RECORD OF DECISION

Stateline Solar Farm Project

and

Amendment to the California Desert Conservation Area Plan

Lead Agency:

United States Department of the Interior
Bureau of Land Management

Case File Number: CACA 048669

Stateline Solar Farm Project
Decision to Grant Right-of-Way and Amend California Desert Conservation Area Plan

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TABLE OF CONTENTS

Appendices

1. Location Maps
2. Biological Opinion
3. Minor Corrections/Clarifications
4. Adopted Mitigation Measures
5. Environmental Construction and Compliance Monitoring Program
6. Responses to February 4, 2014 letter from Laborers International Union of North America, Local 783

Executive Summary

This Record of Decision (ROD) presents the decisions to be made by the United States Department of the Interior (DOI) Bureau of Land Management (BLM) with respect to the Stateline Solar Farm Project (SSFP, Project, or Proposed Action) proposed by Desert Stateline, LLC (the Applicant). The Applicant has filed an application for a Right-of-Way (ROW) authorization with the BLM to construct, operate, maintain, and decommission an approximately 1,685 acre (ac), 300-megawatt (MW) solar photovoltaic (PV) energy generation facility in the northeastern Mojave Desert in San Bernardino County, California, near the town of Primm, Nevada (Proposed Action or Project).

The decisions to be made in the ROD include:

- Approve a solar energy right-of-way lease/grant to Desert Stateline, LLC;
- Modify the configuration of existing open routes within the footprint of the Project site;
- Amend the California Desert Conservation Area (CDCA) Plan to identify the Project site as suitable for solar energy development; and
- Amend the CDCA Plan to modify the boundaries of the existing Ivanpah Desert Wildlife Management Area (DWMA) to add the Northern Ivanpah Valley Unit to the existing DWMA.

These decisions were analyzed in a joint Proposed Final Plan Amendment/Final Environmental Impact Statement/Environmental Impact Report (PA/EIS/EIR) that was published on November 15, 2013. The Final PA/EIS/EIR analyzed the Applicant's Proposed Action, three alternative configurations of the proposed facility, and related BLM planning decisions regarding resources in the vicinity of the Project site. It was prepared jointly by the BLM and San Bernardino County, CA (County) pursuant to the applicable requirements under the National Environmental Policy Act (NEPA) and the California Environmental Protection Act (CEQA), respectively. The County is separately considering a decision whether to approve groundwater well permits in connection with the Project.

The decisions in this ROD reflect careful consideration and resolution of the issues identified in the Project's PA/EIS/EIR, which were thoroughly analyzed during the environmental review process. These decisions best fulfill the BLM's and DOI's statutory mission and responsibilities. Granting the ROW for the Project will contribute to the public interest providing a reliable electricity supply that allows for the development of renewable power to satisfy Federal renewable energy goals. Similarly, the mitigation measures incorporated as part of the ROW grant and the related planning decisions to be made here will ensure that the authorization of the Project will protect environmental resources and comply with applicable environmental standards. The modification of the boundaries of the DWMA will also contribute to protection of environmental resources, including desert tortoise. In total, these decisions reflect the careful balancing of the many competing public interests in managing the public lands and are based on a comprehensive environmental analysis and full public involvement. The BLM and DOI have determined that approval of the Project is in the public interest.

1.0 Introduction

Background

This ROD presents the decisions being made by the DOI and the BLM with respect to the SSFP proposed by the Applicant. The Applicant, a wholly-owned subsidiary of First Solar Development, Inc. (First Solar), has filed Application CACA #48669 for a ROW authorization with the BLM to construct, operate, maintain, and decommission an approximately 1,685 ac, 300-MW AC solar PV energy generation facility in the northeastern Mojave Desert in San Bernardino County, California, near the town of Primm, Nevada. The Proposed Action includes the PV generating facility, a 220-kilovolt (kV) generation interconnection (gen-tie) transmission line, operations and maintenance facilities, and a site access road. All of the proposed facilities would be located on public lands managed by the BLM's Needles Field Office. In addition, the ROD also approves associated land management planning amendments to the CDCA Plan and implementation decisions being made with respect to resources within the Ivanpah Valley. These decisions include: (i) amending the CDCA Plan to identify the Project site as suitable for solar energy development; (ii) amending the CDCA Plan to modify the boundaries of the existing Ivanpah Desert Wildlife Management Area (DWMA) by adding the Northern Ivanpah Valley Unit to the existing DWMA, and (iii) modifying the configuration of open routes within the Project's footprint.

Purpose and Need

The NEPA guidance published by the Council on Environmental Quality (CEQ) states that the Purpose and Need section of an Environmental Impact Statement "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 Code of Federal Regulations (CFR) §1502.13). The following discussion sets forth the purpose of and need for the project as required under NEPA.

In accordance with the Federal Land Policy Management Act (FLPMA) (Sections 102(a)(7), 302(a), and 601), public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electric energy (Section 501(a)(4)). Taking into account the BLM's multiple use mandate, the purpose and need for the Proposed Action is to respond to a FLPMA ROW application submitted by the Applicant to construct, operate, maintain, and decommission a solar energy-generating facility and associated infrastructure on public lands administered by the BLM in accordance with FLPMA, BLM ROW regulations, and other applicable Federal laws and policies.

In conjunction with FLPMA, the Proposed Action would, if approved, assist the BLM in addressing the following management objectives:

- Executive Order 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."

- Secretarial Order 3285, dated March 11, 2009, and amended as 3285A1 on February 22, 2010, which "establishes the development of renewable energy as a priority of the Department of the Interior."

- The President's Climate Action Plan, announced on June 25, 2013, to reduce carbon pollution, prepare the U.S. for the impacts of climate change, and lead international efforts to address global climate change. To ensure America's continued leadership in clean energy, the Climate Action Plan set a new goal for the Department of the Interior to permit enough renewable electricity generation from public lands to power more than 6 million homes by 2020. This goal will require the approval of 20,000 MWs of renewable energy projects on the public lands by 2020.

The BLM will decide whether to deny the proposed ROW, grant the ROW, or grant the ROW with modifications. The BLM may include any terms, conditions, and stipulations it determines to be in the public interest, and may include modifying the proposed use or changing the route or location of the proposed facilities (43 CFR 2