The impact of the construction and maintenance of the Proposed Action on visual character is described in terms of the magnitude of change in the existing visual elements and patterns from the existing visual condition. Figure 1-2 depicts the layout of the Proposed Action. Site layout of the SunCatchers, the power plant, the proposed bridge over the railroad, the construction staging area, site grading, plant night lighting, glare impact and linear facilities are all components of the Proposed Action that could have visual impacts as discussed below in relation to the magnitude of change in landscape character.

An analysis of visual dominance, scale, continuity, and contrast is used in determining to what degree the Proposed Action would attract attention and to compare the relative change in character with the existing characteristic landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the Proposed Action. Consideration of the amount of visual contrast created is directly related to the amount of attention that is drawn to an element in the landscape. The magnitude of change in the visual character from existing conditions to post-Proposed Action conditions for this assessment is identified by the following definitions:

- *Very low*: Landscape character remains intact with no apparent change to the existing visual elements (line, form, color, and texture) or pattern character (dominance, scale, diversity, and continuity) in the landscape.
- *Low*: Magnitude of change from the existing landscape character is subtle, and the changes in visual elements or pattern character do not attract attention.
- *Moderate*: Magnitude of change from the existing landscape character is noticeable, and the changes in visual elements or pattern character attract attention.
- *High*: Magnitude of change from the existing landscape character is substantial, and the changes in visual pattern elements or pattern character begin to dominate the landscape.
- *Very high*: Magnitude of change from the existing landscape character is severe, and the changes in visual pattern elements or pattern character dominate the landscape.

In determining the magnitude of change, the landscape was also evaluated based on distance zones. Distance zones are based on the distance from where the visual element is located in reference to the viewpoint. For this analysis, distance zones refer to the distance from the key observation point (KOP), to the Proposed Action. The distance zones were classified as foreground (0 feet to 0.5 mile) and middle ground (0.5 to 5.0 miles). No background distance zone analysis, except for the general qualitative assessment, was done. Distance zones are an important factor to consider since people typically view landscape changes in the foreground more critically than changes in the middle ground because of the ability to perceive greater detail at a closer range to landscape features.

#### **4.16.1.2 Visibility Analysis**

The visibility of the proposed pipeline was also considered within the foreground and middle-ground distance zones. The slope of the surrounding terrain is important to the visibility of the proposed pipeline. An aspect of this desert valley setting that is important to the potential visual impact on the landscape is the potential for intrusions to be seen over great distances. The analysis area of this Proposed Action for visual resources includes lands where potential changes to the landscape from the Calico Solar Proposed Action may be discerned. Slightly elevated viewpoints exist, due to the large open areas of the gently sloping topography and absence of intervening landscape features and screening vegetation.

A viewshed analysis was conducted using GIS data to assess where the Calico Solar Proposed Action would be visible in the landscape (Figure A-33). The site is somewhat visually isolated from the Mojave Valley to the west by topography and distance and from the Broadwell Valley to the east by topography (SES 2008).

#### **4.16.1.3 Key Observation Points**

In the VRM process the BLM evaluates the impacts of proposed actions from critical viewpoints that are usually along commonly traveled routes or other locations from which a proposed action is likely to be viewed (BLM Manual 8431). For this Proposed Action the key observation points (KOPs) were selected in coordination with BLM and CEC to represent key sensitive viewer groups who would potentially be affected by the Proposed Action (Figure A-34). Proposed Action simulations were then imposed on these views to illustrate how the same view would appear with the Proposed Action in place. Two additional KOPs were identified as a result of public comments received during the SA/DEIS public comment period. An assessment of the potential impacts on the visual landscape from those viewpoints is included; however, photographs and simulations were not prepared.

##### **KOP 1: Route 66/I-40**

The KOP 1 is located on National Trails Highway which parallels I-40 slightly to the south in this segment. This portion of the highway is not designated as a scenic byway or any other officially designated status. It is maintained by the County and is a remnant of the original National Old Trails Road established in the early 20th century between Maryland and California. I-40 is an eligible state scenic highway but has not been officially designated. It receives relatively high levels of traffic (15,600 vehicles per day) (SES 2008). Views of the site from this KOP are unobstructed and the sloping topography is oriented to the highway, increasing its overall exposure. Views generally include I-40 and low-voltage utility lines in the immediate foreground, but these visual intrusions remain visually subordinate. The Cady Mountains dominate the background. The focus of many U.S. Route 66/Historic Trails Highway users would be on the historic nature of this roadway and the encompassing landscape through which earlier travelers would have traveled. In this context, the integrity of the view would be important.

##### **KOP 2: Cady Mountains WSA**

The KOP 2 is located within the Cady Mountains WSA approximately 1,500 feet north of the Proposed Action site boundary. This KOP location is somewhat elevated above the site. Open and unobstructed views are present within the WSA to background distances but visibility is intermittent. Views are often obstructed by intervening rock outcrops in the rough terrain, characterized by highly irregular rocky peaks and ridges separated by lower alluvial washes.

The immediate foreground is dominated by sparse vegetation, cobbles, and the smaller landforms on the lower slopes of the Cady Mountains. This location has views of level open desert terrain characterized by light tan colored soils and sparse scrub vegetation that occupy the middle ground. The BNSF Railroad, approximately 3 miles away, and I-40, approximately 5 miles away, create linear elements crossing the middle ground, but are visually subordinate in the landscape. Pisgah Crater and associated contrasting lava features are also visible in the middle ground. The ridges of the Rodman and Lava Bed Mountains are 12 to 14 miles away and dominate the background.

### **KOP 3: Eastside View**

The KOP 3 located east of the site represents the view from the nearest residence to the Proposed Action site. The Proposed Action's eastern boundary would be at the existing transmission line visible in the middle ground at a distance of approximately 1.5 mile. Views within this landscape are open and largely unobstructed. This KOP is at approximately the same elevation as much of the Proposed Action site. Views of level, open desert characterized by light tan colored soils and sparse scrub vegetation occupy the visual foreground and middle ground. The existing transmission line, electric substation, BNSF Railroad, and I-40 are located south and west of this point. These features are visible and remain visually subordinate, but they diminish the intactness of the existing landscape. Ridges of the westernmost Cady Mountains are visible at a distance of approximately 9 miles.

### **KOP 4: BNSF Railroad/I-40 West**

The KOP 4 is located along the BNSF rail line, looking northwest into the Proposed Action's eastern boundary at a distance of roughly 800 feet. This KOP was included because the Amtrak Southwest Chief route from Los Angeles to Chicago travels on the BNSF rail line through the middle of the Proposed Action site. The passenger train travels through the site only at night in both directions. KOP 4 also resembles viewing conditions of westbound I-40 motorists in close proximity to the Proposed Action boundaries. This viewpoint is also helpfully in understanding the potential effects of the Proposed Action for westbound motorists when seen at close distance.

### **KOP 5: I-40 East**

The KOP 5 is along eastbound I-40 and views from this location would be across the westbound lanes of the interstate. Viewer numbers on I-40 are relatively high (15,600 vehicles per day) (SES 2008). The foreground distance zone includes the median of the highway westbound lanes and the utility poles along the highway. The middle ground encompasses the relatively intact sloping bajadas descending from the Cady Mountains, characterized by light tan soils and sparse scrub vegetation. The BNSF railroad forms a relatively inconspicuous linear element in

the middle ground. Hills and ridges of the Cady and Bristol Mountains are vivid features in the middle ground with contrast between dark, rugged rock outcrops and ridges against lighter-colored strata and alluvial washes. The mountains enclose and dominate the view, enhancing the visual character for eastbound travelers.

### **KOP 6: Rodman Mountains Wilderness**

The KOP 6 is located in the northern area of the WA on a broad bajada or alluvial fan sloping to the north from the Rodman Mountains. The KOP is approximately 4 miles from the closest portion of the proposed project and approximately 9 miles from the central area of the main collector field. The foreground distance zone includes the undisturbed, rolling terrain of the bajada that is crossed by numerous small washes that drain from the mountains. Vegetation is mostly low, sparse creosote scrub with light tan soils. The middle-ground views include the continuing slope of the bajada. I-40 and the BNSF Railroad form linear features in the landscape, though they are not as conspicuous as from other KOPs. Other minor intrusions and disturbances such as roads and scattered development are visible to the north. The Cady Mountains and the bajada sloping away from the base of the mountain are prominent features in the background view to the northeast.

### **KOP 7: Rodman Mountains Wilderness**

The KOP 7 is approximately 3 miles south of KOP 6, within an area of mountainous terrain in the WA. The KOP is approximately 7 miles from the closest portion of the project and approximately 12 miles from the central area of the main collector field. Views are limited to the foreground in many directions because of the topography. Vegetation is low-stature creosote scrub and is sparser in some areas surrounding the KOP than on the bajada slope location of KOP 6 and is not a dominant feature. Distant views are intermittent and views to the north and northeast toward the project site are often obscured by landforms. I-40 and the BNSF railroad are not noticeable features from this distance.

## **4.16.2 Direct and Indirect Impacts**

### **4.16.2.1 Alternative 1: Proposed Action**

#### **Direct Impacts**

The overall magnitude of change from the Proposed Action would be very high, and would dominate the existing landscape. The features of the Proposed Action would introduce a vast quantity of circular and rectangular shapes and forms into the landscape, contrasting with the

lines, forms, colors and textures of the existing vegetation and landforms. The distinct lines created by the long rows of SunCatchers and by the regular edges of the developed site would also contrast with the characteristic landscape, lending a distinctly industrial character to the location. The reflective metallic surface of the SunCatchers would contrast with the landscape as well, particularly when reflecting a blue sky and/or white cloud formations. The field of collectors would at times resemble a vast lake surface when reflecting the sky and at other times would appear very bright. Poles for the electric collection system would be visible throughout the site and would introduce additional vertical and horizontal elements. The impacts from these features, however, would be dwarfed by the vast scale and dominance of the solar collector fields. The scale of the Proposed Action would very large, and would disrupt the continuity of the existing landscape.

Based on the visibility analysis, the Proposed Action would be visible from locations throughout this contained viewshed. Intermittent views of the site extend into the Cady Mountains, and in general the Proposed Action would be visible from various locations falling within a 5-mile radius, with the exception of mountainous areas to the north and east where terrain encloses views near the site boundary. Visibility within the Cady Mountains WSA is spotty and fragmented, and primarily limited to the southwest area of the WSA due to rough, irregular terrain.

### ***Visual Impacts from KOPs***

#### KOP 1: U.S. Route 66/I-40

Existing conditions from KOP 1 are shown in Figure 4-2. The simulation in Figure 4-3 depicts the view from this KOP looking northward from National Trails Highway, at a foreground distance of less than 1,000 feet to the site. The nearest solar collector units depicted in this simulation are located more than 1,700 feet away. From this KOP, the Proposed Action would create a very high degree of contrast within the foreground for those travelling on both National Trails Highway and I-40. The magnitude of change from this viewpoint would be severe, and would dominate the landscape.

The Proposed Action could become a strong nuisance or distraction from this location for some motorists but would not be a hazard to navigation. The long, linear, bright rows of SunCatchers, which are oriented perpendicular to the highway, would rapidly alternate with the darker-colored land between each row, introducing a large-scale flickering effect at the highway frontage that would compound the nuisance and distraction of glare for some viewers. From some viewpoints, the taller buildings of the Main Services Complex (up to 77 feet tall) could also be visible in the center of the site. These taller buildings would have contrasting lines and rectangular forms that could also attract attention, although at this distance they would not be dominant features.

The Proposed Action would create strong horizontal form and line, and would visually dominate the view from this KOP, occupying a vast expanse of the landscape along nearly 5 miles of highway frontage, not including the view when approaching the Proposed Action on the highway. As depicted in the simulation, the overall proportion of the view occupied by the Proposed Action would be extensive compared to the foreground terrain, background mountains, and sky, due to the sloping terrain and resulting site exposure.

The Proposed Action would not physically block scenic views of the Cady Mountains in the distance from viewpoints along the highway, but would dominate views toward the mountains.



**Figure 4-2 Existing View of Proposed Action Site from KOP 1, U.S. Route 66/I-40**



**Figure 4-3 Simulated View of Proposed Action Site from KOP 1, U.S. Route 66/I-40**

#### KOP 2: Cady Mountains WSA

Existing conditions from KOP 2 are displayed in Figure 4-4. The simulation in Figure 4-5 depicts the view from this KOP, from within the Cady Mountains WSA. The location is at an elevation of approximately 300 feet above the base of the nearest SunCatchers, and 500 feet above the BNSF rail line visible in the view. From this KOP, the Proposed Action would create a moderate to high degree of contrast. The magnitude of change from this viewpoint would be high and would attract attention. Direct impacts from this KOP would be similar to those discussed above for this Alternative, although the contrast in line and form would be more subdued, blending with the broad horizontal lines of the level terrain and existing linear features.

Due to the viewshed characteristics in the Cady Mountains, visual dominance would vary considerably, as a function of visual exposure due to terrain. The most exposed conditions, would be from the areas north of the Proposed Action, where viewers could overlook a panorama of up to 8 square miles of SunCatchers. That would be approximately four times the area depicted in the simulation, with the nearest of these seen at foreground distance zone. From such viewpoints, the dominance of the Proposed Action would be high, occupying the largest part of the overall view and overshadowing all other elements. In other cases, as in the simulated view, where a large portion of the Proposed Action is hidden by terrain, contrast and dominance would be moderate, and the Proposed Action would appear to be visually co-dominant with the background mountains. The Proposed Action would not block scenic views of the mountains in the background, but it would block view of the natural valley floor.

Overall change in visual character from KOP 2 and similar middle-ground viewpoints would range from moderate to high depending on location and distance. However, according to viewshed mapping, from the majority of locations at distances approaching 1 mile or more, visual exposure would decline due to intervening terrain, as would visual dominance and contrast due to distance.



**Figure 4-4 Existing View of Project Site from KOP 2, Cady Mountains WSA**



**Figure 4-5 Simulated View of Project Site from KOP 2, Cady Mountains WSA**

### KOP 3: Eastside View

Existing conditions from KOP 3 are displayed in Figure 4-6. The simulated view from this KOP as depicted in Figure 4-7 represents the view from the nearest residence to the Proposed Action site, approximately 2 miles to the east of the site. This viewpoint is the only residence within the viewshed of the Proposed Action and may therefore be unique, and not representative of a larger viewer group. From this KOP, the Proposed Action would create a high degree of contrast. The magnitude of change from this viewpoint would be high, and would begin to dominate the landscape.

At this distance the existing SCE 500-kV and 230-kV transmission line towers and poles are evident, though visually subordinate within the view. The line and towers do not intrude into the skyline due to the mountains in the background. The Proposed Action would begin just beyond the existing transmission line and extend away from the viewer. Numerous towers and poles required by the Proposed Action internal to the site would increase the degree of vertical form and line contrast with the horizontal landscape. Due to the relatively level grade/elevation relationship between the Proposed Action and viewpoint, and the associated oblique viewing angle, the Proposed Action would occupy a narrow portion of the overall field of view. The reduced dominance due to the oblique viewing angle is somewhat offset, however, by the vast horizontal extent of the Proposed Action at this distance. The Proposed Action would have high spatial dominance; and high contrast of because of anticipated mirror brightness under typical conditions. Although the Proposed Action would not obstruct background views, the extensive array of regularly spaced solar units along the Proposed Action boundary would dominate the middle ground.



**Figure 4-6 Existing View of Project Site from KOP 3, Eastside View**



**Figure 4-7 Simulated View of Project Site from KOP 3, Eastside View**

#### KOP 4: BNSF Railroad/I-40 West

Existing conditions from KOP 4 are displayed in Figure 4-8. The simulation from this KOP illustrates the effect of foreground views where grade relationships are relatively level (Figure 4-9). In such situations, the SunCatchers would likely block and enclose views. From this KOP, the Proposed Action would create a strong degree of contrast. The magnitude of change from this viewpoint would be very high, and the Proposed Action would dominate the landscape.

For most of the frontage of the Proposed Action, I-40 is elevated in relation to the adjoining ground. However, the elevation is not sufficient by itself to prevent the 38 foot-tall mirror units from blocking views and being highly dominant. Based on USGS topographic maps, however, elevations of the adjoining plain northward from the road edge tend to decrease along much of the highway frontage until the point of the BNSF rail line, which generally represents a low point.



**Figure 4-8 Existing View of Project Site from KOP 4, BNSF Railroad and I-40 West**



**Figure 4-9 Simulated View of Project Site from KOP 4, BNSF Railroad and I-40 West**

#### KOP 5: I-40 East

Existing conditions from KOP 5 are displayed in Figure 4-10. The simulated view from this KOP represents foreground to middle-ground views of the Proposed Action by motorists on I-40 eastbound (Figure 4-11). The simulation depicts the southeastern-most corner of Proposed

Action, covering an area of roughly two sections (2 square miles). At this distance, the contrast and dominance of the Proposed Action is substantially reduced when compared to KOP 1 and, especially, to KOP 4. Similarly, the spatial dominance of the Proposed Action appears much less than in KOP 1 because the area depicted is considerably smaller. From this KOP the Proposed Action could appear co-dominant with the surrounding landscape. However, the view in the KOP 5 simulation represents the greatest distance between the highway and the Proposed Action at any point in the 5 miles of frontage. Over 80 percent of the frontage on I-40 could be as little as a few yards from the highway right-of-way. Although spatial dominance of the Proposed Action in this image appears moderate, a turn to the left from this same location would depict a view of most of the 8 square miles of the Proposed Action as it extended to its highest elevations at the foot of the Cady Mountains. From this KOP, the Proposed Action would therefore create a substantial degree of contrast. The magnitude of change from this viewpoint would be high, and would begin to dominate the landscape. Direct impacts from this KOP would be similar to those discussed above for this Alternative, although construction lay-down areas would not be visible from this location.



**Figure 4-10 Existing View of Project Site from KOP 5, I-40 Eastbound**



**Figure 4-11 Simulated View of Project Site from KOP 5, I-40 Eastbound**

#### KOP 6: Rodman Mountains Wilderness

From this KOP, the Proposed Action would create a low to moderate degree of contrast and the magnitude of change from this viewpoint would be low. The Proposed Action would be a subtle change in the landscape and not be a dominant element. The Proposed Action would be visible but would not attract undue attention because of the scale of the landscape and surrounding mountains. At this distance the project features would not be discernable and under most conditions, the collector field would have a diffuse reflection that would appear similar to the a distant view of a lake surface. Wilderness users in this area of the Rodman Mountains Wilderness have views of some existing development and landscape disturbances. The visibility of the Proposed Action may slightly diminish the sense of solitude, but would not otherwise impact opportunities for primitive and unconfined recreation in the WA.

#### KOP 7: Rodman Mountains Wilderness

Views from this KOP would be even more distant than from KOP 6. The Proposed Action would create a very low degree of contrast and the magnitude of change from this viewpoint would be very low and there would be no apparent change in the landscape character. The intermittent views of the project site, because of the terrain, would further reduce the potential impacts of the Proposed Action. The Proposed Action could be visible in some directions from the vicinity of the KOP, but similar to KOP 6, would not attract undue attention because of the scale of the landscape and surrounding mountains. At this distance the project features would not be discernable and the collector field would have a diffuse reflection that would appear similar to

the distant view of a lake surface. The Proposed Action would not diminish opportunities for solitude, primitive recreation experiences or otherwise impact wilderness characteristics in this area of the WA.

### ***Glare and Nighttime Light Impacts***

Diffuse reflected light from the SunCatcher mirrors could potentially represent a substantial component of the overall appearance, visual contrast/change, and impact of the Proposed Action. Under most conditions, diffuse reflection would be seen by viewers and appear similar to the reflection of the sky on a lake surface, or at certain times, more intense shimmering glare from brighter diffuse reflection of the sun. Under certain circumstances, glare effects could be much more prominent, particularly in early morning hours as seen by westbound motorists; and in the late afternoon near sunset for eastbound motorists on I-40. Based on the Glint and Glare Study prepared for the Calico Solar Project, glare from diffuse reflection is not considered to represent a hazard or substantial nuisance to aircraft due to distance and potential level of brightness.

Data on anticipated brightness or luminance of the SunCatcher units and the Calico Solar Project is not available, but it was estimated that approximately 5 percent of the visible spectrum which is not redirected to the PCUs has the potential to make the SunCatcher mirrors appear as very bright objects. This reflection could be an intrusive and distracting nuisance to motorists under certain conditions but would not produce retinal damage.

The first (outer) row of mirrors and the mirrors at the ends of the rows of SunCatchers would be exposed to viewers on the highway. These mirrors can be expected to be sources of distracting nuisance brightness in the early mornings or late afternoons. In addition, motorists traveling at freeway speeds east or west on I-40 past the north-south-oriented rows of SunCatchers may be exposed to a flicker or stroboscopic effect from the repetitive bright mirrors at the row ends.

Nighttime light pollution as a result of the Calico Solar Project is also a concern. A large area around the project site is now mostly dark at night. The unlit night sky could be an important part of the camping experience for many visitors to remote areas such as the Cady Mountains WSA and the Rodman Mountains WA. Unmitigated night lighting of the Proposed Action could represent a substantial impact on the recreation experience at these locations.

Night lighting of the Main Services Complex would consist of 400-watt high-pressure sodium lights, with illumination falling to 0.0 foot-candles on the ground a short distance from the facility. Parking and road lighting on the site would consist of full cut-off luminaires to minimize night sky light pollution. Preliminary photometric studies provided by the applicant depict illumination from these fixtures falling to 0.0 foot-candles a short distance from each roadway intersection.

### **Construction Impacts**

The initial disturbance in the laydown area would be located within the project site. The form, line, and texture contrast of stored equipment, materials, and disturbed soil would be strong for viewers along I-40 and from the other KOPs except KOPs 6 and 7 in the Rodman Mountains WA. The potential visual impacts of project grading and construction would be considerable and comparable to those of the Proposed Action. Grading would result in strong color contrast from soil surface disturbance. Project construction would include a highly industrial scene of assembly and installation of the SunCatcher units. The initial disturbances from construction would be absorbed into the project development as construction is completed and would not create a separate visual disturbance in the project vicinity.

### **Impacts of Closure and Decommissioning**

The removal of the existing facility would create a prominent visual impact over the entire site due to color contrast created between disturbed soils and undisturbed areas in the region of the Proposed Action site. This color contrast is due particularly to the dark color element contributed by normal scrub vegetation, and the lighter color of underlying soils in the area. At present, despite some surface disturbance from the railroad and utility rights of way, the site retains a predominantly natural character. However, unlike these rights-of-way, the disturbed area of the Proposed Action site would be highly visible to motorists traveling on I-40 and the National Trails Highway. Visual recovery from land disturbance after closure and decommissioning could take place, although only over a long period of time, with implementation of an active and comprehensive revegetation program for the site.

### **Indirect Impacts**

By substantially lowering the prevailing visual quality of the local viewshed, the Proposed Action could have the indirect effect of encouraging additional subsequent development of similar industrial character in the area. Because the relatively intact existing landscape would appear highly compromised after introduction of the Proposed Action, the incremental additional impacts of other future Proposed Actions could appear to be less considerable than if they were occurring in the current, intact landscape.

### **CDCA Plan Amendment**

The proposed CDCA Plan Amendment to allow the project site to be developed into an 8,230-acre solar facility would result in impacts on the visual landscape as described above.

#### **4.16.2.2 Alternative 1a: Agency Preferred Alternative**

The impacts of the Agency Preferred Alternative would be similar to those described for the Proposed Action. Views of the Agency Preferred Alternative from all KOPs except KOP 2 would be similar to the Proposed Action because the location and distances to the SunCatchers and other facilities would be similar. The size of the site would be reduced, but not to an extent that would be readily perceptible to most viewers, in particular those on the adjacent highways. Under this alternative the project would be almost 1 mile further away from KOP 2 and would be less dominant than the proposed Action. The Agency Preferred Alternative would still create a moderate to high degree of contrast and the magnitude of change from this viewpoint would be high. The contrast in line and form would be somewhat subdued compared to the Proposed Action because of the increased distance and the broad horizontal lines of project would begin to blend with the level terrain and existing linear features. The Agency Preferred Alternative would have direct and indirect, long-term adverse impacts on visual resources.

#### **CDCA Plan Amendment**

The proposed CDCA Plan Amendment to allow the project site to be developed into a 6,215-acre solar facility would result in impacts on the visual landscape as described for the Proposed Action. The multiple-use guidelines and elements from the CDCA Plan that are pertinent to this section that pertain to visual resources would not be affected.

#### **4.16.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative is 31 percent of the size of the Proposed Action. Under this alternative, the Proposed Action site would be set back approximately 1 mile from I-40. Because of the increased distance to the highway and reduced extent of the solar collector fields, overall visual change under this alternative would be considerably less than under the Proposed Action. The overall appearance would be somewhat similar to the simulation of KOP 5, which depicts the Proposed Action at a similar distance to the Reduced Acreage Alternative, and depicts a similarly reduced overall scale. With this setback and reduced area, the Reduced Acreage Alternative would create a noticeable degree of contrast. The magnitude of change from this viewpoint would be moderate, and would attract attention. Direct impacts from this KOP would be similar to those discussed above for the Proposed Action, but to a lesser degree with the reduction in overall scale.

With the greater setback, nuisance glare in the eyes of approaching motorists would be substantially reduced because of the much lower proportion of the field of view occupied by the mirrors. Motorists approaching on I-40 from the east in the morning could still be subject to bright glare from the front row of solar units on the eastern edge of the site for a considerable distance approaching the site, since the units would be directly ahead of the motorist. However,

except for such short-lived events, overall nuisance glare effects would be substantially reduced. The Reduced Acreage Alternative would not reduce potential glare impacts on train operators, as the railroad would still pass through the site.

The Reduced Acreage Alternative would set back the project site boundary approximately 2 miles from the Cady Mountains WSA. This would eliminate the foreground impacts as seen from this location. Middle-ground impacts would also be reduced, as less of the landscape would be occupied. Likewise, the increased setback of this alternative would eliminate the possibility of obstructing scenic views of the mountains in the background. The Reduced Acreage Alternative would have direct and indirect, long-term adverse impacts on visual resources.

### **CDCA Plan Amendment**

The proposed CDCA Plan Amendment to allow the project site to be developed into an 6,215-acre solar facility would result in impacts on the visual landscape as described for the Proposed Action. The multiple-use guidelines and elements from the CDCA Plan that are pertinent to this section that pertain to visual resources would not be affected.

#### **4.16.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The impacts of the Avoidance of Donated and Acquired Lands Alternative would be similar to those described for the Proposed Action. The size of the site would be reduced, but not to an extent that would be readily perceptible to most viewers, in particular those on the adjacent highways. The Avoidance of Donated and Acquired Lands Alternative would have direct and indirect, long-term adverse impacts on visual resources.

### **CDCA Plan Amendment**

The proposed CDCA Plan Amendment to allow the project site to be developed into an 6,215-acre solar facility would result in impacts on the visual landscape as described for the Proposed Action. The multiple-use guidelines and elements from the CDCA Plan that are pertinent to this section that pertain to visual resources would not be affected.

#### **4.16.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative the project site would remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance.

As a result, no impacts on visual resources from construction or operation of the Proposed Action would occur.

### **CDCA Plan Amendment**

Under the No Action alternative there would be no proposed project and no proposed CDCA Plan Amendment. As such, there would no direct or indirect impacts on visual resources.

#### **4.16.2.6 Alternative 5: LUP Amendment: Deny Calico Solar ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance from the Calico Solar Project. As a result, no impacts on visual resources from construction or operation of the Proposed Action would occur.

### **CDCA Plan Amendment**

Because the CDCA Plan would be amended to allow other solar projects, the land on which the Calico Solar Project is proposed would become available to other utility scale power generation uses that would be consistent with the CDCA Plan. Approval of an alternate solar project on the project site could result in impacts on visual resources similar to those described for the Proposed Action.

#### **4.16.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this alternative, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, no impacts on visual resources from construction or operation of the Proposed Action would occur.

### **CDCA Plan Amendment**

Because the CDCA Plan would be amended to prohibit other solar projects, the land on which the Calico Solar Project is proposed would become available only to other uses that are consistent with the current CDCA Plan and WEMO Plan. Prohibiting another solar power project

on the project site would avoid potential impacts on visual resources as described for the Calico Solar Project.

The CDCA Plan Amendment would potentially allow other utility scale power development on the site that could result in impacts on visual resources. The planning of future projects would be subject to the BLM land use planning process and require a plan amendment for uses not consistent with the current CDCA Plan and WEMO Plan.

#### **4.16.2.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

### **4.16.3 Cumulative Impacts**

The geographic scope for cumulative visual resources impacts is the CDD and the time scale is the 30 year life of the project. The CDD within which the Calico Solar project located is a unique and highly valued scenic resource of national importance, as reflected by the presence of three national parks and numerous WAs within its boundaries.

#### **4.16.3.1 Alternative 1: Proposed Action**

Cumulative impacts could occur if implementation of the Proposed Action would combine with those of other local or regional projects, including foreseeable future solar and other renewable energy projects as identified in Chapter 2. The Calico Solar Project is among the first of a large number of existing solar Proposed Action applications in the CDD. As such, past and present projects have had a negligible, region-wide cumulative impact.

Although it is unlikely that all of the future solar and wind development projects proposed in the region would be constructed, it is reasonable to assume that some of them would be constructed, particularly in light of the state and federal mandates for renewable energy development. The cumulative impacts from these projects could include a substantial decline in the overall number and extent of scenically intact, undisturbed desert landscapes, and a substantially more urbanized character in the overall southern California desert landscape. In particular, the number of current renewable applications before the BLM and CEC that could potentially be prominently visible from the desert region's major highways is proportionally high, and the proportion of those highways that could be affected is also high. Because these highways are the location from which the vast majority of viewers experience the California desert, this potential effect is of particular concern.

As the undisturbed desert transitions to a more developed landscape the visual character would become urbanized in nature. The development of future utility scale renewable energy projects would continue this trend of change in the visual character of the area of geographic influence to a more industrial landscape. Therefore, when considered along with past, present, and reasonably foreseeable projects in the geographic area of influence, the action alternatives would contribute incrementally to an adverse impact on visual resources.

#### **4.16.3.2 Alternative 1a: Agency Preferred Alternative**

The cumulative impacts of the Agency Preferred Alternative would be similar to those of the Proposed Action. Though the project would be smaller in area, the difference in scale would not be noticeably different and this alternative would contribute to the conversion of the natural desert setting to a more industrial landscape.

#### **4.16.3.3 Alternative 2: Reduced Acreage Alternative**

The cumulative impacts of the Agency Preferred Alternative would be similar to those of the Proposed Action. Though the project would be substantially smaller in area, the difference in scale would not be noticeably different in relation to the total area of the reasonably foreseeable projects. This alternative would contribute to the conversion of the natural desert setting to a more industrial landscape.

#### **4.16.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The cumulative impacts of the Agency Preferred Alternative would be similar to those of the Proposed Action. The project would be very similar in area, and this alternative would contribute to the conversion of the natural desert setting to a more industrial landscape.

#### **4.16.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under the No Action Alternative there would be no contribution to cumulative impacts from development on the project site.

#### **4.16.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this alternative there would be no contribution to cumulative impacts from development of the project site for the Calico Solar Project. Other solar energy projects developed on the site could contribute incrementally to adverse impacts on visual resources similar to the Proposed Action.

#### **4.16.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this alternative there would be no contribution to cumulative impacts from development of the project site for the Calico Solar Project. The CDCA plan amendment would avoid incremental contributions to adverse impacts on visual resources from future solar energy projects. However, development of other utility scale power generation projects on the site could contribute to the conversion of the desert landscape to an industrial character as described for the Proposed Action.

#### **4.16.3.8 Environmentally Preferred Alternative**

The Agency Preferred Alternative is the Environmentally Preferred Alternative. As such, potential contributions to cumulative impacts resulting from the Environmentally Preferred Alternative would be the same as those described for the Agency Preferred Alternative.

### **4.16.4 Mitigation, Project Design Features, BMPs, and Other Measures**

#### **4.16.4.1 Surface Treatment of Nonmirror Proposed Action Structures and Buildings**

##### **Vis-1**

The Proposed Action owner shall treat all nonmirror surfaces of all Proposed Action structures and buildings visible to the public such that (a) their colors minimize visual intrusion and contrast by blending with the existing tan and brown color of the surrounding landscape; (b) their colors

and finishes do not create excessive glare; and (c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be nonspecular and nonreflective, and the insulators shall be nonreflective and nonrefractive. This measure shall include coloring of security fencing with vinyl or other nonreflective coating; or with slats or similar semiopaque, nonreflective material, to blend to the greatest feasible extent with the background soil.

The Proposed Action owner shall submit for CPM review and approval, a specific Surface Treatment Plan that would satisfy these requirements. The treatment plan shall include:

- (1) A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes.
- (2) A list of each major Proposed Action structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system.
- (3) One set of color brochures or color chips showing each proposed color and finish.
- (4) A specific schedule for completion of the treatment.
- (5) A procedure to ensure proper treatment maintenance for the life of the Proposed Action.

The Proposed Action owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the Proposed Action owner receives notification of approval of the treatment plan by BLM's AO and the CPM. Subsequent modifications to the treatment plan are prohibited without BLM's AO and CPM approval.

*Verification:* At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the Proposed Action owner shall submit the proposed treatment plan to BLM's AO and the CPM for review and approval and simultaneously to San Bernardino County for review and comment. If BLM's AO and the CPM determine that the plan requires revision, the Proposed Action owner shall provide to BLM's AO and the CPM a plan with the specified revision(s) for review and approval by BLM's AO and the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to BLM's AO and the CPM for review and approval.

Prior to the start of commercial operation, the Proposed Action owner shall notify BLM's AO and the CPM that surface treatment of all listed structures and buildings has been completed and that they are ready for inspection and shall submit to each one set of electronic color

photographs from the same KOPs identified in this section. The Proposed Action owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify (a) the condition of the surfaces of all structures and buildings at the end of the reporting year; (b) maintenance activities that occurred during the reporting year; and (c) the schedule of maintenance activities for the next year.

#### **4.16.4.2 Temporary and Permanent Exterior Lighting**

##### **VIS-2**

To the extent feasible, consistent with safety and security considerations, the Proposed Action owner shall design and install all permanent exterior lighting and all temporary construction lighting such that (a) lamps and reflectors are not visible from beyond the Proposed Action site, including any off-site security buffer areas; (b) lighting does not cause excessive reflected glare; (c) direct lighting does not illuminate the nighttime sky, except for required Federal Aviation Administration aircraft safety lighting; (d) illumination of the Proposed Action and its immediate vicinity is minimized, and (e) the plan complies with local policies and ordinances. The Proposed Action owner shall submit to BLM's AO and the CPM for review and approval and simultaneously to the County of San Bernardino for review and comment a lighting mitigation plan that includes the following:

- (1) Location and direction of light fixtures shall take the lighting mitigation requirements into account.
- (2) Lighting design shall consider setbacks of Proposed Action features from the site boundary to aid in satisfying the lighting mitigation requirements.
- (3) Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated.
- (4) Light fixtures that are visible from beyond the Proposed Action boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the Proposed Action boundary, except where necessary for security.
- (5) All lighting shall be of minimum necessary brightness consistent with operational safety and security.
- (6) Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

**Verification:** At least 90 days prior to ordering any permanent exterior lighting or temporary construction lighting, the Proposed Action owner shall contact BLM's AO and the CPM to discuss the documentation required in the lighting mitigation plan. At least 60 days prior to ordering any permanent exterior lighting, the Proposed Action owner shall submit to BLM's AO and the CPM for review and approval and simultaneously to the County of San Bernardino for review and comment a lighting mitigation plan. If BLM's AO and the CPM determine that the plan requires revision, the Proposed Action owner shall provide to BLM's AO and the CPM a revised plan for review and approval by BLM's AO and the CPM.

The Proposed Action owner shall not order any exterior lighting until receiving BLM AO and CPM approval of the lighting mitigation plan.

Prior to commercial operation, the Proposed Action owner shall notify BLM's AO and the CPM that the lighting has been completed and is ready for inspection. If after inspection, BLM's AO and the CPM notify the Proposed Action owner that modifications to the lighting are needed, within 30 days of receiving that notification the Proposed Action owner shall implement the modifications and notify BLM's AO and the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a lighting complaint, the Proposed Action owner shall provide BLM's AO and the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The Proposed Action owner shall notify BLM's AO and the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to BLM's AO and the CPM within 30 days.

#### **4.16.4.3 Setback of SunCatchers from I-40**

##### **VIS-3**

To reduce the visual dominance and glare effects of the SunCatchers to motorists on I-40, the applicant shall set back the nearest units to the area north of the existing pipeline right-of-way, and at a minimum distance of 500 feet from the edge of the roadway, whichever is greater.

**Verification:** At least 90 days prior to start of construction, the Proposed Action owner shall present to BLM's AO and the CPM a revised plan depicting how the proposed SunCatchers would be set back from the highway. If BLM's AO and the CPM determine that the plan requires revision, the Proposed Action owner shall provide to BLM's AO and the CPM a revised plan for review and approval by BLM's AO and the CPM.

The Proposed Action owner shall not begin construction until receiving BLM AO and CPM approval of the revised plan.

#### **4.16.4.4 Screening, Setback, and Revegetation of Staging Area**

##### **VIS-4**

In order to minimize the visual prominence of the proposed staging area adjoining I-40 to motorists, the Proposed Action owner shall provide opaque screening of the site as seen from the highway, and a setback from the roadway of at least 250 feet. In addition, the Proposed Action owner shall provide a revegetation plan describing how the staging site would be restored following construction. The plan shall call for beginning of restoration of the site within the shortest feasible time following completion of construction.

**Verification:** At least 90 days prior to start of construction, the Proposed Action owner shall present to BLM's AO and the CPM a revised staging area site plan including a setback from I-8 of at least 0.25 mile. If BLM's AO and the CPM determine that the plan requires revision, the Proposed Action owner shall provide to BLM's AO and the CPM a revised plan for review and approval by BLM's AO and the CPM. The Proposed Action owner shall not begin construction until receiving BLM AO and CPM approval of the revised plan.

At least 60 days prior to start of operation, the Proposed Action owner shall present to BLM's AO and the CPM a revegetation plan for the staging area. If BLM's AO and the CPM determine that the plan requires revision, the Proposed Action owner shall provide to BLM's AO and the CPM a revised plan for review and approval by BLM's AO and the CPM. The Proposed Action owner shall not begin operation until receiving BLM AO and CPM approval of the revised plan.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## **4.17 Hydrology and Water Resources**

This section assesses the environmental impacts of the Proposed Action and alternatives on hydrology and water resources, including potential impacts on surface water, groundwater, California jurisdictional waters, flooding and erosion, floodplains, and water quality and quantity. It is developed from Section C.7 Hydrology, Water Use, and Water Quality (Soil and Water Resources) of the SA/DEIS.

### 4.17.1 Methodology

The methodology used to assess impacts on hydrology and water resources has been modified from Section C.7.3 of the SA/DEIS to more fully align with the CEQ regulations for implementing NEPA as discussed in Section 4.3 of this chapter. Potential impacts on hydrology and water resources could occur if the Calico Solar Project leads to any of the following environmental consequences:

- A violation in any water quality standards or waste discharge requirements
- A depletion of groundwater supplies or interference with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)
- An alteration of the existing drainage pattern of the project site or area, including through the alteration of the course of a stream or river, in a manner that would result in erosion or siltation on-site or off-site
- An alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or increase the rate or amount of surface runoff in a manner which would result in flooding on-site or off-site
- A contribution of runoff water that exceeds the capacity of existing or planned stormwater drainage systems or provides additional sources of polluted runoff
- A degradation of surface water or groundwater quality
- Placement of structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- Exposure of people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam
- An impairment of existing or potential beneficial uses of waters of the United States or waters of the State of California

## 4.17.2 Direct and Indirect Impacts

### 4.17.2.1 Alternative 1: Proposed Action

#### Hydrology

On the project site, surface waters occur on discontinuous alluvial fans with areas that exhibit a mixed pattern of sheet flow or shallow concentrated flow across isolated, wide areas of land. Due to the project area's susceptibility to flash flooding and prolonged periods of precipitation, high intensity and short duration runoff events coupled with earth disturbance activities could result in accelerated on-site erosion.

The project site would be developed utilizing the existing land features without undergoing mass grading operations. Off-site flow would be intercepted prior to entering the project site using large debris basins constructed on-site and located at the toe of each mountainous drainage basin near the northern project boundary (Figure 1-2). The four identified drainage areas to the north of the project site that would affect the Proposed Action range in size from 380 to 3,230 acres. The four drainage areas and the surface water flow directions are shown in A-7. A series of detention basins would be designed and constructed along the northern project boundary to intercept and retain inflows from a Type II, 100-year storm event flowing from the four identified drainage areas. Maximum inflow rates from the four drainage areas are calculated to be from 860 cubic feet per second (cfs) for the smallest drainage area, to 4,650 cfs, for the largest. Outflows from the detention basin complexes would range from 30 cfs from the smallest drainage to 1,620 cfs from the largest, and would flow into existing drainages on the project site (BLM and CEC 2010). The exact size and design of the detention basins would depend on final site improvement layout.

On-site runoff would be intercepted in detention basins which would be sized to retain the 100-year on-site stormwater discharge runoff and debris flows. The on-site basins are designed to retain 4 years of average sediment accumulation for the area or subarea they are designated to serve. After the 4 years of average sediment accumulation is captured, the sediment would be removed from the basins and distributed on site. Surface flows would be directed from the 10 large detention and the approximately 151 small debris basins into the primary drainage channels that occur on the site (Tessera Solar 2010c). These project debris basins would also be designed to retain associated debris resulting from a 100-year storm. In addition to intercepting debris from the mountains, the proposed debris basins would also provide for peak runoff attenuation of the surface flows. Drainage control facilities are designed to protect the project site from flooding, sediment deposition, and scour.

Site drainage during construction would follow predevelopment flow patterns toward the elevated BNSF railroad grade, and ultimately to the westernmost property boundary. Debris basins and/or low-flow culverts would be installed for sediment control and to provide for storm peak attenuation. Best management practices for erosion and sediment control would be used in combination with debris basins for roadway crossing of major washes. In the main services complex, the stormwater would be directed to a detention basin, where the site runoff would infiltrate or evaporate. The detention basins would be sized to meet the San Bernardino County development criteria.

The project would create new impervious surfaces that would have the potential to create additional runoff and subsequent erosion and sedimentation. To minimize potential surface water impacts, site grades would be established to minimize the amount of earthwork required to construct the facilities and to maintain control of stormwater runoff. Selected areas would be covered with appropriate material, as conditions require (such as soil binders or asphalt concrete for road base and gravel for other facility area surfaces). Finish grading would be performed to conform to the finished design elevations for surface drainage and to prepare the areas for the specified surface finishes. Rainfall flowing from vehicle parking and paved areas in the site facilities area would be collected and directed to appropriately designed water quality devices for pollutant removal.

Soft bottom stormwater detention basins would be constructed to mitigate the increase in runoff from the proposed building sites. Rainfall from paved areas and building roofs would be collected and directed to the stormwater detention basins. The stormwater detention basins would be sized to hold the entire volume from the proposed building sites resulting from a 24-hour, 100-year storm. The detention basins would be designed so that the retained flows would empty within 72 hours after the storm to provide mosquito abatement. The post-development flow rates released from the project site are expected to be less than the predevelopment flow rates.

Except for the building sites, the majority of the project site would remain pervious, as a small portion of the site would be covered by pavement and SunCatchers foundations. Localized channel grading is proposed to take place on a limited basis to improve channel hydraulics in the vicinity of BNSF railroad grade to control the surface runoff. In addition, the main services complex would be protected from a 100-year flood by berms or channels that would direct the flow around the perimeter of the building site, if required.

Debris basins would be added throughout the project site for low-flow surface runoff detention in lieu of culverts. The design of the drainage facilities would be based on best management practices for erosion and sediment control. Blading and treated roads would be constructed as close to the existing topography as possible, and would consist of limited removal of terrain and limited cut-and-fill operations to maintain a 10 percent maximum slope grade and roadway design grade of less than 10 percent, respectively. The main access road between the main

services complex and I-40 would be a designated evacuation route. As such, the driving surface would be constructed at an elevation above the projected profile of a 25-year storm event. Overland flow resulting from the 100-year storm event would not exceed 7 inches in depth. For minor storm events, it is anticipated that the unpaved roadway sections may need to be bladed to remove soil deposition, along with sediment removal from debris basins and stem pipe risers at the culvert locations. For major storm events, in addition to the aforementioned maintenance, roadway repairs may be required due to possible damage where the roadways cross the channels and where the flows exceed culvert capacity.

Table 4-46 provides a summary of anticipated precipitation and storm flow (i.e., runoff) rates.

**Table 4-46 Stormwater Summary**

<b>Storm Frequency</b>	<b>6-hour Storm Rainfall (inches)</b>	<b>24-hour Storm Rainfall (inches)</b>	<b>6-hour Storm Runoff (cubic feet per second)</b>	<b>24-hour Storm Runoff (cubic feet per second)</b>
2-year	0.70	0.94	0	0
5-year	1.06	1.41	0	0
10-year	1.33	1.73	1,458	4,145
25-year	1.70	2.15	3,904	7,939
50-year	1.99	2.47	6,435	11,150
100-year	2.31	2.80	22,049	28,772

*Table Source:* BLM and CEC 2010.

Water quality could also be impacted if the stormwater drainage pattern concentrates runoff in areas that are not properly designed or protected with BMPs or causes increased erosion and sediment discharge offsite. Project components that could alter or concentrate existing drainage patterns include linear fences, access roads, buildings, SunCatchers, and associated infrastructure.

### ***Hydrology Impacts***

The Applicant has conducted mathematical calculations and probabilistic modeling to estimate anticipated potential impacts. Site development for the Proposed Action would result in direct, adverse, long-term impacts on surface hydrology on the project site due to a loss of on-site ephemeral drainages which promote groundwater recharge, flood peak attenuation, floodwater storage, and wildlife corridors and habitat. However, impacts would be localized and would be effectively mitigated with the implementation of mitigation measures required for the Proposed Action. Impacts would also be temporary, in that they would be reclaimed at the time of project decommissioning.

Construction of the Proposed Action, and the resulting effects on on-site ephemeral streams and washes, would alter the hydrological, biogeochemical, vegetation and wildlife functions of the ephemeral drainages. The construction of the drainage control project features would affect flows into the primary natural drainages on site. Because these structures would attenuate peak flood discharge rates, construction of the project would create direct, adverse, long term impacts on desert wash communities downstream of the project.

Potential adverse, indirect, long-term impacts include an increase in standing water onsite due to construction of swales, detention or infiltration areas that may promote vector issues (mosquito breeding). Additional adverse, indirect, long-term impacts include potential wildlife attraction to standing water within the project wastewater evaporation ponds and the possible water transport of broken mirror pieces offsite during storm events.

## **Groundwater Resources**

The Proposed Action would consume an average of 136 acre feet per year of water during construction and an average of 20 acre-feet per year for operations for mirror washing and domestic use. As discussed in Chapter 3, the Applicant proposes to use a groundwater well (Well 3) located on private land adjacent to the project site as its primary water supply (Figure A-18). Pump testing of Well 3 demonstrates it can support water demands for the project during construction and the lifespan of its operations.

Well 3 is located in the Lavic Groundwater Basin which currently has minimal groundwater withdrawals (Figure A-18). The CDWR reports that the total storage capacity of the Lavic groundwater basin is approximately 270,000 acre-feet and that there is approximately 300 acre-feet of natural annual recharge to the basin. The projected annual water use during project construction is approximately 45 percent of the annual average recharge to the Lavic Basin, and projected annual water use for operations is approximately 7 percent of the annual average recharge to the Lavic Basin. The projected total consumptive water use over the forty-year functional life of the Proposed Action would be approximately 1,325 acre-feet, which constitutes approximately 0.4 percent, of the total Lavic Basin capacity.

Pump testing of the Well 3 indicates that the maximum drawdown of the water level would occur during the approximately 5 year construction period. The maximum drawdown within 1,000 feet of the well would be approximately 3.5 feet below the static groundwater level. During the 30-year operational period, the maximum drawdown in the Well 3 within 1,000 feet would be approximately 0.4 feet. The results of the zone of influence calculations developed through pump testing of Well 3 indicate that the distance that the water would move laterally during pumping is relatively small, less than a quarter mile (Tessera 2010b). The water pumping during construction and operation of the project would not alter the patterns of water quality in the groundwater aquifer from which the water is pumped.

As discussed in Chapter 3.18, the SA/DEIS evaluated the feasibility of furnishing project water supply from the Cadiz BNSF well located approximately 64 miles east of the project site in the Cadiz Valley Groundwater Basin. Based on testing result of the well, it is now proposed that the Cadiz BNSF well would be utilized as a backup water supply if the Well 3 water supply requires augmentation. For more information on the Cadiz BNSF well, please refer to the SA/DEIS (BLM and CEC 2010).

### **Construction Water Supply**

During the 52 months of proposed project construction, the total water demand for combined construction and dust suppression would be approximately 600 acre-feet. The estimated monthly volume of water required for construction is provided in Table 4-47. The maximum expected rate of well water demand during construction is expected to be in August 2013, when 4,045,921 gallons of water (12.4 acre-feet) would be required.

**Table 4-47 Proposed Action: Estimated Monthly Water Use During Construction**

<b>Month-Year</b>	<b>Gallons</b>	<b>Acre-Feet</b>
<b>Year 1 Total = 135.6 Acre-Feet per Year</b>		
November-10	3,278,200	10.1
December-10	3,278,200	10.1
January-11	3,369,775	10.3
February-11	3,811,595	11.7
March-11	3,915,144	12.0
April-11	3,915,144	12.0
May-11	3,823,569	11.7
June-11	3,823,569	11.7
July-11	3,823,569	11.7
August-11	3,823,569	11.7
September-11	3,653,369	11.2
October-11	3,653,369	11.2
<b>Year 2 Total = 123.1 Acre-Feet per Year</b>		
November-11	3,653,369	11.2
December-11	3,549,820	10.9
January-12	3,549,820	10.9
February-12	3,549,820	10.9
March-12	3,549,820	10.9
April-12	3,108,000	9.5
May-12	3,108,000	9.5

<b>Month-Year</b>	<b>Gallons</b>	<b>Acre-Feet</b>
June-12	3,108,000	9.5
July-12	3,108,000	9.5
August-12	3,108,000	9.5
September-12	3,359,073	10.3
October-12	3,359,075	10.3
<b>Year 3 Total = 71.9 Acre-Feet per Year</b>		
November-12	3,400,702	10.4
December-12	3,916,160	12.0
January-13	0	0.0
February-13	0	0.0
March-13	0	0.0
April-13	0	0.0
May-13	0	0.0
June-13	0	0.0
July-13	4,045,919	12.4
August-13	4,045,921	12.4
September-13	4,004,298	12.3
October-13	4,004,300	12.3
<b>Year 4 Total = 142.5 Acre-Feet per Year</b>		
November-13	4,004,302	12.3
December-13	4,004,304	12.3
January-14	4,004,306	12.3
February-14	4,004,307	12.3
March-14	4,004,309	12.3
April-14	4,004,311	12.3
May-14	3,753,242	11.5
June-14	3,753,243	11.5
July-14	3,753,245	11.5
August-14	3,753,247	11.5
September-14	3,753,249	11.5
October-14	3,623,493	11.1
<b>Year 5 Total = 125.5 Acre-Feet per Year</b>		
November-14	3,623,495	11.1
December-14	3,623,497	11.1
January-15	3,623,499	11.1

Month-Year	Gallons	Acre-Feet
February-15	3,623,501	11.1
March-15	3,623,503	11.1
April-15	3,623,504	11.1
May-15	3,623,506	11.1
June-15	3,108,052	9.5
July-15	3,108,054	9.5
August-15	3,108,056	9.5
September-15	3,108,056	9.5
October-15	3,108,056	9.5

Table Source: BLM and CEC 2010.

### Operations Water Supply

Water consumption during operation of the Proposed Action would include mirror washing (10.3 acre-feet per year), water treatment (5.2 acre-feet per year), potable use (2.2 acre-feet per year), and dust control (2.5 acre-feet per year). Additionally, water would be used to generate hydrogen used in the SunCatcher engines. The Applicant estimates that 0.2 acre-feet per year of water would be required to produce a sufficient volume of hydrogen for power plant use. As shown in Table 4-48, the Applicant estimates that the total maximum consumptive use of groundwater during project operation would be approximately 20.4 acre-feet per year.

Water from Well 3 would be transported to the main services complex via an underground pipeline. The total length of the waterline would be 0.51 mile, and 990 feet would traverse non-BLM land (Parcel numbers APN 0529-281-34 and APN 0529-281-23) before entering the project site (Figure A-35).

**Table 4-48 Proposed Action: Operations Water Usage Rates**

Water Use	Daily Average (gallons per minute)	Daily Maximum (gallons per minute)	Annual Usage (acre-feet)
<b>Equipment Water Requirements</b>			
SunCatcher Mirror Washing	9.3 [Table Note 1]	25.0 [Table Note 2]	10.3 [Table Note 3]
<b>Water Treatment System Discharge</b>			
Brine to Evaporation Ponds	4.7	14.1 [Table Note 4]	5.2
<b>Potable Water Use</b>			
For drinking and sanitary water requirements	1.6 [Table Note 5]	1.9 [Table Note 6]	2.2 [Table Note 7]

<b>Water Use</b>	<b>Daily Average (gallons per minute)</b>	<b>Daily Maximum (gallons per minute)</b>	<b>Annual Usage (acre-feet)</b>
<b>Dust Control</b>			
Water mixed with Soiltac for dust control	1.5	28.6 [Table Note 8]	2.5 [Table Note 9]
<b>Hydrogen Generation</b>			
Electrolysis water requirements	0.1	0.2 [Table Note 6]	0.2 [Table Note 10]
<b>Totals</b>			
	17.3	69.8	20.4

*Table Source:* Tessera Solar 2010a and unpublished data.

*Table Note 1:* Based on washing 80 percent of the dishes (27,177 SunCatchers) each month with an average of 10.3 gallons of demineralized water per wash and 21 work days per month.

*Table Note 2:* Assumes one 500-gallon water tanker is filled over 20 minutes.

*Table Note 3:* Based on all 34,000 SunCatchers experiencing 9.6 washes per year.

*Table Note 4:* Based on the maximum amount of demineralized water required for mirror washing and assumes a decrease in raw water quality requiring an additional 20 percent of system discharge.

*Table Note 5:* Assumes 17 gallons per person per day for 136 people.

*Table Note 6:* Maximum amount assumes a 20 percent contingency over the Daily Average.

*Table Note 7:* Assumes a 6-day work week and average daily usage.

*Table Note 8:* Based on filling a 2,000 gallon tanker truck 6/7 full of water over 1 hour.

*Table Note 9:* Assumes 6:1 mix of water to Soiltac applied to 1,245 acres of road every 2 years.

*Table Note 10:* Assumes 195 standard cubic feet of hydrogen generated per year per dish and 1.5 liters of water consumed per cubic meter of hydrogen generated.

## **Groundwater Resource Impacts**

Based on measured drawdown during groundwater pumping, and the rapid recovery of groundwater levels following the aquifer test of Well 3, groundwater extraction for the Proposed Action would not have an adverse affect on water quality or quantity. During construction and operation of the Proposed Action, direct, negligible, long-term impacts on groundwater would occur in the form of localized drawdown of the water table in the vicinity of Well 3. No impact would occur to groundwater or wells outside the project site, because there are no known active water wells within the Lavic Valley Basin in the project vicinity. At the conclusion of construction, the water table in the vicinity of Well 3 would rebound, due to reduced pumping rates to supply the water required for project operation. Groundwater impacts of the Proposed Action would be reversible, as groundwater levels would recover to pre-pumping conditions after closure of the facility (Tessera 2010b).

## **Operations Wastewater**

Groundwater would require treatment to remove dissolved solids for SunCatcher mirror wash water applications, and additional treatment would be required to meet current drinking water quality standards. Groundwater would be demineralized to prevent mineral deposits forming on the SunCatcher mirrors. A reverse osmosis is proposed as a project feature to remove dissolved solids prior to project use. The wastewater generated by the reverse osmosis process would contain relatively high concentrations of TDS, estimated at approximately 3,600 mg/l.

It is assumed that the wastewater quality would be worse than the quality of the groundwater at the site, and that the wastewater would be classified as a “designated waste” in California Code of Regulations Title 27. Therefore, wastewater from project operations would be discharged into two on-site, double-lined evaporation ponds that would need to comply with the requirements for a Class II surface impoundment.

The on-site facility wastewater would include two evaporation ponds, each covering approximately a half an acre in surface area. The engineered evaporation pond system would consist of a layer of 20-mil high-density polyethylene (HDPE) geomembrane as the bottom layer with a 6-inch-thick Portland cement concrete (PCC) slab section with a rebar mat.

Each evaporation pond would be designed to contain one year of wastewater discharge and alternated each year accordingly. After undergoing the evaporation process, the accumulated bottom solids would be tested and disposed in an appropriate off-site waste disposal facility as nonhazardous waste in accordance with applicable laws and regulations.

## **Jurisdictional Waters**

The USACE has determined that no Waters (federal jurisdictional waters) are present within the Proposed Action project site (Appendix F). Accordingly, the Proposed Action would have no impacts on Waters.

California State jurisdictional waters are present in the Proposed Action project site. The discussion of impacts on State jurisdictional waters was included in the Biological Resources chapter of the SA/DEIS. The Proposed Action project site contains 1,099 acres of drainages characterized by well defined banks and vegetation consistent with desert washes (Figure A-17). Important desert wash vegetation includes Catclaw acacia thorn scrub, smoke tree (microphyll) woodland, and big galleta shrub-steppe.

Of the 1,099 acres of State jurisdictional waters present on the project site, construction of the Proposed Action would result in direct, adverse, long-term impacts on 614 acres, 56 percent of the State jurisdictional drainage areas on the project site. Impacts would primarily occur from the placement of facility structures including SunCatcher footings, roads, detention basins, and

other project components. The direct impacts on State jurisdictional waters would include the removal of native vegetation, the discharge of fill, degradation of water quality, and the attenuation of peak flood flows which affect sediment transport. Most of these impacts would occur during access road improvements and the development of the project's detention basin and stormwater management system.

Indirect, adverse, long-term impacts on State jurisdictional waters could include alterations to the existing topographical and hydrological conditions and the introduction of nonnative, invasive plant species. Construction of the project would result in alterations to the existing hydrology and expected sediment transport across the site.

Based on the attenuation of storm flows and loss of sediment to the system, coupled with the level of maintenance expected to occur on the project site, the CDFG considers that all 1,099 acres of the ephemeral washes on the project site and portions of the washes downstream of the project boundaries would be adversely affected by the proposed project.

## **Floodplains**

FEMA's Flood Insurance Rate Map has no panels for the project area. The project site is in an unmapped area, and is designated as Zone D. The Proposed Action would place 34,000 SunCatchers and related project features on the project site. No structural buildings are proposed to be located in areas susceptible to flooding resulting from a 100-year storm. The project's Stormwater Damage Monitoring and Response Plan would ensure that structures are protected and that redirected flows are designed such that they not cause adverse impacts. The existing flooding patterns would remain once the Project is constructed (BLM and CEC 2010). No direct or indirect adverse impacts on floodplains are expected due to the lack of FEMA designated floodplains occurring in the project area.

## **Potential Flood Damage**

The Proposed Action includes a total of 34,000 SunCatchers supported by a single metal fin-pipe foundation hydraulically driven into the ground. Foundation elements designed to support the SunCatchers are proposed to be installed within existing drainage channels. The volume of the foundation elements would decrease the capacity of the existing channel to contain flood flows.

Migration of channels and local scour caused by stormwater flows could remove sediment supporting individual poles and cause them to fall to the ground. Once on the ground during a storm event, the broken glass associated with the mirrors could further break and be transported downstream. Also, the SunCatcher structure itself and the associated wiring, could be transported downstream. Although the security fence located on the downstream side of the project site area could stop larger pieces from leaving the property, it would not stop small glass

fragments. Also, the fence itself could be damaged by stormwater flows and may not guarantee the onsite capture of all damaged materials.

The detention/debris basins inside the northern boundary of the project site would be of sufficient size to completely retain flood flows resulting from a 100-year flood. Following significant storms, retained water would be released into the existing channels in a controlled and metered manner at a rate that is designed to not cause damage to SunCatcher pole foundations located within the channels.

### **CDCA Plan Amendment**

The Proposed Action, when mitigation measures and BMPs are implemented, would be consistent with the guidelines of the CDCA Plan as discussed below in Section 4.18 (BLM 1999).

#### **4.17.2.2 Alternative 1a: Agency Preferred Alternative**

##### **Hydrology**

The impacts of the 6,215-acre Agency Preferred Alternative on the hydrology of the project vicinity would be similar to the Proposed Action, but the impacts on on-site ephemeral streams and washes would be reduced proportionally, due to the smaller project footprint. The spacing between SunCatchers would be the same as for the Proposed Action. The planned detention basins on the northern boundary would be designed and constructed to perform in the same manner as those of the Proposed Action. Downstream offsite hydrologic impacts would be substantially similar to those of the Proposed Action.

##### **Groundwater Resources**

The Agency Preferred Alternative would provide enough room on the project site for 34,000 SunCatchers, similar to the Proposed Action. All of the planned construction activities and main project improvements associated with the Proposed Action would also be included. Water consumption during construction and operation, and wastewater management during operations, would therefore be the same as for the Proposed Action. Impacts on groundwater resources of the Agency Preferred Alternative would be the same as for the Proposed Action.

##### **Jurisdictional Waters**

The Agency Preferred Alternative would avoid surface impacts on most of the high quality microphyll woodland habitat in the northwestern portion of the Proposed Action project site. It

would re-locate the detention basins along the northern project boundary to the south approximately 0.6 mile, leaving the existing ephemeral washes in that area undisturbed and functioning.

## **Floodplains**

The northern boundary of the Agency Preferred Alternative would be located approximately 0.6 mile south of the boundary of the Proposed Action. A preliminary hydrology report submitted to the CEC in April 2009 analyzed flood flow volumes, velocity, scour and water depth for the 100-year storm, and identified three flood hazard areas within the Proposed Action project site. The highest flood hazard area was shown to be the northern one third of the project area, an area largely avoided by moving the northern project boundary to the south.

The Agency Preferred Alternative would experience flooding hazards similar to the Proposed Action, except that substantially fewer SunCatchers would be located in the highest flooding hazard area of the Proposed Action, resulting in a lower risk of flood damage to SunCatchers and other project infrastructure.

## **CDCA Plan Amendment**

The Agency Preferred Alternative would have the same effects with regard to the CDCA Plan as the Proposed Action.

### **4.17.2.3 Alternative 2: Reduced Acreage Alternative**

The Reduced Acreage Alternative would occupy approximately 2,600 acres, about 32 percent of the lands affected by the Proposed Action. This alternative would retain approximately 31 percent of the SunCatchers proposed under the Proposed Action.

All of the potential direct and indirect impacts identified for the Proposed Action would occur with the Reduced Acreage Alternative. However, due to the alternative's reduced project footprint and the reduction in the number of SunCatchers, these potential impacts would be proportionately reduced.

## **Hydrology**

The detention and debris basins for the Reduced Acreage Alternative are assumed to be located in the same locations as the detention basins for Phase 1 of the Proposed Action (Figure 1-2). The main services complex and other significant project features would be located in the same locations as the Proposed Action.

Construction of the Reduced Acreage Alternative would reduce the affected number of natural, ephemeral drainages in the project site, but would still have localized, long-term direct impacts on surface waters in the project site. This alternative would require the construction of a stormwater management system that would disrupt the hydrologic and sediment transport system within many of the washes that occur on and adjacent to the project site. Construction of the Reduced Acreage Alternative would have the same qualitative direct and indirect impacts on surface water as the Proposed Alternative.

### **Groundwater Resources**

The annual volume of water required for construction of the Reduced Acreage Alternative would be the same as for the Proposed Action but, due to the shorter construction period (similar to Phase I of the Proposed Action), total consumption would be less. Operational water usage would be 9 acre feet per year. Overall groundwater usage would be considerably less than for the Proposed Action, given a shorter construction time-frame and the reduced number of SunCatchers that would be operating and require periodic mirror washing. The direct impacts on groundwater resources caused by the Reduced Acreage Alternative would be long-term and temporary, but proportionally less than for the Proposed Action.

### **Jurisdictional Waters**

The Reduced Acreage Alternative would avoid many of the natural desert washes that occur within the Proposed Action project site. Due to the location and topography of the Reduced Acreage Alternative, it would avoid impacts on most of the of the high quality wash habitat in the foothills of the Cady Mountains that supports microphyll woodland. Although wash habitat would be affected near the BNSF Railroad, the Reduced Acreage Alternative would result in substantially lower direct impacts on State jurisdictional waters. As with the Proposed Action, the Reduced Acreage Alternative would require coordination with the CDFG, and mitigation measures would be necessary to mitigate for the Reduced Acreage Alternative's impacts on State Waters. No Waters are present in the Reduced Acreage project site.

### **Floodplains**

The Reduced Acreage Alternative would experience flooding hazards similar to the Proposed Action, except that substantially fewer SunCatchers would be located in the highest flooding hazard area of the Proposed Action, resulting in a lower risk of flood damage to SunCatchers and other project infrastructure.

## **CDCA Plan Amendment**

The Reduced Acreage Alternative would have the same effects with regard to the CDCA Plan as the proposed Action.

### **4.17.2.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The Avoidance of Donated and Acquired Lands Alternative would include approximately 7,050 acres, or 85 percent, of the lands affected by the Proposed Action.

#### **Hydrology**

A donated parcel is located near the center of the Avoidance of Donated and Acquired Lands Alternative project site. Should this alternative be constructed, onsite drainage control structures would need to be redesigned to avoid that donated parcel, while maintaining site erosion/ sedimentation control. The Avoidance of Donated and Acquired Lands Alternative would create long-term, direct impacts on most of the same desert washes that would be affected by the Proposed Action. Drainages located on donated and acquired lands would not be directly impacted. However, direct effects on drainages within the avoided lands, especially those lands that would be enclosed within the boundaries of the site, would still occur.

#### **Groundwater Resources**

Direct and indirect impacts on groundwater would be the same as those of Proposed Action.

#### **Floodplains**

The Avoidance of Donated and Acquired Lands Alternative would experience flooding hazards similar to the Proposed Action, except that fewer SunCatchers would be located in the highest flooding hazard area of the Proposed Action, resulting in a somewhat lower risk of flood damage to SunCatchers and other project infrastructure.

## **CDCA Plan Amendment**

The Avoidance of Donated and Acquired Lands Alternative would have the same effects with regard to the CDCA Plan as the proposed Action.

#### **4.17.2.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Under this alternative, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing Multiple-Use Class designations in the CDCA Plan. No impacts on hydrology or water resources on the project site or project vicinity would occur.

#### **4.17.2.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Under this alternative, the Calico Solar Project would not be approved, but the BLM would amend the CDCA Plan to allow other solar energy projects to be constructed on the project site. If a future solar project were approved, hydrology and water resource impacts would result from the construction and operation of the solar technology, and would likely be similar in type to the impacts of the Proposed Action.

#### **4.17.2.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Under this alternative, no solar energy project would be constructed on the project site. The BLM would not reclassify any lands within the project site, but would amend the CDCA Plan to specifically prohibit the construction of other solar energy projects on the project site. The BLM would continue to manage the site consistent with the existing land use designations, guidelines and elements of the CDCA Plan.

#### **4.17.2.8 Environmentally Preferred Alternative**

The BLM considers the Agency Preferred Alternative to be the Environmentally Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

### **4.17.3 Cumulative Impacts**

Cumulative impacts on hydrology and water resources in the project vicinity are evaluated in the context of implementation with other past, present and reasonably foreseeable future projects as described earlier in this chapter. The project site and surrounding project vicinity is at present

mostly an undeveloped Mojave Desert landscape. There is the potential for reasonably foreseeable future actions in the Lavic Valley (the proposed Calico Solar Project site and location of the proposed primary water supply) and in the Cadiz Valley (the location of the proposed backup water supply) and throughout the CDCA planning area in the southern Mojave Desert.

To be conservative, this cumulative analysis assumes that all reasonably foreseeable future projects as described at the beginning of this chapter (Tables 4-2, 4-3, 4-4, and 4-5, Figures A-19 through A-21), are built and operating during the 30-year operational lifetime of the Calico Solar Project. Each project would have its own implementation schedule, which may or may not coincide or overlap with the Calico Solar Project's construction and operation schedule.

### **4.17.3.1 Alternative 1: Proposed Action**

#### **Surface Water Hydrology and Stormwater**

The geographic setting for evaluating cumulative effects on surface water hydrology and stormwater is the Newberry Springs watershed of the Troy Valley hydrologic subarea (Figure A-17). The Newberry Springs watershed area is approximately 90 square miles. The project site occupies an insignificant proportion of the total watershed area, less than 0.01 percent.

The Proposed Action would result in both temporary and permanent changes to the drainage patterns of surface water runoff at and downstream of the project site. Taken together with the existing and reasonably foreseeable future projects in the Newberry Springs watershed, and without the use of best management practices and mitigation measures, these changes could incrementally increase local soil erosion and stormwater runoff. Accordingly, the Proposed Action would contribute incrementally to adverse cumulative soil erosion and stormwater impacts within the Newberry Springs watershed.

#### **Groundwater**

The geographic setting for evaluation of groundwater impacts is the Lavic and Cadiz Groundwater Basins. The estimated average annual operational water use for the Proposed Action is 20 acre-feet per year (533,000 gallons per month). The maximum expected rate of monthly groundwater pumping during construction is estimated to be 12.4 acre-feet (August 2013) (Tessera Solar 2010b). The cumulative adverse groundwater impacts resulting from pumping of either the proposed primary water supply (Well 3 in the Lavic Basin) or the proposed backup water supply (the BNSF well in the Cadiz Basin) under the Proposed Action is expected to be negligible, due the size and capacities of the affected groundwater basins; the existing and

proposed future uses of groundwater in the basins; and the relatively low water use requirements of the proposed project.

#### **4.17.3.2 Alternative 1a: Agency Preferred Alternative**

The cumulative effects of the Agency Preferred Alternative are the same as those identified under the Proposed Action.

#### **4.17.3.3 Alternative 2: Reduced Acreage Alternative**

The cumulative effects of the Reduced Acreage Alternative are the same as those identified under the Proposed Action, except that overall groundwater use would be less than for the Proposed Action.

#### **4.17.3.4 Alternative 3: Avoidance of Donated and Acquired Lands Alternative**

The cumulative effects of the Avoidance of Donated and Acquired Lands Alternative are the same as those identified under the Proposed Action.

#### **4.17.3.5 Alternative 4: No Action: Deny Calico Solar Project ROW Grant/No CDCA Plan Amendment**

Because there are no direct or indirect effects on hydrology or water resources under the No Action Alternative, there would be no cumulative effects.

#### **4.17.3.6 Alternative 5: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Allow Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect effects on hydrology or water resources under the Alternative 5, there would be no cumulative effects.

#### **4.17.3.7 Alternative 6: LUP Amendment: Deny Calico Solar Project ROW Grant/Amend CDCA Plan to Prohibit Other Solar Energy Projects on the Project Site**

Because there are no direct or indirect effect on hydrology or water resources under the Alternative 5, there would be no cumulative effects.

#### **4.17.3.8 Environmentally Preferred Alternative**

The BLM considers the Agency Preferred Alternative to be the Environmentally Preferred Alternative. As such, the environmental consequences of this alternative are the same as those described above for the Agency Preferred Alternative.

#### **4.17.3.9 Mitigation, Project Design Features, BMPs, and Other Measures**

The proposed detention basins and implementation of BMPs, the final Drainage, Erosion and Sediment Control Plan (DESCP), the Stormwater Pollution Prevention Plan (SWPPP), and compliance with all applicable erosion and stormwater management mitigation measures are designed to reduce surface water impacts on and adjacent to the project site. All NPDES requirements, including those necessary to fulfill the monitoring and inspection requirements, would be adhered to during construction.

### **Erosion and Sedimentation Control**

#### ***Water-1***

Prior to site mobilization, the Applicant shall obtain both BLM's Authorized Officer's and the CPM's approval for a site specific DESCP that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, and identify all monitoring and maintenance activities. The project owner shall complete all necessary engineering plans, reports, and documents necessary for both BLM's Authorized Officer and the CMP to conduct a review of the proposed project and provide a written evaluation as to whether the proposed grading, drainage improvements, and flood management activities comply with all requirements presented herein. The plan shall be consistent with the grading and drainage plan as required by Mitigation Measure CIVIL-1 and shall contain the following elements:

- (1) Vicinity Map. A map shall be provided indicating the location of all project elements with depictions of all major geographic features to include watercourses, washes, irrigation and drainage canals, major utilities, and sensitive areas.
- (2) Site Delineation. The site and all project elements shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, underground utilities, roads, and drainage facilities. Adjacent property owners shall be identified on the plan maps. All maps shall be presented at a legible scale.
- (3) Drainage. The DESCPC shall include the following elements:
  - (a) *Topography*. Topography for offsite areas is required to define the existing upstream tributary areas to the site and downstream to provide enough definition to map the existing stormwater flow and flood hazard. Spot elevations shall be required where relatively flat conditions exist.
  - (b) *Proposed Grade*. Proposed grade contours shall be shown at a scale appropriate for delineation of onsite ephemeral washes, drainage ditches, and tie-ins to the existing topography.
  - (c) *Hydrology*. Existing and proposed hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow.
  - (d) *Hydraulics*. Provide hydraulic calculations to support the selection and sizing of the onsite drainage network, diversion facilities and BMPs.
- (4) Watercourses and Critical Areas. The DESCPC shall show the location of all onsite and nearby watercourses including washes, irrigation and drainage canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Maps shall identify high hazard flood prone areas.
- (5) Clearing and Grading. The plan shall provide a delineation of all areas to be cleared of vegetation, areas to be preserved, and areas where vegetation would be cut to allow clear movement of the heliostats. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCPC shall include a statement of the quantities of material excavated at the site, whether such

excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance shall be properly identified and delineated on the plan maps.

- (6) Soil Wind and Water Erosion Control. The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and nonroad surfaces including the specific identification of all chemical-based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects on vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by both BLM's Authorized Officer and the CPM prior to use. With regard to erosion risk and stormwater runoff, debris and detention basins shall be installed which are sized and located to intercept stormwater flow from off-site areas as it enters the project site. On-site roadways and other infrastructure shall be designed and located to avoid existing and proposed flow paths to the extent feasible.
- (7) Project Schedule. The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction. This scheduling should require the installation of debris basins, detention/ infiltration basins, swales, and related stormwater management facilities before construction commences on each phase.
- (8) Best Management Practices. The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.
- (9) Erosion Control Drawings. The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion-control specialist.

- (10) Agency Comments. The DESCPC shall include copies of recommendations, conditions, and provisions from the County of San Bernardino, CDFG, and Lahontan RWQCB.
- (11) Monitoring Plan. Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and stormwater diversions and the requirements specified in Appendix D.

**Verification:** The DESCPC shall be consistent with the grading and drainage plan, and relevant portions of the DESCPC shall clearly show approval by the chief building official (CBO). In addition, the project owner shall do all of the following:

- No later than ninety (90) days prior to start of site mobilization, the project owner shall submit a copy of the DESCPC to the County of San Bernardino, the RWQCB, the BLM's authorized officer, and CMP for review and comment. Both BLM's Authorized Officer and the CPM shall consider comments received from San Bernardino County and RWQCB.
- During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities.
- Once operational, the project owner shall provide in the annual compliance report information on the results of stormwater BMP monitoring and maintenance activities.
- Provide BLM's Authorized Officer and the CPM with two (2) copies each of all monitoring or other reports required for compliance with San Bernardino County, CDFG, and RWQCB.

## **Stormwater Damage Monitoring and Response Plan**

### ***Water-3***

The project owner shall ensure that all SunCatcher pole foundations are designed to withstand stormwater scour from surface erosion and/or channel migration. The project owner shall also develop a Stormwater Damage Monitoring and Response Plan to evaluate potential impacts from stormwater, including pole foundations that fail due to stormwater flow or otherwise break and scatter mirror debris and other SunCatcher components on to the ground surface. The Stormwater Damage Monitoring and Response Plan shall include the following elements:

- (1) Detailed maps showing the installed location of all SunCatcher pole foundations within each project phase, including existing and proposed drainage channels.
- (2) Each SunCatcher pole foundation should be identified by a unique identification number marked to show initial ground surface at its base, and the depth to the tip of the pole below ground.
- (3) Minimum Depth Stability Threshold to be maintained of SunCatcher pole foundations to meet long-term stability for applicable wind, water and debris loading effects;
- (4) Above- and belowground construction details of a typical installed SunCatcher pole foundation.
- (5) BMPs to be employed to minimize the potential impact of broken mirrors to soil resources.
- (6) Methods and response time of mirror cleanup and measures that may be used to mitigate further impact on soil resources from broken mirror fragments.
- (7) Monitor and Inspect Periodically, Before First Seasonal and After Every Storm Event:
  - (a) Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris
  - (b) SunCatcher Pole Foundations within Drainages or Subject to Drainage Overflow: Inspect for tilting, mirror damage, depth of scour compared to foundation depth below ground and the Minimum Depth Stability Threshold, collapse, and downstream transport.
  - (c) Drainage Channels: Inspect for substantial migration or changes in depth, and transport of broken mirror glass.
  - (d) Constructed Diversion Channels: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup.
- (8) Short-Term Incident-Based Response:
  - (a) Security and Tortoise Exclusion Fence: repair damage, and remove build-up of sediment and debris.
  - (b) SunCatcher Pole Foundations: Remove broken glass, damaged structures, and wiring from the ground, and for foundations no longer meeting the

Minimum Depth Stability Threshold, either replace/reinforce or remove the SunCatcher to avoid exposure for broken glass.

- (c) Drainage Channels: No short-term response necessary unless changes indicate risk to facility structures.
  - (d) Constructed Diversion Channels: Repair damage, maintain erosion control measures and remove built-up sediment and debris.
- (9) Long-Term Design-Based Response:
- (a) Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards.
  - (b) Replace/reinforce SunCatcher Pole Foundations no longer meeting the Minimum Depth Stability Threshold or remove the SunCatchers to avoid exposure for broken glass.
  - (c) Propose design modifications to address ongoing issues. This may include construction of active stormwater management diversion channels and/or detention ponds.
  - (d) Inspection, short-term incident response, and long-term design-based response may include activities both inside and outside of the approved ROW. For activities outside of the approved ROW, the Applicant would notify BLM and acquire environmental review and approval before field activities begin.

**Verification:** At least sixty (60) days prior to commercial operation, the project owner shall submit to both BLM's Authorized Officer (AO) and the CPM a copy of the Stormwater Damage Monitoring and Response Plan for review and approval prior to commercial operation. The project owner shall retain a copy of this plan onsite at the power plant at all times. The project owner shall prepare an annual summary of the number of heliostats failed, cause of the failure, and cleanup and mitigation performed for each failed heliostat.

## **Decommissioning Plan**

### **Water-7**

The Project owner shall identify likely decommissioning scenarios and develop specific decommissioning plans for each scenario that would identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions

may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of project materials and chemicals, and access restrictions.

**Verification:** At least 90 days prior to the start of site mobilization, the project owner shall submit decommissioning plans to the AO and CPM for review and approval prior to site mobilization. The project owner shall amend these documents as necessary, with approval from the AO and CPM, should the decommissioning scenario change in the future.

When developing the Record of Decision for the proposed Calico Solar Project and CDCA Plan Amendment, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies.

## 4.18 Land Use Plan Amendment Analysis

The proposed CDCA land use plan amendment to be made by the BLM is a power generation site identification decision only. The Proposed Action is located on lands classified Multiple-Use Class L (3 percent of the project site) and Multiple-Use Class M (97 percent of the project site). Approximately 1 percent of the project site for Alternative 3 is located on Multiple-Use Class L lands. The Agency Preferred and reduced Acreage Alternatives are located entirely on Multiple-Use Class M lands.

The classification designations govern the type and degree of land-use activities allowed within the classification area. All land use actions and resource-management activities on public lands within a multiple-use class delineation must meet the guidelines for that class. Multiple-Use Classes L and M allow for electric generation plants for solar facilities after NEPA requirements are met. These guidelines are listed in Table 1, Multiple-Use Class Guidelines, of the CDCA Plan (BLM 1999:15). The specific application of the multiple-use class designations and resource management guidelines for a specific resource or activity are further discussed in the plan elements section of the CDCA Plan. In Class L designations, the authorized officer is directed to use his judgment in allowing for consumptive uses by taking into consideration the sensitive natural and cultural values that might be degraded. For Class M lands, the authorized officer is directed to manage for a controlled balance of higher intensity uses and protection of public lands values.

The applicability of the CDCA Plan guidelines is addressed in each of the resource discussions in Chapter 4, above. This section summarizes the effects of the Proposed Action and alternatives on the CDCA Plan.

The proposed site location for the Calico Solar project meets the Multiple-Use Class Guidelines (as applicable to the particular project/alternatives/site locations) of the CDCA Plan for the following reasons:

- (1) Agriculture. Agricultural uses of Class L and M lands are not allowed, with the exception of livestock grazing. The project area is not currently used for agriculture or grazing, and none of the action alternatives would involve use of the project site for agriculture. Therefore, all the action alternatives would be in conformance with this CDCA Plan guideline.
- (2) Air Quality. Class L and M lands, including the Proposed Action site and the alternatives, are to be managed to protect their air quality and visibility in accordance with Class II objectives of the Federal CAA. The worst-case emissions that would be associated with the proposed project are provided in Table 4.1. These values have been compared to emissions objectives for air quality and visibility associated with Class II areas in 40 CFR 52.51, and are all well below the limitations required for Class II areas. The emissions associated with the Reduced Acreage and Agency Preferred Alternatives would be lower than those of the Proposed Action, and there would be no emissions associated with the No Action and LUP Amendment Alternatives. Therefore, all of the alternatives would conform to the Class II objectives of the CDCA Plan guidelines.
- (3) Water Quality. Class L lands will be managed to provide for the protection and enhancement of surface and groundwater resources, and BMPs will be used to avoid degradation and to comply with EO 12088. Class M lands will be managed to minimize degradation of water resources, and BMPs will be used to avoid degradation and comply with EO 12088. Section 4.17 of this FEIS evaluated the Proposed Action and the action alternatives for impacts to groundwater use and quality, and for the potential to impact surface water resources. The incorporation of low impact development practices with limited grading, and limited removal of vegetation to maintain natural flow across the site were developed by the applicant, in coordination with the BLM, to reduce these potential impacts. The Agency Preferred Alternative was developed, in part, to avoid impacts to active washes and California State jurisdictional waters. Although BLM has not established BMPs for solar projects, the agency has reviewed, and agrees with the implementation of, the BMPs that would be associated with the proposed project and its alternatives. These BMPs have been derived from a variety of sources, including those proposed by the applicant, those required by the CEC through its Conditions of Certification, and those required for compliance with other state and Federal laws designed to protect water resources. Implementation of these BMPs, and BLM's standard term and condition requiring compliance with other Federal, state, and

local regulations, would constitute compliance with EO 12088. The measures would be applicable to all action alternatives, and would therefore conform to the guidelines in Table 1 of the CDCA Plan.

- (4) Cultural and Paleontological Resources. For all Multiple-Use Classes, archaeological and paleontological values will be preserved and protected. Procedures described in 36 CFR 800 will be observed where applicable. As described in Sections 4.5.2 and 4.5.3, The Proposed Action would affect three cultural resources that are eligible for listing under the NRHP, and the Avoidance of Donated and Acquired Lands Alternative would affect two eligible resources. The Reduced Acreage Alternative would affect one eligible cultural resource. The Agency Preferred Alternative would not affect any cultural resources eligible for the NRHP. Disturbance of eligible cultural resources is an adverse impact. However, the identification of the site location as an electrical generation facility for the Proposed Action or any of the action alternatives is subject to the Multiple-Use Class guidelines for cultural and paleontological resource protection as is evidenced by the applicability of the guidelines to the specific facility proposal. As such, all of the project site configurations for the action alternatives are within the Multiple-Use Class guidelines for cultural and paleontological resource protection established by the CDCA Plan.
- (5) Native American Values. Native American cultural and religious values will be protected and preserved on Multiple-Use Class L and M lands with appropriate Native American groups consulted. Repeated efforts and opportunities have been provided to allow tribal entities to raise concerns. No tribal entities raised concerns with the Proposed Action, or any of the action alternatives. Therefore, CDCA cultural guidelines with respect to requirements for consultation have been met. In addition, the protection of cultural resources, as discussed in Section 4.5.2 and in Item Number 4 above, ensures that preservation and protection of cultural and religious values is accomplished in accordance with the CDCA Plan Multiple-Use Class guideline.
- (6) Electrical Generation Facilities. Solar generation may be allowed on Class L and M lands after NEPA requirements are met. The analysis contained in the FEIS, which addresses the Proposed Action and its alternatives, comprises the NEPA compliance required for this Multiple-Use Class guideline.
- (7) Transmission Facilities. Class L and M guidelines allow electric transmission to occur in designated ROW corridors. For all the action alternatives, the transmission line from the Calico substation to the Pisgah substation will be located within the Calico generation facility ROW and an existing utility corridor, thereby meeting the CDCA guideline for transmission facilities.

- (8) Communication Sites. Neither the Proposed Action nor any of the action alternatives would involve the installation of communications sites.
- (9) Fire Management. Fire suppression measures in Class L and M areas will be taken in accordance with specific fire management plans, subject to such conditions as the authorized officer deems necessary. The project area is within the area covered by the BLM California Desert District Barstow Fire Management Area. That Area Plan addresses management and suppression of wildfires, but does not address incidents on specific facilities such as power plants. The Applicant has developed fire suppression measures that would be used for the Calico Solar project, and these measures are discussed in Section 4.6.2. However, the specific fire management plan is not relevant to the types of fires that would be addressed by the applicant. Should a fire occur in the area that is not specific to the facility, it would be addressed by BLM, not by the applicant, and it would be addressed in conformance with the Fire Management Plan.
- (10) Vegetation. Table 1 of the CDCA Plan includes a variety of guidelines associated with vegetation. These are addressed in the EIS as follows:
- (a) *Native Plants*. Removal of native plants in Class L and Class M areas is only allowed by permit after NEPA requirements are met, and after development of necessary stipulation. Approval of the ROW grant for the Proposed Action or any of the action alternatives would constitute the permit for such removal. The mitigation measures in the FEIS and conditions of approval to be required in the ROD would constitute the stipulations to avoid or minimize impacts from the removal.
- (b) *Harvesting of Plants by Mechanical Means*. Harvesting by mechanical means is also allowed by permit only. Although the Proposed Action and the action alternatives would include the collection of succulents and seeds to assist with reclamation, the removal of these items would not be done for distribution to the public. Also, the guidelines for vegetation harvesting include encouragement of such harvesting in areas where the vegetation would be destroyed by other actions, which would be the case with the Proposed Action and action alternatives. Therefore, the Proposed Action and action alternatives would be in conformance with this Multiple-Use Class guideline.
- (c) *Rare, Threatened, and Endangered Species, State and Federal*. In all Multiple-Use Class areas, all state and federally listed species will be fully protected. In addition, actions which may jeopardize the continued existence of federally listed species require consultation with the USFWS. As evaluated

in Section 4.3, no federally or state listed plants would be impacted by the Proposed Action or action alternatives.

- (d) *Sensitive Plant Species.* Identified sensitive plant species would be given protection in management decisions consistent with BLM's policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recovered listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. One BLM sensitive plant, the white-margined beard-tongue, has been identified in the project area, and impacts and mitigation associated with this species are discussed in Section 4.4. All on-site occurrences of white-margined beardtongue would be avoided with the establishment of specially-designated Environmentally Sensitive Areas on the project site. This protection was a substantial consideration in the development of the Agency Preferred Alternative, and selection of this alternative would be expected to provide greater protection to the species than would the Proposed Action. Because these measures are intended to reduce threats to this species to minimize the likelihood of listing, these measures are in conformance with the Multiple-Use Class guidance in the CDCA Plan.
  - (e) *Unusual Plant Assemblages.* No UPAs have been identified on the site of the Proposed Action or any of the action alternatives.
  - (f) *Vegetation Manipulation.* Manipulation of vegetation in Class L areas by mechanical control or aerial broadcasting is not permitted, but is allowed in Class M lands. Vegetation manipulation is defined in the CDCA Plan as removing noxious or poisonous plants from rangelands; increasing forage production; creating open areas within dense brush communities to favor certain wildlife species; or eliminating introduced plant species. None of these actions would be conducted as part of the Proposed Action or action alternatives. Therefore, each alternative would conform with the CDCA Plan guidelines.
- (11) Land Tenure Adjustment. Neither Class L nor Class M lands will be sold. The Proposed Action and the action alternatives would not involve any sale of public lands.
- (12) Livestock Grazing. The Proposed Action and action alternatives would not involve the addition of livestock grazing to any Class L or M area where it does not already occur.

- (13) Minerals. The Proposed Action and the action alternatives would not involve the development of minerals on Class L or M lands.
- (14) Motorized Vehicle Access/Transportation. Pursuant to the CDCA LUP guidelines for Class L and M areas, new roads may be developed under ROW grants or approved plans of operations. No areas in the Proposed Action project site or any of the action alternatives is designated for OHV use. Changes to the transportation network (new routes, re-routes, or closures) in areas may be made through activity-level planning or with site-specific NEPA analysis (IM 2008-014, BLM 2007). Modifications to area OHV designations (open, closed, or limited) require amendment to the RMP. There are no area OHV designations that are being made or modified through the Proposed Action or any of the alternatives. With the Proposed Action and its alternatives, some existing route segments are being closed. These changes may be made with site-specific NEPA analysis. This analysis is provided in Section 4.15. The access needs for the proposed solar facility do not substantially differ among the action alternatives presented in the FEIS. The Proposed Action and action alternatives are consistent with the CDCA Plan guideline noted above.
- (15) Recreation. The Proposed Action and action alternatives would not involve the use of the project sites for recreational uses.
- (16) Waste Disposal. The Proposed Action and action alternatives would not involve the development of waste disposal sites on the project or alternative sites
- (17) Wildlife Species and Habitat. Table 1 of the CDCA Plan includes a variety of guidelines associated with wildlife. These are addressed in the EIS as follows:
- (a) *Rare, Threatened, and Endangered Species, State and Federal*. In all Multiple-Use Class areas, all state and federally listed species and their critical habitat will be fully protected. In addition, actions which may jeopardize the continued existence of federally listed species will require consultation with the USFWS. As discussed in Section 4.3, the desert tortoise, which is listed as federally and state threatened, would be affected by the Proposed Action and action alternatives. However, none of the action alternatives would affect critical habitat. As specified in the guideline, BLM has initiated formal consultation with the USFWS in accordance with Section 7 of the Endangered Species Act. BLM has worked with the CEC, USFWS, CDFG, and Applicant to develop protection and compensation measures for the desert tortoise, which include stringent avoidance measures, the full level of compensation required by USFWS for this category of tortoise habitat, and enhancement and protection measures in other areas. The Agency Preferred Alternative was

specifically developed to minimize impacts to desert tortoise by avoiding disturbance of 1,770 acres of habitat in the northern portion of the project area. Therefore, the Proposed Action and action alternatives would comply with the guideline to provide full protection to the species.

- (b) *Sensitive Species*. Identified species would be given protection in management decisions consistent with BLM's policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recovered listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. Sensitive wildlife species are present on the sites associated with the Proposed Action and the action alternatives.

The Proposed Action and action alternatives, including the mitigation measures associated with these actions, would involve habitat manipulation to improve habitat (such as tortoise fencing along roads) and introduction of native species (through the translocation of tortoises). Introduction of native species is permitted in Class L and M areas, and habitat manipulation is allowed subject to environmental assessment, as is done within this FEIS. Therefore, the Proposed Action and the action alternatives would be in conformance with these guidelines.

The Proposed Action and the action alternatives, including the translocation associated with these actions, would not involve the control of depredation wildlife and pests. Therefore, this guideline is not applicable to these actions.

- (18) Wetland/Riparian Areas. Wetland/riparian areas will be considered in all proposed land use actions in Class L and M lands. These issues were considered in the analysis of the site location for the Proposed Action and action alternatives. However, no wetlands or riparian areas are present in these areas.
- (19) Wild Horses and Burros. Under the CDCA Plan guidelines, populations of wild and free-roaming horses and burros will be maintained in healthy, stable herds, but will be subject to controls to protect sensitive resources. As discussed in Section 4.82, no wild and free-roaming horses are present in the project area, and no HMAs have been established. Therefore, the Proposed Action and the action alternatives would conform with the requirements of the guidelines in the CDCA Plan.

## **4.19 Irreversible and Irretrievable Commitment of Resources**

NEPA requires an analysis of any irreversible or irretrievable commitments of resources which would be involved with a proposed action should it be implemented. Resources irreversibly or irretrievably committed to a proposed action are those used on a long-term or permanent basis. This includes the use of nonrenewable resources such as metal, wood, fuel, paper, and other natural or cultural resources. These resources are considered nonretrievable in that they would be used for a proposed action when they could have been conserved or used for other purposes. Additionally, any unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment is also considered to be an irreversible and irretrievable commitment of resources.

The Calico Solar Project would irretrievably commit resources over the 30-year lifespan of the project. After 30 years, the Calico Solar Project is planned to be decommissioned and the land returned to its pre-project state. This would indicate that potentially some of the resources on project site could be retrieved. However, due to the long lifespan of the project many variables could impact the project resulting in some of the resources not being retrieved. Additionally, due to the lifespan of the project it is questionable as to how well the resources within the site can recover to their current conditions. Open desert lands and sensitive desert habitats as found within the Calico Solar Project site can take a long time to recover from disturbances, particularly those associated with large scale development. To date, the Calico Solar Project site has been minimally disturbed by off-highway vehicle use on designated BLM routes. In the most conservative interpretation of commitment of resources, and given the unknowns surrounding the long-term future, it is reasonable to assume that the Calico Solar Project would irretrievably and irreversibly commit these undeveloped lands within the project boundaries.

Conversely, because the Calico Solar Project is a renewable energy solar generating project it would have a positive benefit of reducing the reliance on fossil fuels. Over the lifespan of the project there should be a reduction or at least a no net increase in the use of fossil fuels. Therefore, the reduction in expending fossil fuels would be a positive effect on the commitment of nonrenewable resources.

In addition to the general description given above the following sections provide more specific descriptions of irreversible and irretrievable commitment of resources by resource element. If no irreversible or irretrievable commitment of a resource element would occur, the element is not listed below.

### 4.19.1 Biological Resources

Development of the solar facility would impact on the environment and result in an irretrievable and irreversible commitment of biological resources, either directly through removal of vegetation and wildlife, or indirectly through impacts on soils, fragmentation of wildlife habitats and populations, and/or disruption of wildlife movement patterns. However, the implementation of mitigation measures identified in Section 4.3.4 Mitigation, Project Design Features, BMPs, and Other Measures would reduce these direct and indirect adverse impacts.

Native vegetation would be removed from 8,230 acres during the development of the Calico Solar facility. However, the degree of impact would be reduced through the salvage and on-site protection of some plants, and by the development of a restoration program to be implemented upon decommissioning of the facility such that irreversible losses would be reduced to the vegetation destroyed during land clearing and to portions of the developed land that may be impacted to the level that restoration would not be possible (e.g., paved roads). In addition, ground-disturbing activities often result in the introduction and/or spread of nonnative and invasive plant species even with the implementation of specific measures to control this vegetation. The presence of nonnative plants on or adjacent to the developed site prior to or following restoration actions may alter ecological processes (e.g., fire regimes) resulting in irretrievable impacts on the environment. Although areas impacted by construction activities would be restored as soon as the sites are no longer needed, and the developed area would be reclaimed at some point in the future, it is unlikely that the land would be restored to original conditions that would result in former vegetation cover, structure, and diversity. Therefore, these commitments of vegetation resources would be considered irreversible.

The loss of vegetation (irreversible or permanent loss, and irretrievable loss or reduced productivity) would also result in the loss of productive use of these lands as wildlife habitat, and the displacement or death of animals, including migratory birds, located on site during ground clearing. Disturbances caused by construction actions, road use, and other human activities could also result in short- and long-term impacts on wildlife. However, the degree of impact would be reduced through the removal and translocation of some individual animals prior to land clearing, and restoration of habitats upon decommissioning of the facility. The resulting decrease in function of wildlife habitat and resulting impacts on wildlife populations would be considered an irretrievable commitment of wildlife resources. Irreversible impacts on wildlife would include impacts on fossorial (that is, burrowing) species that may not be able to recolonize the reclaimed site due to permanent alteration of soil structure that restoration activities may not be able to correct.

Irreversible loss of special status species and their habitats would be limited by the implementation of specific measures designed to protect animals through pre-construction surveys and relocation/translocation of individuals, including the desert tortoise and western burrowing owl, and future reclamation of the site. However, permanent (irretrievable) loss may

occur to limited acreage of sensitive plant species habitat through destruction of habitat patches that may provide site-specific soil conditions that cannot be replaced or reclaimed. Irretrievable loss of special status species and their habitat would result when restoration would not fully return the area to its former function in supporting these plant and animal populations. Recolonization of the area by the desert tortoise and burrowing owl may be limited due to compromised soil structure and reduced capacity for digging or supporting burrows.

#### **4.19.2 Cultural Resources and Paleontology**

The development of the project would result in irreversible and irretrievable effects on cultural resources because of earthmoving activity. These effects would be minimized through the use of properly designed and implemented mitigation programs.

#### **4.19.3 Geology, Soils, and Mineral Resources**

To the extent that cryptobiotic soils and desert pavement are present on the project site, the construction and operation of the Calico Solar Project would result in an irreversible and irretrievable loss of those resources where directly impacted because of the long time periods believed to be required for their formation.

#### **4.19.4 Grazing and Wild Horses and Burros**

Long-term disturbance to the project site would be considered an irreversible and irretrievable commitment of land use resources, including grazing, due to the long time frame required for site reclamation and restoration.

### **4.20 Growth-Inducing Impacts**

Under NEPA, growth inducing impacts fall under the category of potential indirect effects, meaning they occur later in time or farther away in distance but are still reasonably foreseeable. A growth inducing project can include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.8[b]).

The Calico Solar Project site is located on federal land managed by the BLM. The nearest incorporated communities to the project site are Barstow, (37 miles) Victorville (57 miles), and 77 miles Adelanto. The project site is approximately 115 miles east of Los Angeles, California. The 2008 population of Barstow was 23,952. The population of Victorville was 107,408; and that of Adelanto was 28,181. San Bernardino county had a total population of 1,710,139 in 2000 and

2,055,766 in 2008 (BLM and CEC 2010). The September 2008 unemployment rate for San Bernardino County and the incorporated communities in the vicinity of the project site ranged from a low of 8.5 percent in San Bernardino County as a whole to 13 percent in the city of Adelanto. The State of California unemployment rate was 7.5 percent in September 2008 (BLM and CEC 2010).

To determine whether the Calico Solar Project would induce population growth, the availability of the local workforce and the population in the region were analyzed. The local workforce is defined as workers in Riverside, San Bernardino, Ontario and the Los Angeles Metropolitan Statistical Areas (MSA). It should be noted that it is estimated that 90 percent of the workforce will reside in Southern California, including the Barstow area (BLM and CEC 2010). The remainder may come from other areas of the Southwest. Many of the higher-skill-level positions required for essential trades could come from outside the local area.

During Construction, it is anticipated that specialized trades and higher-skill-level construction personnel will commute to the Calico Solar Project site on a weekly basis and stay in temporary housing or apartments during the week for the duration of the construction phase. Similarly, contractor and subcontractor employees will commute on a weekly basis and lease temporary housing or apartments in the Barstow area.

The San Bernardino and Riverside Counties labor market area (within a 2-hour commute of the project site) was used for the evaluation of construction worker availability. Analysis of the total labor by skill of Riverside, San Bernardino, Ontario and Los Angeles Counties indicates that these areas are more than adequate to provide construction labor for the Calico Solar Project.

The Applicant expects construction of the Calico Solar Project would occur in 2 phases over a 52-month period. The size of the on-site workforce would range from 101 during Month 1 to 731 during the peak period in Month 7. When fully operational, the Calico Solar Project is forecast to employ approximately 182 full-time workers. The Calico Solar Project would operate 7 days per week, with maintenance activities occurring 7 days per week, 24 hours per day. The Applicant proposes that project construction would start in late 2010. Table 4-49 shows the total construction labor by types of skills needed for the Calico Solar Project, in the San Bernardino and Los Angeles County MSA. The workforce needed for demolition of the Calico Solar Project would likely total the peak number of construction workforce.

**Table 4-49 Total 2009 Labor Force in Imperial, San Diego, Riverside, and San Bernardino Counties by Construction Skill for Construction**

<b>Occupational Title</b>	<b>San Bernardino County MSA</b>	<b>Los Angeles County MSA</b>	<b>Peak Number of Workers for Calico Construction by Craft</b>
Carpenters	32,390	30,050	40
Concrete crews	4,690	4,530	42
Electricians	7,600	13,700	106
Ironworkers	1,090	770	38
Laborers	32,080	34,810	136
Miscellaneous crews	4,960	8,610	10
Operators	5,460	4,780	104
Plumbers	5,330	12,900	26
SES technicians	Not available	Not available	32
SunCatchers assemblers	990	1,350	64
SunCatchers electricians	7,600	13,700	16
SunCatchers ironworkers	1,090	770	32
SunCatchers laborers	32,080	34,810	16
SunCatchers material handlers	990	1,350	16
SunCatchers operators	5,460	4,780	8
SunCatchers teamsters	Not available	Not available	12
SunCatchers Technicians	1,150	5,130	32
Teamsters	not available	Not available	58
Technicians	1,150	5,130	6

*Table Source:* BLM AND CEC 2010.

*Table Key:* MSA = metropolitan statistical area.

Because the majority of the construction workforce currently resides within San Bernardino and Riverside Counties, construction and operation of the project would have little impact with respect to inducing substantial population growth.

During project operation, the workforce of the Calico Solar Project is estimated at 136 workers. Most of these workers would reside within a one hour commute of the project site. Therefore, inducement of substantial population growth either directly or indirectly by the Calico Solar Project, would not be adverse.

## **4.21 Short-Term Uses Versus Long-Term Productivity of the Environment**

The short-term uses of the environment as a result of the build alternatives include those typically associated with solar energy development. These are primarily related to construction activities and include effects on the natural environment. Additionally, for the Calico Solar Project short-term uses of the environment also will have long-term productivity impacts on recreation, land use, and transportation resources. These can be compared to the long-term benefits that, in turn, would provide for the production of clean renewable energy consistent with the federal and state goals of increasing the production of renewable energy to help reduce dependence on fossil fuels.

As discussed in Section 4.19, the build alternatives could permanently damage sensitive desert habitats which in turn could adversely affect the long-term productivity of the area. However, these alternatives would also provide a long-term benefit by providing electric power without any increase in the use of nonrenewable resources such as fossil fuels which would result in a benefit to air quality and a reduction in carbon-based emissions.

## **4.22 Summary of Unavoidable Adverse Impacts**

The construction and implementation of any of the Calico Solar Project build alternatives considered in this EIS would result in short and long term adverse environmental impacts. This section summarizes those impacts and also indicates whether the build alternatives would result in unavoidable adverse impacts.

### **4.22.1 Air Quality**

No unavoidable adverse impacts on air quality would result from the construction and operation of the Calico Solar Project.

### **4.22.2 Biological Resources**

Certain adverse impacts cannot be avoided even with the application of mitigation measures; unavoidable adverse impacts do not include temporary or permanent impacts which would be mitigated. Construction and operation of the proposed solar facility would result in the loss of 8,230 acres of vegetation and wildlife habitat and would result in the displacement, translocation, or direct loss of associated plants and wildlife. Long-term disturbance to vegetation communities and decreased productivity of plant resources would be minimized where reclamation and revegetation mitigation measures are implemented at all stages of

project development and operations. The implementation of a vegetation reclamation plan would further reduce impacts on vegetation communities with the use of approved plant materials, salvage and translocation of key plant species, enforcing measures that would minimize erosion and seed loss, controlling the invasion or spread of nonnative/invasive weed species, and monitoring vegetation recovery. Since it is not expected that restoration for vegetation resources and control of nonnative plants would fully replicate preconstruction conditions, the result would be some level of unmitigated loss of vegetation resources.

The proposed facility would result in unavoidable adverse impacts on wildlife resources that include habitat loss, disruption of foraging and breeding activities of some species, disruption of animal movement patterns, fragmentation of wildlife populations, and mortality of individual plants and animals. Adverse impacts on wildlife that cannot be avoided related to construction-related activities would be expected to result from new sources of noise, other anthropogenic disturbances, changes in the distribution and abundance of predators and invasive species (plants and animals), increased traffic volume and collision-related mortality to resident and migratory wildlife and birds, and barriers to wildlife movements across the landscape. Fencing of the entire facility would preclude many animals from entering the facility where habitat would be unsuitable, though would also contribute to fragmentation of wildlife populations and disruptions in movement patterns. Mitigating one aspect of project-related impacts on wildlife can have associated adverse impacts on other aspects of wildlife ecology, and can result in impacts that are not fully mitigated.

A total of 10 special-status plant species and 17 special-status wildlife species has been recorded, or have the potential to occur in the project vicinity. Construction and maintenance of project facilities could result in loss and/or disturbance to individuals of these species and their habitat. Pre-construction surveys would be conducted by the Applicant to identify and record the locations of all affected special-status species for avoidance, translocation of individuals, or use in restoration of disturbed sites, where feasible. Despite the application of repeated surveys throughout the project area, many of these species are difficult to locate and unreported occurrences may be lost during development activities resulting in unavoidable adverse impacts on special-status species.

However, partial recovery and mitigation of some or most of these losses to vegetation, wildlife, and special-status species may be attained through the implementation of mitigation measures that include best management practices, habitat restoration, and purchase and management of replacement habitat.

### **4.22.3 Climate Change**

The concentrated on-site activities during construction would result in short-term, unavoidable adverse impacts from increases in vehicle and equipment emissions that include GHG. If soils

are disturbed, then the potential for this area to naturally store carbon would be reduced as the soils take many years (as much as 100 years) to redevelop. During the life of the project, there would be a net benefit or reduction in GHG emissions associated with the Calico Solar Project. Once the project is decommissioned, it is possible that it would take many more years before the disturbed soils could once again store carbon. This could be an unavoidable adverse impact. Since the understanding of the carbon storing capacity of desert soils in general is just developing and the actual storing capability with the site is unknown, it is not possible to definitively quantify the potential impact.

#### **4.22.4 Cultural Resources and Paleontology**

Because cultural resources are nonrenewable, the removal or destruction of any resource results in a net loss of resources. However, the construction of the Calico Solar Project is not expected to result in adverse effects to any historic properties, though there may be impacts on Native American tribally sensitive cultural resources on the project site during ground disturbance and other construction activities. If during construction cultural resources are discovered than they would be handled according to the incidental discovery plan.

#### **4.22.5 Fire and Fuels**

No unavoidable adverse impacts on fire and fuels would result from the construction and operation of the Calico Solar Project.

#### **4.22.6 Geology, Soils, and Mineral Resources**

No unavoidable adverse impacts on geology, soils or mineral resources would result from the construction and operation of the Calico Solar Project.

#### **4.22.7 Grazing and Wild Horses and Burros**

No unavoidable adverse impacts on grazing, wild horses, and burros would result from the construction and operation of the Calico Solar Project.

#### **4.22.8 Land Use**

Approval of the Calico Solar Project would result in the unavoidable adverse impact of occupying and fencing the entire project site for solar power generation to the exclusion of other public land uses, except existing ROWs.

#### **4.22.9 Noise and Vibration**

No unavoidable adverse impacts from noise and vibration would result from the construction and operation of the Calico Solar Project.

#### **4.22.10 Public Health and Safety and Hazardous Materials**

No unavoidable adverse impacts from public health and safety and hazardous material would result from the construction and operation of the Calico Solar Project.

#### **4.22.11 Recreation**

The unavoidable adverse impacts of the Calico Solar Project to recreational resources would include the loss of public recreational lands due to the closure of the project area. Additionally, segments of BLM routes would be closed to public access. Diminished scenic values would also adversely affect recreational experiences in the project vicinity.

#### **4.22.12 Socioeconomics and Environmental Justice**

No unavoidable adverse impacts on socioeconomic or environmental justice would result from the construction and operation of the Calico Solar Project.

#### **4.22.13 Special Designations**

Unavoidable adverse impacts would include the permanent loss of naturalness and diminished opportunities for solitude and primitive and unconfined recreation in the southwest area of the Cady Mountain WSA and to a lesser extent, the north area of the Rodman Mountains WA.

#### **4.22.14 Traffic and Transportation**

Approval of any of the three action alternatives would result in the closure of segments of currently open BLM routes that traverse the project site and result in direct adverse impacts on public users of the area. The closure of BLM routes would also result in direct adverse impacts on the owners of private properties in the project vicinity who rely on BLM routes for access to their properties, and recreational and other users who use BLM routes for access to recreational sites and other destinations.

#### **4.22.15 Visual Resources**

The Calico Solar project would degrade the existing visual character and quality of the site and its surroundings. An area of roughly 8 square miles, including over approximately 6 miles of frontage on I-40, would experience a visual transformation from a predominantly natural desert landscape to one of a highly industrial character. The character and quality of views from some areas the Cady Mountains WSA would be adversely impacted.

#### **4.22.16 Hydrology and Water Resources**

Approval of the Calico Solar Project would result in long-term, localized, adverse impacts on the surface hydrology of the project site and areas adjacent to and downstream of the project site. The long-term impacts on the ephemeral drainages designated as State Waters would also be considered an unavoidable adverse impact. While long-term, impacts on surface hydrology would not be permanent, because the project site and adjacent areas would be reclaimed after termination of the project.

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# Chapter 5

## Consultation, Coordination, and Public Participation

### 5.1 Scoping Process

Scoping is the process that is used by federal agencies to solicit public and agency comments on the issues, impacts, and potential alternatives to be addressed in an environmental document, as well as the degree to which those issues and impacts will be analyzed. Scoping is one form of public involvement in the EIS process; scoping occurs early in the process and generally extends through the development of alternatives (BLM 2008).

Scoping activities for the proposed Calico Solar Project and CDCA Plan amendment were conducted jointly by the BLM and CEC in accordance with federal and state law. The BLM published the Notice of Intent (NOI) to prepare an EIS for the Calico Solar Project and amend the CDCA Plan in the June 8, 2009 Federal Register (Volume 74, Number 108 FR 27176-27178). The NOI included notice for the BLM's formal scoping meeting. The NOI was accompanied by a June 8, 2009, news release publicizing the NOI and the June 22, 2009, public scoping meeting in Barstow, California. A joint BLM scoping meeting and CEC informational hearing and site visit were held in Barstow, California, on June 22, 2009, to solicit public participation in the project. The meeting included presentations by the BLM, CEC, and the Applicant. The 30-day public scoping period ran from June 8 to July 7, 2009. Written comments were received from public agencies, nongovernmental organizations, and members of the general public.

Scoping efforts and comments received during project scoping for the Calico Solar Project are documented in a final scoping report and summarized in Table 5-1.

**Table 5-1 Summary of Written Scoping Comments for the Proposed Calico Solar Project**

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
<b>Comment Letters from Public Agencies</b>			
United States Environmental Protection Agency (EPA) (letter dated 7/7/2009)	EPA-1	EPA supports the use of renewable energy resources.	See Table Note 1
	EPA-2	Purpose and Need: Provide a clear and objective statement of the project's purpose and need.	Purpose and Need
	EPA-3	Alternatives: Provide a robust range of alternatives; explain why some alternatives were eliminated; look at alternative sites, capacities, technologies.	Alternatives
	EPA-4	Water Resources: Estimate the quantity of water required, the source, and the potential effects on other water users and natural resources in the area of influence.	Hydrology, Water Use, and Water Quality
	EPA-5	Groundwater: Direct, indirect, and cumulative effects on groundwater.	Hydrology and Water Resources
	EPA-6	Water Quality: Potential effects of project discharges on surface water quality	Hydrology and Water Resources
	EPA-7	Water Quality: Potential need for a Section 404 permit.	Hydrology and Water Resources
	EPA-8	Water Quality: Discuss any Section 303(d) impaired waters in the project area.	Hydrology and Water Resources
	EPA-9	Biological Resources: Address threatened and endangered species in detail, including baseline conditions; how avoidance, minimization, and mitigation measures will protect species, and long-term management and monitoring efforts	Biological Resources and Special Designations
	EPA-10	Invasive species: Address potential for project to introduce invasive species; how they will be controlled; development of an invasive species management plan; and restoration, as appropriate, of native species.	Biological Resources
	EPA-11	Indirect and Cumulative Impacts: Identify the resources that may be cumulatively impacted and the geographic area that will be impacted by the project; look at past impacts on resources; identify opportunities to avoid and minimize cumulative impacts.	Environmental Consequences

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
	EPA-12	Climate Change: Quantify and disclose the anticipated climate change benefits of solar energy; climate change's potential influence.	Climate Change
	EPA-13	Air Quality: Detailed discussion of ambient air quality; quantify project emissions; specify emission sources by pollutant (mobile, stationary, ground disturbance); identify the need for an Equipment Emissions Mitigation Plan and Fugitive Dust Control Plan.	Air Quality
	EPA-14	Consultation with Tribal Governments: Describe process and outcome of government-to-government consultation; address the existence of Indian sacred sites in the project area; provide a summary of all coordination with Tribes and the State and Tribal Historic Preservation Offices including identification of National Register of Historic Places eligible sites and development of Cultural Resources Management Plan.	Cultural Resources and Native American Consultation
	EPA-15	Environmental Justice: Identify environmental justice populations in the project area and potential impacts of the project on those populations; identify whether the impacts are disproportionate on those populations; discuss any coordination with environmental justice populations.	Socioeconomics and Environmental Justice
	EPA-16	Recreation: Address effects of the project on recreational users in the project area, including potential hazards to those users associated with the project facilities; identify appropriate safety precautions	Recreation
	EPA-17	Hazardous Materials and Wastes: Address potential indirect, direct, and cumulative impacts of hazardous wastes generated during project construction and operation; identify types and volumes of wastes; identify handling, storage, disposal, and management plans; alternative industrial processes using less toxic materials should be considered.	Public Health and Safety
	EPA-18	Land Use: Identify how the proposed action would support or conflict with objectives of federal, state, tribal, or local land use plans, policies, and controls in the project area.	Land Use

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
<b>Comment Letters from Groups and Organizations</b>			
Michael J. Conner, Ph.D., California Director, Western Watersheds Project (WWP) (undated letter)	WWP-1	Alternatives: Present environmental impacts of Proposed Action and alternatives in comparative form; consider “No Action Alternative” and “Alternative Site” alternatives.	Alternatives
	WWP-2	Desert Tortoise: Describe, clearly characterize, and identify the impacted desert tortoise populations; ensure genetic connectivity among Desert Tortoise populations; fully document genetic background and provide a firm estimate of population size; frank estimates of expected losses; and provide a review of direct, indirect, and cumulative impacts on the West Mojave Recovery Unit.	Biological Resources
	WWP-3	Desert Bighorn Sheep: Review all direct, indirect, and cumulative impacts to bighorn sheep including linkage to habitat and connectivity issues.	Biological Resources
	WWP-4	Other Sensitive Animals and Plants: Fully analyze impacts to other sensitive species (i.e., Mojave fringe-toed lizard) and ensure compliance with West Mojave Plan’s conservation strategy and other applicable governing plans.	Biological Resources
	WWP-5	Wilderness Values: Provide a review of the direct, indirect, and cumulative impacts on the Cady Mountain WSA.	Special Designations
	WWP-6	Biological Resources: Use the recently released USGS desert tortoise habitat model to determine likely changes in desert tortoise habitat quality in the area and the importance of connectivity between populations.	Biological Resources
	WWP-7	Monitoring: Explain monitoring programs to monitor short and long term impacts of the project area.	Monitoring and Compliance
Defenders of Wildlife (DW) (letter dated 7/11/2009)	DW-1	Biological Resources: Concerned that the proposed project will reduce populations of certain wildlife, particularly Desert tortoise, bighorn sheep, and birds of prey.	Biological Resources
	DW-2	Does not believe the project area is in a degrading condition due to mining, livestock grazing, and off-road vehicle use as suggested.	Land Use

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
	DW-3	CEC and BLM should study and disclose the magnitude of development on wildlife movement, specifically the Desert tortoise and Desert bighorn sheep.	Biological Resources
	DW-4	Catalogue and discuss sensitive species populations and habitats present in the area and those cumulatively affected by this project and others in the area; articulate and implement a monitoring plan for sensitive species.	Biological Resources
	DW-5	Alternatives: Consideration of alternatives that include different sites or a reduction of project size.	Alternatives
	DW-6	Cumulative Impacts: Examine and disclose environmental effects of projects and human activities in the area	Environmental Consequences
	DW-7	Interagency consultation for endangered and threatened species, specifically the Desert tortoise.	Biological Resources
Meg Grossglass, Off-Road Business Association (ORBA) and EcoLogic Partners, Inc. (undated letter)	ORBA-1	Recreation: Potential indirect, direct, and cumulative impacts to recreational uses in the area.	Recreation
	ORBA-2	Inclusion of a "Reclamation Plan."	Alternatives
	ORBA-3	Water Quality: Impact on available water supplies.	Hydrology and Water Resources
	ORBA-4	Visual Impacts: Evaluate the project's aesthetic and visual impacts on the region.	Visual Resources
	ORBA-5	Biological Resources: Evaluate the project's direct, indirect, and cumulative impact on endangered and threatened species.	Biological Resources
	ORBA-6	Land Use: Evaluate project's consistency with existing land use and regulatory plans.	Land Use
	ORBA-7	Environmental Justice: Evaluate whether the project's environmental burdens are disproportionately placed on individuals and/or groups who, due to their socioeconomic status, have insufficient resources to challenge the project.	Socioeconomics and Environmental Justice
	ORBA-8	Cultural Resources: Evaluate potential impacts on archaeological, cultural, and historic resources.	Cultural Resources

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
	ORBA-9	Alternatives: Evaluate and analyze feasible alternatives to the proposed project; public access to the Cady Mountains will be lost if approved as proposed; suggests four alternatives that would minimize the impact to public access of the area.	Alternatives
George C. Kerr, Wildlife & Habitat Coordinator, Society for the Conservation of Bighorn Sheep (SCBS) (letter dated 6/22/2009)	SCBS-1	Biological Resources: Concerned about the loss of habitat for bighorn sheep and the fragmentation of metapopulations; must maintain access through and/or around the area for wildlife management.	Biological Resources
	SCBS-2	Full and complete reclamation.	Alternatives
The Wilderness Society (WS) and The National Resources Defense Council (letter dated 7/7/2009)	WS-1	Biological Resources: Prioritize protection of species in the project area by further analyzing potential impacts and developing best management practices and steps to minimize and mitigate any unavoidable impacts.	Biological Resources
	WS-2	Cultural Resources: BLM should prioritize protection of area's outstanding cultural resources, including study of the area's resources, development of strategies to minimize and mitigate impacts, and ongoing engagement in consultation with local Native American tribes.	Cultural Resources
	WS-3	Soil Resources: Dedicate adequate time and resources early in the process to addressing soil resources issues adequately, including through the preparation of a detailed drainage, erosion and sediment control plan that addresses these potential impacts and provides mitigation measures that will render these hazards to a level less than significant.	Hydrology and Water Resources
	WS-4	Water Resources: Gather additional information to confirm that the water needed for the project will be available as well as that the source of the needed water will conform to existing CEC policy and all laws, ordinances, regulations, and standards.	Hydrology and Water Resources
	WS-5	Visual Resources: BLM and CEC should continue to collaborate on a visual analysis conforming to BLM regulations to address concerns identified in the Issue Identification Report.	Visual Resources
	WS-6	Alternatives: Consider a project boundary alternative that avoids the Catellus parcels.	Alternatives

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
	WS-7	Land Use: Plan Amendment must fully analyze the impacts of this scale of industrial development on public lands of a largely undisturbed nature.	Land Use
	WS-8	Phased Development: BLM should consider granting a ROW only for the area necessary to support development for TE1 upgrades at this time. When TE2 upgrades have been approved, then BLM can consider granting ROW for the area necessary for the remaining 575 megawatts; because of technological challenges, BLM should consider establishing requirements for demonstration of technological and economic viability of the project within the first 3–5 years before extending the term of the ROW.	Alternatives
	WS-9	Should comprehensively analyze the project's net reductions to GHG emissions, including GHG emissions during manufacture, construction, operation, decommissioning, and reclamation of the area. Analysis should consider both the potential for the project to reduce GHG emissions as well as potential for the project to increase these emissions. The results should then be compared to the same type of analysis for fossil-fuel based energy production, including combined-cycle natural gas fired and coal fired power plants.	Climate Change
	WS-10	Agencies should do a thorough analysis of the anticipated costs of decommissioning and restoring the area. The agencies should also require bonds be purchased before development.	Alternatives
	WS-11	Agencies must thoroughly consider and present the public with a true range of alternatives. Agencies should also compare the project and its impacts with all other identified "fast-track" projects on BLM land in order to identify the least environmentally harmful projects among the applicants that have been selected for expedited permitting.	Alternatives

<b>Name and Agency of Commenter (Date of Comment)</b>	<b>Comment Number</b>	<b>Summary of Comments by Environmental Parameter or Topic</b>	<b>Where the Comments are Addressed in the FEIS</b>
April Sall, Conservation Director, The Wildlands Conservancy (TWC) (letter dated 7/7/2009)	TWC-1	The Wildlands Conservancy supports the use of renewable energy resources.	See Table Note 1
	TWC-2	Phase 1 of the project lies on the boundary of the Pisgah Area of Environmental Concern, Cady Mountains WSA, and proposed Mojave National Monument boundary (which includes the Catellus lands). This is of high concern because of the cumulative impacts the site would have on this highly environmentally sensitive area.	Special Designations
	TWC-3	Development of Phase 2 of the project should begin before Phase 1 because Phase 2 is closer to the Pisgah substation, closer to several existing transmission ROWs, closer to I-40, and provides better acreage to megawatt production ratio	Alternatives
	TWC-4	If Phase 1 must proceed first, shift the site to the west so as to eliminate encroachment onto BLM-managed Catellus sections, the proposed national monument, Cady Mountains WSA, several Desert Wildlife Management Areas, and sensitive plant species.	Alternatives
	TWC-5	The mock-up of the site during the site tour does not match that in the document.	Alternatives
	TWC-6	Because of the nature of the soil in the area, more impactful drilling methods will be required.	Geology and Soils
	TWC-7	Carbon emissions will increase with the loss of critical cryptobiotic soil crusts and caliche layers which help stabilize the ground and sequester carbon; contributing to climate change, lessening the benefits of renewable energy generated.	Climate Change
	TWC-8	Habitat and microhabitat impact assessments are necessary before any further developments.	Biological Resources
	TWC-9	Phase 1 will block access to historical trails and open routes on public land in this area.	Land Use Traffic and Transportation
	TWC-10	Water Resources: Utilize technology that is “dry-cooled” instead of “wet-cooled”; how much water will be used during each phase of the project? how will wastewater be managed?	Hydrology and Water Resources
	TWC-11	Consider using private and public lands that have been previously degraded or disturbed and closer to existing transmission.	Alternatives

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
Loulena A. Miles, California Unions for Reliable Energy (CURE) (letter dated 6/22/2009)	CURE-1	Does not provide adequate information or analysis in the following biological areas: (1) baseline information regarding desert tortoise; (2) mitigation for impacts to desert tortoise; (3) impacts to burrowing owl; (4) rare plants survey methods and baseline data; (5) rare plant impact assessment; (6) rare plant mitigation; (7) impacts to the Mojave fringe-toed lizard; (8) impacts to Nelson's bighorn sheep; (9) impacts to wildlife corridors; (10) impacts to nesting bird species; (11) collision hazards; (12) wildlife mortality from evaporation ponds.	Biological Resources
	CURE-2	Does not provide adequate information or analysis regarding impacts to potential jurisdictional waters.	Hydrology and Water Resources
	CURE-3	Does not provide adequate information or analysis regarding cumulative impacts of the project.	Environmental Consequences
	CURE-4	Does not provide adequate information or analysis regarding compliance with laws, ordinances, rules, and standards.	Affected Environment
Kevin Emmerich and Laura Cunningham, Basin and Range Watch (BRW) (e-mail dated 6/8/2009)	BRW-1	Concerned the BLM is intentionally streamlining the approval of the project.	Introduction and Purpose and Need
<b>Comment letters from Members of the General Public</b>			
David Beaumont (DB) (e-mails dated 7/7/2009 and 7/10/2009)	DB-1	Proposed fencing along project boundary will cut off vehicular access to a guzzler maintained by the California Department of Fish and Game.	Biological Resources
	DB-2	What design criteria will be utilized to continue wildlife migration routes through the fenced area?	Biological Resources
	DB-3	Wildlife habitat and recreational access will be lost with the building of the boundary fence; what will be done to mitigate these losses?	Biological Resources Recreation
	DB-4	Will the damage to the area be reclaimed after the project is over?	Alternatives Biological Resources
	DB-5	Suggests leaving a corridor open between Solar 1 and Solar 3 for animal and vehicle traffic.	Alternatives
	DB-6	Suggests moving proposed boundaries back in order to allow vehicular traffic along the fence lines in order to connect routes which have been isolated.	Traffic and Transportation

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
	DB-7	Concerned with the number of miles of access roads needed for the project and the closure of existing roads used for recreational and wildlife care purposes.	Traffic and Transportation
Joachim Falkenhagen (JF) (e-mail dated 7/8/2009)	JF-1	Local climate consequences of solar thermal generation should be assessed in the future.	Climate Change
	JF-2	Stirling dishes are less suitable to water cooling than parabolic trough solar power stations; the cumulative number of solar projects in the area might make it possible to bring water from the Pacific for cooling, though that would need to be established with a feasibility study.	Alternatives
Joe Orawczyk (JO) (e-mail dated 6/23/2009)	JO-1	Water Resources: Concerns with transmission of water from groundwater wells (what type of underground pipelines). Will there be water towers or evaporative coolers on site and how much water will these use? What is the total number of groundwater wells that will be dug for the project? Water tank size will hold larger quantity than stated.	Hydrology and Water Resources
	JO-2	How will Stirling Energy Systems accommodate visitors? Will there be public parking? Will there be a Welcome Center or museum? Are there safety plans for visitors? How will increase in local traffic and trash be mitigated? What effect will visitors have on water resources? Will an observation point be built for visitors?	Environmental Consequences
	JO-3	What are the hazards of flood paths within the project area? Has the delineation been done; if not, when will it be available and will it be publicly available?	Hydrology and Water Resources
	JO-4	What effect will nighttime light pollution have on wildlife and travelers? Will there be light along the perimeter fence? How will light pollution be mitigated? Would night vision security cameras be an option after construction?	Visual Resources Biological Resources
	JO-5	Has there been any coordination with Homeland Security? How quickly could Solar 1 recover from a potential terrorist attack? Who will pay for security and repair if subject to a terrorist attack?	Public Health and Safety
	JO-6	Will the total dissolved solids in the evaporative ponds from washing mirrors be hazardous? Could the brine be filtered and used for dust control, fire suppression, and flushing commodes?	Public Health and Safety

Name and Agency of Commenter (Date of Comment)	Comment Number	Summary of Comments by Environmental Parameter or Topic	Where the Comments are Addressed in the FEIS
	JO-7	How often will the mirrors be washed? There is some discrepancy in different parts of the Application for Certification. Will the washing be done manually or automatically?	Alternatives
	JO-8	Some conflicting data in amount of potable water used.	Alternatives Hydrology and Water Resources
	JO-9	Of the 182 workers, how many will be work construction and how many non-construction? What will their work schedules be? What will workforce fluctuations be for the life of the project and what will their effect be on the environment and water resources?	Introduction
	JO-10	Size of the aquifer and does it recharge? What is the risk of the depleted aquifer creating a sinkhole?	Hydrology and Water Resources
	JO-11	Why was data on pump and water quality tests insufficient? What are the level of nitrates, fluoride, pharmaceuticals, and endocrine disrupters in the water? How will the water be treated? If chemicals are used, what (if any) health risks or hazards to people do they pose? How will that be mitigated/controlled?	Hydrology and Water Resources
	JO-12	Will secondary wells be capped and abandoned or removed and backfills after construction?	Hydrology and Water Resources
	JO-13	Will workforce be permitted to drink deionized water to mitigate effects of excessive fluoride?	Hydrology and Water Resources
	JO-14	What further evaluation will be done for the various options that may be available to treat, store, and distribute the water?	Hydrology and Water Resources
	JO-15	Will reverse osmosis be used? If so, how much energy will this consume? If not, why the need for evaporative ponds?	Hydrology and Water Resources
	JO-16	If bottled water and/or soda will be available, what recycling program will be implemented? Which bottling companies are being considered and are they local?	
	JO-17	Will the use of waterless urinals and compost toilets be considered? If not, what approved off-site disposal facility will receive the waste?	Project Description
	JO-18	Concerned with lack of closure plan.	Project Description

*Table General Note:* If individuals who use assistive technology experience any difficulty accessing this table and need help with its data or information, please contact the Bureau of Land Management, Barstow Field Office, at 760-252-6000. Please reference the *Final Environmental Impact Statement and Proposed Amendment to the California Desert Conservation Area Plan for the Calico Solar (formerly SES Solar One) Project, San Bernardino County, California*, dated August 2010.

*Table Note 1:* This comment does not raise an issue under NEPA or CEQA. All comments describing support for or opposition to the proposed project or asking for analyses not required under CEQA or NEPA will be considered by the decision-makers at the BLM and the CEC.

*Table Key:* BLM = Bureau of Land Management; CEC = California Energy Commission; CEQA = California Environmental Quality Act; EPA = U.S. Environmental Protection Agency; FEIS = Final Environmental Impact Statement; GHG = greenhouse gas; NEPA = National Environmental Policy Act; ROW = right-of-way; USGS = U.S. Geological Survey; WSA = wilderness study area.

## **5.2 Organizations and Individuals Consulted**

### **5.2.1 Agency Coordination**

The following agencies were consulted as part of agency scoping for the Calico Solar Project.

#### **Federal**

- U.S. Army Corps of Engineers
- U.S. Department of Energy (a cooperating agency under NEPA)
- U.S. Environmental Protection Agency, Region IX
- U.S. Fish and Wildlife Service

#### **State**

- California Department of Fish and Game
- California State Office of Historic Preservation
- California State Water Resources Control Board/Lahontan Regional Water Quality Control Board

#### **Local**

- Mojave Desert Air Quality Management District

- Mojave Water Agency
- San Bernardino County

### **5.2.2 Public Coordination**

Public involvement is an important part of the NEPA process. Public involvement begins early in the NEPA process, with scoping, and continues throughout the preparation of the analysis and decision (BLM 2008). The public was notified of the proposed Calico Solar Project and how to provide comments at several milestones during the process. While comments are accepted anytime during the EIS process, a 30-day public comment period was provided during project scoping, a 90-day public comment period was provided after the NOA for the DEIS was released, and a 30-day public comment period is provided after the NOA for the FEIS is issued. In addition, an agency may request comments on an FEIS before the decision is finally made (40 CFR 1503.1[b]) Written comments are typically submitted by postal letter or e-mail or on comment forms and question cards during public workshops and meetings.

The BLM and CEC developed a mailing list as part of their public outreach efforts. The mailing list included property owners near the project site; local, state, and national agencies with potential jurisdiction over the project; local and state elected officials and certain appointed officials; interested parties; and “sensitive receptors” (including schools, community, cultural and health facilities, and daycare and senior-care centers, as well as environmental and ethnic organizations). Notices for workshops and hearings have been and will continue to be distributed to those agencies, individuals, and businesses that are on or request to be placed on the project’s mailing list.

The CEC and the BLM held the following public meetings, workshops, and public hearings to inform the public and solicit input about the proposed project:

- June 22, 2009, Scoping Meeting and Informational Hearing (Barstow, California)
- September 16, 2009, Data Response and Issues Resolution Workshop (Barstow, California)
- December 22, 2009, Data Response and Issues Resolution Workshop (Sacramento, California)
- April 16, 2010, CEC Workshop for SA/DEIS (Barstow, California)
- April 28, 2010, BLM Public Information Meeting and Open House for SA/DEIS (Newberry Springs, California)

Project information and documents are posted on the BLM's and the CEC's project Web sites as follows:

- BLM Web site: [http://www.blm.gov/ca/st/en/fo/barstow/solar\\_one\\_calico.html](http://www.blm.gov/ca/st/en/fo/barstow/solar_one_calico.html)
- CEC Web site: <http://www.energy.ca.gov/sitingcases/calicosolar/index.html>

### **5.2.3 Native American Consultation**

The BLM notified affected Indian tribes regarding the proposed Calico Solar Project, has sought their comments, and has invited them to consult on the project on a government-to-government basis. Refer to Chapter 7 for more information about the Native American consultation process.

## **5.3 Public Review of the SA/DEIS**

The SA/DEIS was released on March 30, 2010, and the EPA published a NOA for the document on April 2, 2010. Additionally, the BLM published a NOA for the SA/DEIS on April 19, 2010. The 90-day public comment period on the DEIS ran from April 2 to July 1, 2010. Two public meetings were held after the publication of the SA/DEIS. The CEC facilitated the first public meeting (called a staff workshop) in Barstow on April 16, 2010. The CEC staff provided a description of the project, followed by a question-and-answer session. Participants had the opportunity to attend in person; by telephone; and through WebEx, an online forum that allows participants to attend electronically through a Web hosting program.

The second public meeting was held on April 28, 2010, in Newberry Springs, California, approximately 17 miles east of Barstow. The BLM hosted this public information meeting and open house. Representatives from the BLM and the Applicant presented a slide show and answered questions from attendees.

Comments received on the SA/DEIS were analyzed and used in the preparation of this FEIS. Because the SA/DEIS was a joint federal-state effort by the BLM and CEC, the BLM accepted and responded to all comments received on that document in this FEIS regardless of whether they were submitted directly to the BLM or the CEC.

Approximately 22 sets of comments were received on the SA/DEIS during the BLM's 90-day public comment period. Comments were received from eight individuals, one agency (San Bernardino County), and nine organizations. Those agencies and individuals that provided comments concerning the project have been considered in this FEIS environmental analysis. Appendix G includes an overview of the written comments received by the BLM and CEC on the SA/DEIS, and the BLM's responses to the individual comments.

## 5.4 Administrative Remedies

An NOA of the FEIS is being published in the *Federal Register* simultaneously with the release of this document. The FEIS will be available for public review for a minimum of 30 days before the BLM issues a ROD.

All alternatives remain viable under NEPA until the ROD is signed at the conclusion of the EIS process. Upon signing of the ROD, the decision regarding the ROW grant is in full force and effect; however, in most cases appeals can be made to the DOI Board of Land Appeals upon issuance of the ROD. The FEIS also contains a proposal to amend the CDCA Plan. Proposed plan amendment decisions may be protested within 30 days after the EPA publishes the NOA for the FEIS in the *Federal Register*. The BLM cannot authorize implementation of the decision regarding issuance of a ROW grant until any protest regarding the plan amendment decision is resolved.

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## **Chapter 6**

# **Monitoring and Compliance**

The BLM's NEPA Handbook H-1790-1 (BLM 2008) explains the purpose of monitoring projects as they are implemented. Monitoring can provide important information to the BLM, including whether decisions were implemented as designed, their influence in achieving desired outcomes, and the effectiveness of the mitigation measures. The ROD for the Calico Solar Project, should the BLM proceed to implement an action alternative, will include adoption of a monitoring and enforcement program for project mitigation. Mitigation measures proposed to date for the project are discussed in Chapter 4, Environmental Consequences, and in Appendix D of this FEIS. When developing the ROD, the BLM may consider the SA/DEIS Conditions of Certification, additional Conditions of Certification from the Supplemental SA, and other mitigation measures developed by the BLM and other regulatory agencies. The Applicant's POD contains procedures and best management practices to minimize environmental impacts, and these will also be monitored for compliance.

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# Chapter 7

## Native American Consultation, Concerns, and Values

The Native American Heritage Commission (NAHC) was contacted on July 22, 2008, to search the Native American Sacred Lands File (SLF) as an aid in determining the presence of Native American sacred sites within the project APE. A list of Native American contacts that may have knowledge of known cultural resources or sacred sites within the Project APE was also requested.

The NAHC responded on July 24, 2008, and indicated a records search of the SLF “failed to indicate the presence of Native American cultural resources in the immediate Project Area.” In addition to the response letter, the NAHC also provided a Native American contact list.

### 7.1 Government-to-Government Consultation

Letters offering formal government-to-government consultation were issued by the BLM Barstow Field Office on November 5, 2008. BLM is the lead federal agency and consultation between interested Native American groups and BLM is ongoing pursuant to the Executive Memorandum of April 29, 1994, as well as other relevant laws and regulations, including Section 106 of the National Historic Preservation Act (NHPA). The following tribes or tribal organizations were invited to participate in government-to-government consultation:

- Colorado River Indian Tribes
- Fort Mojave Indian Tribe
- Morongo Band of Mission Indians
- San Manuel Band of Mission Indians
- Twentynine Palms Band of Mission Indians
- Chemehuevi Reservation

General informational meetings about the project were held on November 10, 2009. The BLM has responded to three requests for formal meetings with the following tribes: the San Manuel Band of Mission Indians, Twentynine Palms Band of Mission Indians, and the Chemehuevi Reservation; the BLM has received some written comments from tribal governments. A field visit

to the Calico Solar Project site took place on June 13, 2010, and was attended by members of the San Manuel Band of Mission Indians, Fort Mojave Indian Tribe, Twentynine Palms Band of Mission Indians, and the Chemehuevi Reservation.

Consultation with Native American tribes and discussions with tribal organizations and individuals have revealed a few concerns about the cultural resources within and near the Calico Solar Project site.

As a result of those meetings, the project footprint has been redesigned to address tribal concerns.

# Chapter 8

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#### ***4.21 Short-Term Uses Versus Long-Term Productivity of the Environment***

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## **Chapter 7 Native American Consultation, Concerns, and Values**

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## **Chapter 8 List of Preparers**

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## **Chapter 10 Index**

[No references/citations]

## **Chapter 11 Glossary**

[No references/citations]

## **Appendix A Figures**

[No references/citations]

## **Appendix B CEC and BLM Memorandum of Understanding**

[No references/citations]

## **Appendix C Determination of NEPA Adequacy**

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## **Appendix D Summary of Proposed Mitigation Measures**

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## **Appendix E Cultural Resources Documentation**

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## **Appendix F Determination Regarding US Army Corps of Engineers Permit**

[No references/citations]

## **Appendix G Public and Agency Comments on the Draft Environmental Impact Statement**

[No references/citations]

## **Appendix H Biological Assessments**

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# Chapter 11

## Glossary

The following is a glossary of common technical terms used throughout this FEIS.

Technical Term	Definition
Adverse impact	The effect is negative to a particular resource or a number of resources.
Aeolian	Of or caused by the wind; wind-blown.
Aesthetic value	(See "scenic quality")
Aestivate	To pass the summer in a dormant or torpid state.
Affect	To bring about a change. As a verb, affect is most commonly used in the sense "to influence" or "impact." The adjective "affected" means acted upon or influenced.
Air dispersion model	A mathematical model that estimates the maximum expected affects of project emissions for comparison with the state and federal ambient air quality standards for criteria pollutants.
Albedo	Surface reflectivity of sun's radiation.
Alkali	A soluble salt or a mixture of soluble salts present in some soils or arid regions in quantity detrimental to agriculture.
Alkaline	Of, relating to, containing, or having the properties of an alkali or alkali metal; basic.
Alluvial	A fan-shaped deposit formed where a fast flowing stream flattens, slows, and spreads typically at the exit of a canyon onto a flatter plain.
Alternatives	Other options to the proposed action by which the BLM can meet its purpose and need. The BLM is directed by the NEPA to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources" (NEPA Section 102[2]E).
Ambient noise level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Amendment	The process for considering or making changes in the terms, conditions, and decisions of approved RMPs or MFPs. Usually only one or two issues are considered that involve only a portion of the planning area.
Anthropogenic	Effects, processes, or materials that are derived from human activities.
Area of critical environmental concern (ACEC)	Areas within the public lands where special management attention is required to protect or prevent irreparable damage to resource values.

Technical Term	Definition
Arizo soils	Arizo soils are also formed in mixed alluvium and are present on recent alluvial fans, inset fans, fan apron, fan skirts, stream terraces, and in intermittent stream and channel floodplains. The material is typically very gravelly fine sand with 35 percent to 80 percent gravel and cobbles, increasing with depth. The A horizon is very gravelly fine sand with 35 percent pebbles. The soils are very deep, excessively drained, with negligible to medium runoff and rapid to very rapid permeability.
Arthropod	Any of a phylum (Arthropoda) of invertebrate animals (as insects, arachnids, and crustaceans) that have a segmented body and jointed appendages, a usually chitinous exoskeleton molted at intervals, and a dorsal anterior brain connected to a ventral chain of ganglia.
Attainment area	This is a geographic or politically delineated air basin that meets the national ambient air quality standards for criteria pollutants.
Attenuation	A decrease in severity.
A-weighted sound level	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this EIS are A-weighted. A unit describing the amplitude of sound measured on a sound level meter using the A-weighting filter network is a dBA.
Background concentrations	Natural and manmade sources of air pollution not related to the proposed action or alternatives.
Bajada	Broad slope of debris spread along the lower slopes of mountains by descending streams, usually found in arid or semiarid climates; the term was adopted because of its use in the U.S. Southwest. A bajada is often formed by the coalescing of several alluvial fans.
Beneficial impact	The effect is positive to a particular resource or a number of resources.
Best management practices (BMPs)	A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered a land use plan decision unless the land use plan specifies that they are mandatory. They may be updated or modified without a plan amendment if they are not mandatory.
Biological carbon sinks	Areas that naturally absorb carbon dioxide, including forests and desert soils.
Bitter soils	Similar to Arizo and Nickel soils, Bitter soils are formed in mixed alluvium. They are present on dissected old fans between lower recent fans and the toes of steep slopes generally ranging from 2 percent to 15 percent. The material is extremely gravelly sandy loam with 45 percent to 75 percent pebbles and cobbles. The upper horizons are composed of extremely to very gravelly sandy loam with 50 percent pebbles and cobbles. Bitter soils are well drained with medium runoff and moderately slow permeability.
California Climate Action Team	A group of 14 agencies and 11 subgroups that assists CARB with the Climate Change Scoping Plan.

Technical Term	Definition
Calvista series	Calvista series consists of sandy loam formed from granitic rock with seams of calcite. It is typically present on slopes of 2 percent to 30 percent and mountain ridges, buttes and domes in Southern California deserts. Hard rock is generally present at a depth of 14 to 20 inches, although rock outcrops may be present. The gravel content is typically less than 35 percent. Calvista soils are shallow and well drained soils, with medium to rapid runoff and moderately rapid permeability.
Carbon footprint	A measurement of all greenhouse gases that we individually produce, which is measured in metric tons (or kg) of carbon dioxide equivalent.
Carrizo soils	Carrizo soils are formed in alluvium present primarily on flood plains, alluvial fans, fan piedmonts, and bolson floors, with slopes up to 15 percent. These soils are typically very deep gravelly sand. The upper 2 inches is extremely gravelly sand with about 65 percent gravel. Below the upper 2 inches, the material contains coarse sand and averages 70 percent gravel and coarser materials, with clay content less than 8 percent. The soils are excessively drained with negligible or very low runoff and rapid or very rapid permeability.
Characteristic landscape	The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.
Closed	Generally denotes that an area is not available for a particular use or uses; refer to specific definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 sets forth the specific meaning of “closed” as it relates to off-highway vehicle use, and 43 CFR 8364 defines “closed” as it relates to closure and restriction orders.
Clutch	A clutch of eggs refers to all the eggs produced by birds or reptiles often at a single time, particularly those laid in a nest.
Community noise equivalent level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Condition class	Depiction of the degree of departure from historical fire regimes, possibly resulting in alternations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk).
Cone of depression	The depression in a water table around a well defining the area of influence of a well.
Conformance	Means that a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the terms, conditions, decisions, goals, objectives, or standards of the approved land use plan or amendment. The BLM policy requires that a statement of land use plan conformance be included in a NEPA compliance document.

Technical Term	Definition
Connected action	Those actions that are “closely related” and “should be discussed” in the same NEPA document (40 CFR 1508.25 [a][1]). Actions are connected if they automatically trigger other actions that may require an EIS; cannot or will not proceed unless other actions are taken previously or simultaneously; or if the actions are interdependent parts of a larger action and depend upon the larger action for their justification (40 CFR 1508.25 [a][1]). Connected actions are limited to actions that are currently proposed (ripe for decision). Actions that are not yet proposed are not connected actions, but may need to be analyzed in cumulative effects analysis if they are reasonably foreseeable.
Connectivity	The degree to which the landscape facilitates or impedes movement among resource patches.
Consistency	Means that the proposed land use plan does not conflict with officially approved plans, programs, and policies of Tribes, other Federal agencies, and state and local governments (to the extent practical with Federal law, regulation, and policy).
Contrast	Opposition or unlikeness of different forms, lines, colors, or textures in a landscape; created by the introduction of features in the landscape that stand out from the existing visual elements and patterns.
Cooperating agency	Assist the lead federal agency in developing an Environmental Assessment (EA) or Environmental Impacts Statement (EIS). The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act of 1969 (NEPA) define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any federal, state, or local government jurisdiction with such qualification may become a cooperating agency by agreement with the lead agency.
Corridor	An area of habitat connecting wildlife populations separated by human activities (such as roads, development, or logging). This allows an exchange of individuals between populations, which may help prevent the negative effects of inbreeding and reduced genetic diversity (via genetic drift) that often occur within isolated populations. Corridors may also help facilitate the re-establishment of populations that have been reduced or eliminated due to random events (such as fires or disease).
Crepuscular	A term used to describe some animals that are primarily active during twilight that is at dawn and dusk.
Criteria pollutants	Air pollutants with national ambient air quality standards that define allowable concentrations of these substances in ambient air. Some states, including California, have adopted more stringent air quality standards.
Critical habitat	Habitat designated by the United States Fish and Wildlife Service for federally listed threatened or endangered species. The Endangered Species Act defines critical habitat as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

Technical Term	Definition
Cumulative action	Proposed actions, which, when viewed with the proposed action, potentially have cumulatively significant impacts related to one or more identified issues. Cumulative actions “should be discussed” in the same NEPA document (40 CFR 1508.25[a][2]).
Cumulative effect	“. . . the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions” (40 CFR 1508.7 and 1508.25).
Day-night level (L <sub>dn</sub> or DNL)	The average A-weighted sound level during a 24-hour period, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
dBA	Decibels, as measured on an A-weighted scale. The A-weighted scale begins at zero, representing the faintest sound that humans can hear.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Decision-maker	The BLM official who has been delegated authority to approve an action and is responsible for issuing a decision to implement a proposed action. Synonyms include authorized official, authorized officer, responsible official, and responsible manager.
Decision record (DR)	The BLM document associated with an EA that describes the action to be taken when the analysis supports a finding of no significant impact.
Demineralize	The act or process of removing minerals or mineral salts from a liquid, such as water.
Deposition	The act of depositing material, such as soil.
Design features	Measures or procedures incorporated into the proposed action or an alternative, including measures or procedures that could reduce or avoid adverse impacts. Because these features are built into the proposed action or an alternative, design features are not considered mitigation.
Designated roads and trails	Specific roads and trails identified by the BLM (or other agencies) where some type of motorized vehicle use is appropriate and allowed either seasonally or year-long.
Designated route	Specific roads and trails on which some type of motorized vehicle use is allowed either seasonally or yearlong.
Determination of NEPA adequacy (DNA)	An interim step in the BLM’s internal analysis process that concludes that a proposed action is adequately analyzed in an existing NEPA document (an EIS or EA). Where applicable, the determination also addresses conformance with an approved land use plan.
Direct effects	“. . . those effects which are caused by the action and occur at the same time and place” (40 CFR 1508.8[a]).
Disjunct	Discontinuous or separated in time or space.

Technical Term	Definition
Dispersed use	Certain activities occurring on BLM-administered lands that do not require specific authorizations and do not necessarily cause any appreciable disturbance or damage to the public lands. Camping, parking, picnicking, and recovering a harvested big game animal are examples of dispersed uses. These are activities that can normally be accomplished within a minimal distance of roads and vehicle trails. The public is allowed to pursue these activities <i>up to 300 feet away from roads</i> and trails, as long as such activities do not cause resource damage or create new roads or extend existing roads.
Distance zones	A subdivision of the landscape as viewed from an observer position. The subdivision (zones) includes foreground-middleground, background, and seldom seen.
Diurnal	Active primarily in the daytime.
Dynamic compaction	Dynamic compaction of soils results when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase in soil density).
Ecoregion	A large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions. The boundaries of an ecoregion are not fixed and sharp, but rather encompass an area within which important ecological and evolutionary processes most strongly interact.
Ecosystem	An interacting natural system including all the component organisms together with the abiotic environment and processes affecting them.
Effects	Impacts on the human environment brought about by an agent of change, or action. Effects analysis predicts the degree to which the environment will be affected by an action. The CEQ uses both the terms “effect” and “impact” in the NEPA regulations; these terms are synonymous in the NEPA context. As a noun, other synonyms include consequence, result, and outcome. Effects can be both beneficial and detrimental, and may be direct, indirect, or cumulative. See also “impacts.”
Enclosure	The quality or state of being enclosed; closed in, confined, surrounded, or held in.
Ephemeral	Present only during certain seasons; for a short duration after precipitation events.
Equivalent sound level ( $L_{eq}$ )	The energy average A-weighted sound level during the noise level measurement period.
Erosion	The process by which the surface of the earth is worn away by the action of water, glaciers, winds, waves, etc.
Escarpment	A long cliff or steep slope separating two comparatively level or more gently sloping surfaces and resulting from erosion or faulting.
Evaporation	The process of a liquid converting to a gaseous state.
Extirpation	Completely eliminated (as undesirable); uprooted. Within ecology, a species or other taxon which no longer exists in a certain area is extirpated or locally extinct.
Fecundity	Refers to the ability to reproduce. In biology the definition is more equivalent to fertility, or the actual reproductive rate of an organism or population, measured by the number of gametes (eggs), seed set or asexual propagules.

<b>Technical Term</b>	<b>Definition</b>
Federal lands	Lands managed by the United States government.
Federal Land Policy and Management Act (FLPMA) of 1976	Public Law 94-579, October 21, 1976, often referred to as BLM's "Organic Act," which provides the majority of BLM's legislated authority, policy direction, and basic management guidance.
Federal Register	The official daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as executive orders and other presidential documents. The Federal Register is published by the Office of the Federal Register, National Archives and Records Administration (NARA).
Fire hazard area	Those wildland areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems.
Fire and rescue resources	The necessary personnel, apparatus and equipment under the direct control of the fire and rescue service needed to provide mutual aid assistance for all emergencies; i.e., fire engines, ladder trucks, emergency medical service units, hazardous materials units, search and rescue, crash fire rescue, bulldozers, helicopters, fixed wing aircraft, hand crews, fire boats, communications equipment, etc.
Fire management	Activities required for the protection of burnable wildland values from fire and the use of prescribed fire to meet land management objectives.
Fire management area	One or more parcels of land having a common set of fire management objectives.
Fire regime	Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured, such as fire return interval.
Fire season	Period(s) of the year during which wildland fires are likely to occur, spread, and affect resources values sufficient to warrant organized fire management activities; a legally enacted time during which burning activities are regulated by federal, state or local authority.
Flame length	The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface), an indicator of fire intensity.
Flickering effect	The appearance of shining with a fluctuating light.
Fluvial	The processes associated with rivers and streams referring to the deposits and landforms created by the processes.
Forage	Refers to the act of searching for food or the food material that is obtained from foraging.
Foraging habitat	Habitat used for the acquisition of food.
Foreground	The area visible from a travel route, use area, or other observation point (to a distance of 0.5 mile, with respect to this particular document).
Form	The mass or shape of an object or objects which appear unified, such as a vegetative opening in a forest, a cliff formation, or a water tank.
Fossorial	A species that is adapted for digging or burrowing; a ground-dwelling animal.

Technical Term	Definition
Frequency	The number of complete pressure fluctuations per second above and below atmospheric pressure. Measured in hertz (Hz), which is defined as cycles per second.
Friable	A friable substance is any substance that can be reduced to fibers or finer particles by the action of a small pressure of friction on its mass, such as inadvertently brushing up against the substance.
Fuel	Any combustible material, especially petroleum-based products, but within a wildland setting, fuels are generally vegetation such as grass, shrubs, and timber.
Fuel bed	An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.
Fuel model	Simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.
Fuel type	An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.
Geomembrane	An impermeable membrane used with geotechnical material in order to block the migration of fluids.
Geomorphic	Relating to the form of the earth.
Germplasm	A collection of genetic resources for an organism. For plants, the germplasm may be stored as a seed collection or, for trees, in a nursery.
Glare	A harsh reflection of brightly shining light.
Global warming	An increase in the world's temperatures, believed to be caused in part by the greenhouse effect.
Global warming potential	A measure of how much a given mass of greenhouse gas is estimated to contribute to global warming and is devised to enable comparison of the warming effects of different gases.
Greenhouse gas (GHG)	Gas that absorbs radiation: a gas that contributes to the warming of the Earth's atmosphere by reflecting radiation from the Earth's surface, e.g. carbon dioxide, ozone, or water vapor.
Goal	A broad statement of a desired outcome; usually not quantifiable and may not have established timeframes for achievement.
Guidelines	Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as best management practices. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.
Gunsight series	Gunsight series is comprised of very deep calcareous alluvial soils on fan or stream terraces with slopes up to 60 percent. The soils are very gravelly loam, with gravel content ranging from 40 percent to 75 percent gravel and an average of less than 18 percent clay. The soils are somewhat excessively drained with very low to high runoff and moderate or moderately rapid permeability.

Technical Term	Definition
Habitat fragmentation	The disruption of extensive habitats into isolated and small patches; or the result of development in a large area where habitat is now fragmented into separate units.
Habitat isolation	Habitat that is separated (either physically or ecologically) from other suitable habitats nearby, such that dispersal into or from the habitat from other suitable habitats is precluded.
Herbaceous	An herbaceous plant (in a botanical use simply herb) is a plant that has leaves and stems that die down at the end of the growing season to the soil level. They have no persistent woody stem above ground. An herbaceous plant may be annual, biennial or perennial.
Herbivorous	Feeding on plants; plant-eating.
Herd area (HA)	Geographic areas where wild horse or burro populations were found at the passage of the Wild Free-Roaming Horses and Burros Act in 1971.
Herd management area (HMA)	Areas within HAs where populations of wild horses and/or burros are managed through Land Use Plans.
Heterogeneous	An environment consisting of elements that are not of the same kind or nature.
Hibernacula	A shelter occupied during the winter by a dormant animal (as an insect or reptile).
Hummock	A rounded knoll or hillock (small hill).
Hydrologic regime	Characteristic pattern of precipitation, runoff, infiltration, and evaporation affecting a water body.
Hydrostatic	Relating to the exertion and transmission of fluids.
Impacts	Environmental consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative. See also "effects."
Indirect effects	Effects that ". . . are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on water and air and other natural systems, including ecosystems" (40 CFR 1508.8[b]).
Infiltration	The act or process of water entering into a porous substance.
Intrusive noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Invasive species	Applies to nonindigenous species, or "nonnative," plants or animals that adversely affect the habitats and bioregions they invade economically, environmentally, and/or ecologically.

<b>Technical Term</b>	<b>Definition</b>
Key observation point (KOP)	One or a series of points on a travel route or at a use area or a potential use area, where the view of a management activity would be most revealing.
L <sub>10</sub> , L <sub>50</sub> , and L <sub>90</sub>	The A-weighted sound levels that are exceeded 10 percent, 50 percent, and 90 percent of the time, respectively, during the measurement period. L <sub>90</sub> is generally taken as the background noise level.
Lacustrine	Relating to a lake.
Landform	A natural feature of a land surface.
Landscape	A portion of land or territory that the eye can comprehend in a single view, including all the objects it contains.
Landscape setting	The visual components of the landscape, such as landforms, vegetation, water, and human-made elements that combine to create a specific scene.
Land use plan	A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of the FLPMA; an assimilation of land-use-plan level decisions developed through the planning process outlined in 43 CFR part 1600, regardless of the scale at which the decisions were developed. The term includes both Resource Management Plans (RMPs ) and Management Framework Plans (MFPs).
Land use plan decision	An established decision or desired outcome identified in a Land Use Plan that has identified actions intended to achieve those decisions or outcomes.
Lateral spreading	Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope—that is, a nearby steep hillside or deeply eroded stream bank, etc.
Limited	Generally denotes that an area or roads and trails are available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines the specific meaning of “limited” as it relates to off-highway vehicle use.
Line	The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches.
Linkages	Broader regions of connectivity important to facilitate the movement of multiple species and maintain ecological processes.
Liquefaction	A condition in which a saturated cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake.
Lithic torriorthents	Lithic torriorthents (shallow rocky soils) are present between rock outcrop areas, in small depressions and on relatively stable hillsides. Slopes typically range from 15 percent to 50 percent. The soil varies from sandy loam to very gravelly sand. They form in material weathered from granitic rock, with hard, fractured rock present at a depth of 1 to 18 inches. These soils are very shallow and shallow, well drained, with medium to rapid runoff and a high water erosion hazard.
Lithology	The study and classification of rocks.

Technical Term	Definition
Live fuel moisture content	Ratio of the amount of water to the amount of dry plant material in living plants.
Long term	The effect occurs for an extended period (more than 5 years) after implementation of the action. Loss of vegetation from construction of the solar project, roads, and other facilities would be considered a long-term impact. Also, noise associated with the project would be a long-term impact as it would last as long as it is in operation.
Magnitude of change	The amount or degree of alteration in visual elements and patterns from the existing visual condition to the proposed visual condition.
Major	The effect is large; there would be a highly noticeable, long-term, or permanent measurable change.
Management decision	A decision made by the BLM to manage public lands. Management decisions include Land Use Plan decisions and implementation decisions (from H-1601-1, <i>BLM Land Use Planning Handbook</i> ).
Megawatt-hours (MWh)	The watt is a derived unit of power in the International System of Units (SI), named after the Scottish engineer James Watt (1736–1819). The unit measures the rate of energy conversion. It is defined as one joule per second. The megawatt is equal to one million watts.
Microhabitat	The elements of habitat that are used by an individual during its daily activities. Refers to a subset of conditions within a wider scope of habitat characteristics.
Microphyll	A leaf having a single unbranched vein, or a structure that is derived from such a leaf.
Middle ground	The area visible from a travel route, use area, or other observation point (from a distance of 0.5 to 5 miles, with respect to this particular document). The outer boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. Vegetation is apparent only in patterns or outline.
Minor	The effect is slight but detectable; there would be a small change.
Mitigation	Measures or procedures that could reduce or avoid adverse impacts and have not been incorporated into the proposed action or an alternative. Mitigation can be applied to reduce or avoid adverse effects to biological, physical, or socioeconomic resources.
Moderate	The effect is readily apparent; there would be a measurable change that could result in small but permanent change.
Moisture of extinction	By raising a fuel's heat capacity, fuel moisture content influences ignition. At high moisture contents, the heat required to evaporate moisture in fuels is more than the amount of heat available in the firebrand and combustion can be stopped.
Monoculture	A crop of population of a single kind of organism.
Multiple-use classes	Management classes employed by the BLM to assign different types and levels of uses permitted within a specific geographical area; there are four classes in total.
Mutual aid	An agreement in which two or more parties agree to furnish resources and facilities and to render services to each and every other party of the agreement to prevent and combat any type of disaster or emergency.

Technical Term	Definition
National Environmental Policy Act (NEPA) of 1969	NEPA establishes policy, sets goals (Section 101), and provides means (Section 102) for carrying out the policy. Section 102(2) contains “action forcing” provisions to make sure that federal agencies act according to the letter and spirit of the Act. The President, federal agencies, and the courts share responsibility for enforcing the Act so as to achieve the substantive requirement of Section 101.
Negligible	The effect is at the lower level of detection; change would be difficult to measure.
Nickel soils	Nickel soils are derived in alluvium from mixed rock sources and are present on fan remnants with slopes up to 35 percent. The soils are very gravelly loam, with gravel content ranging from 25 percent to 75 percent, generally increasing with depth and typically less than 15 percent clay. The A horizon contains approximately 20 percent gravel and cobbles and is classified as gravelly very fine sandy loam. The soils are very deep, well drained with very low to medium runoff and moderate permeability. Nickel soils are commonly associated with Arizo and Bitter soils.
Nocturnal	Primarily active at night.
Nonattainment area	This is a geographic or politically delineated air basin that does not meet the national ambient air quality standards for one or more pollutants. Nonattainment areas/states are required to formulate and submit state implementation plans to the EPA that outline those measures the state will implement to attain and maintain the national ambient air quality standards.
Nonnative	Plants or animals Originating in a different region and acclimated to a new environment.
Notice of availability (NOA)	The Federal Register notice that an EIS (draft or final) or record of decision is available. Publication of a notice of filing of an EIS by the Environmental Protection Agency formally begins the public comment period. A NOA may also be published for an EA.
Notice of intent (NOI)	This Federal Register notice announces that an environmental impact statement or an EA-level land use plan amendment will be prepared. Publication of this notice formally starts the scoping process.
Noxious	Plant species that have been designated by state or national agricultural authorities as plants that are injurious to agricultural and/or horticultural crops and/or humans and livestock. Most have been introduced into a foreign ecosystem either by accident or mismanagement, but some are also native species.
Objective	A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established timeframes for achievement.
Off-highway vehicle (OHV) (also, off-road vehicle [ORV])	Any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used for national defense.

Technical Term	Definition
Open	Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines the specific meaning of “open” as it relates to off-highway vehicle use.
Panoramic	A broad horizontal composition, with no apparent limits to the view. Includes plains, expanses of water, and distant mountain ranges. Sky and foreground elements may occupy much of the scene.
Passerine	Perching birds mostly small and living near the ground with feet having 4 toes arranged to allow for gripping the perch; most are songbirds.
Perennial	Present at all seasons of the year.
Photosynthesis	A process that converts carbon dioxide into organic compounds, especially sugars, using energy from sunlight.
Playa	A level spot temporarily covered with water which subsequently becomes dry through evaporation.
Preferred alternative	The alternative the BLM believes would reasonably accomplish the purpose and need for the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, and technical and other factors. This alternative may or may not be the same as the BLM's or the proponent's proposed action.
Polymeric	Consisting of a polymer.
Primitive recreation	Recreational activities that are associated with land having no roads, including hiking, backpacking, and cross-country travel.
Proposed action	A proposal for the BLM to authorize, recommend,, or implement an action to address a clear purpose and need. A proposal may be generated internally or externally.
Pure tone	A pure tone is defined by the <i>Model Community Noise Control Ordinance</i> as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.
Rain shadow	A dry area on the mountainside facing away from the direction of the wind. The mountains cause moisture-laden air to rise, and the decreased atmospheric pressure and cooler temperature at the higher altitude cause the air to lose much of its moisture as precipitation. As the air continues to move in the prevailing wind direction, little to no moisture remains to be distributed as rain in the rain shadow.
Rangeland	Allotments of land which are designated by BLM as available for grazing livestock.
Rate of spread	The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

<b>Technical Term</b>	<b>Definition</b>
Reasonably foreseeable action	Actions for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends.
Record of decision (ROD)	The decision document associated with an EIS (40 CFR 1505.2).
Recreation environment	(See “recreation settings”)
Recreation experience	Psychological outcomes realized either by recreation-tourism participants as a direct result of their onsite leisure engagements and recreation-tourism activity participation or by nonparticipating community residents as a result of their interaction with visitors and guests within their community and/or interaction with the BLM and other public and private recreation-tourism providers and their actions.
Recreation facilities	Facilities that are intended for the facilitation and enhancement of recreation activities and outcomes.
Recreation opportunities	Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.
Recreation opportunity spectrum (ROS)	One of the existing tools for classifying recreation environments (existing and desired) along a continuum ranging from primitive, low-use, and inconspicuous administration to urban, high-use, and a highly visible administrative presence. This continuum recognizes variation among various components of any landscape's physical, social and administrative attributes; and resulting descriptions (of existing conditions) and prescriptions (of desired future conditions) define recreation setting character.
Recreation resources	Those features in a setting that define a person's experience, such as the natural and cultural resources, special values attached to an area, facilities, infrastructure, personnel, and management regulations and actions.
Recreation setting character conditions	The distinguishing recreational qualities of any landscape, objectively defined along a continuum ranging from primitive to urban landscapes, expressed in terms of the nature of the component parts of its physical, social and administrative attributes. These recreational qualities can be both classified and mapped. This classification and mapping process should be based on variation that either exists (i.e., setting descriptions) or is desired (i.e., setting prescriptions) among component parts of the various physical, social, and administrative attributes of any landscape. The recreation opportunity spectrum is one of the existing tools for doing this.
Recreation settings	The collective, distinguishing attributes of landscapes that influence, and sometimes actually determine, what kinds of recreation opportunities are produced.
Refugia	Areas that have escaped ecological changes occurring elsewhere and so provide suitable habitat for isolated or relict populations of species that were once more widespread.

Technical Term	Definition
Regulation	An official rule. Within the Federal government, certain administrative agencies (such as the BLM) have a narrow authority to control conduct within their areas of responsibility. A rule (also called a regulation or rulemaking) is a statement published in the Federal Register to implement or interpret law or policy (see Administrative Procedure Act, 5 U.S.C. 551(4) (“rule’ means the whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency...”). A rule is generally published as a proposed rule and then as a final rule. Once a rule is published in final, it is codified in the Code of Federal Regulations and remains in effect until it is modified by publication of another rule.
Revegetation	The process of replanting and rebuilding the soil of disturbed land.
Riparian	Of, inhabiting, or situated on the bank of a river or waterway.
Rockhounding	Amateur rock and mineral collecting.
Rositas soils	Rositas soils are formed in sandy aeolian material on dunes and sand sheets, with slopes up to 30 percent. These soils are typically fine sand with up to 5 percent gravel and up to 10 percent clay. Rositas soils are very deep and somewhat excessively drained, with negligible or low runoff and rapid permeability.
Saline	Of, relating to, or containing salt; salty.
Sand sheet	Built from successive deposits of sand left behind by the migration of ordinary small sand ripples, along with fine sediment (dust) deposited from suspension, and gravel or granules moved by creep. They are composed of gently inclined or nearly horizontal layers, each less than about a centimeter thick, or coarse silt and very fine to medium sand separated by layers, one grain thick, or coarse sand and granules.
Scale	The proportionate size relationship between an object and the surroundings in which the object is placed.
Scenic quality	The relative worth of a landscape from a visual perception point of view.
Scenic values	(See “scenic quality”)
Scope	The extent of the analysis in a NEPA document.
Scoping (internal and external)	The process by which the BLM solicits internal and external input on the issues and effects that will be addressed, as well as the degree to which those issues and effects will be analyzed in the NEPA document. Scoping is one form of public involvement in the NEPA process. Scoping occurs early in the NEPA process and generally extends through the development of alternatives. (The public comment periods for EIS review are not scoping). Internal scoping is simply the use of BLM staff to decide what needs to be analyzed in a NEPA document. External scoping, also known as formal scoping, involves notification and opportunities for feedback from other agencies, organizations, and the public.
Scour	Soil and debris movement.

<b>Technical Term</b>	<b>Definition</b>
Sedimentation	The action or process of forming or depositing sediment.
Short term	The effect occurs only for a short-time (first 5 years) after implementation of the action. For example, construction of the solar project would remove vegetation from the staging areas and other areas associated with constructions activities. After the construction is completed these areas would be reclaimed.
Significance	(See “significant impact”)
Significant impact	Effects of sufficient context and intensity that an environmental impact statement is required. The CEQ regulations at 40 CFR 1508.27(b) include ten considerations for evaluating intensity.
Silhouetted	To project on a background like a silhouette; the outline of a mass seen against a backdrop.
Simulations	A realistic visual portrayal which demonstrates the perceivable changes in landscape features caused by a proposed management activity. This is done through the use of photography, artwork, computer graphics, and other such techniques.
Slough	A depression or hollow usually filled with deep mud or mire.
Solitude	The quality or state of being alone or remote from society.
Special recreation management area (SRMA)	A public lands unit identified in land use plans to direct recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities (i.e., activity, experience, and benefit opportunities). Both land use plan decisions and subsequent implementing actions for recreation in each SRMA are geared to a strategically identified primary market—destination, community, or undeveloped.
Special-status species	Includes proposed species, listed species, and candidate species under the Endangered Species Act; state-listed species; and sensitive species designated by the BLM State Director (see BLM Manual 6840, Special Status Species Policy).
Standard	A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., Land Health Standards). To be expressed as a desired outcome (goal).
Stochastic	Involving chance or probability; stochastic events are random events that may have an impact on the environment and/or an organism.
Subsidence	Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation or fill loads.
Substrate	The natural environment, in which an organism lives, or the surface or medium on which an organism grows or is attached such as the soil or ground.
Successional	Exhibiting more or less predictable and orderly changes in the composition or structure of an ecological community. Succession may be initiated either by formation of new, unoccupied habitat (e.g., a lava flow or a severe landslide) or by some form of disturbance (e.g. fire, severe windthrow, logging) of an existing community.
Texture	The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.

<b>Technical Term</b>	<b>Definition</b>
Total dissolved solids (TDS)	A measure of the combined content of all inorganic and organic substances contained in a liquid in molecular, ionized or micro-granular suspended form.
Transmissivity value	The measure of how much water can be transmitted horizontally.
Travel management areas	Delineated areas where a rational approach has been taken to classify areas open, closed, or limited, and to identify and/or designate a network of roads, trails, ways, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose as well as clearly defined activity types, modes of travel, and seasons or timeframes for allowable access or other limitations.
Troposphere	The lowest of the Earth's atmospheric layers and is the layer in which most weather occurs. The troposphere begins at ground level and ranges in height from an average of 11 km (6.8 miles/36,080 feet at the International Standard Atmosphere) at the poles to 17 km (11 miles/58,080 feet) at the equator.
Trunnion	Cylindrical protrusion used as a mounting and/or pivoting point.
Unconfined recreation	Nonmotorized, dispersed outdoor recreation activities that are compatible and do not require developed facilities or mechanical transport.
Upland	Ground elevated above the lowlands along rivers or between hills.
Viewpoints	Locations from which a management activity could potentially be viewed.
Viewshed	The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.
Visual character	The overall visual impression created by individual elements and overall patterns.
Visual dominance	The tendency of a visible feature to dominate certain views because of its color, scale, uniqueness or other factors.
Visual elements	The attributes of objects such as form, line, color, and texture of the visible landscape.
Visual patterns	The presence/absence and arrangement of the individual elements (line, form, color and texture) within a landscape.
Visual quality	The visual appeal of a landscape with regard to all objects (human-made and natural, moving and stationary) and features (e.g., landforms and water bodies) that are visible.
Visual resource inventory	The first stage of the BLM's visual resource management system, involving identification of the visual resources of an area and assigning them to inventory classes. The process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points.
Visual resource management (VRM)	The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.
Visual resource management (VRM) classes	Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape.

<b>Technical Term</b>	<b>Definition</b>
Visual resources	The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).
Visually subordinate	Of a visual character that is secondary, inferior, or of less importance.
Watershed	An area of land that drains to a single outlet and is separated from other watersheds by a divide.
Wetland	An area of land in which soil is saturated with moisture either permanently or seasonally.
Wilderness area (WA)	Land area that has been established by Congress through the Wilderness Act of 1964 to protect federally managed land with pristine, undisturbed natural areas and scenery. These areas are subject to common management restrictions aimed at preserving areas in their natural condition for use by the general public.
Wilderness characteristics	Qualities that potentially define areas as wilderness, including naturalness, solitude, primitive and unconfined recreation, and special features.
Wilderness study areas (WSA)	Land areas that has been inventoried and recommended for Wilderness Area designation by Congress. Although WSAs are not designated wilderness areas, they are required to be managed to maintain their inherent wilderness characteristics until Congress decides to either designate the area or release it for other uses. The general management standard for WSAs focuses on protecting the areas from changes that would potentially impair their suitability as wilderness areas.
Wind rose	A graphic tool used by meteorologists to give a succinct view of how wind speed and direction are typically distributed at a particular location.
Woodland	Land covered by woody vegetation.
Zone of Influence	The area surrounding a pumping well within which the water table has been changed due to ground-water withdrawal.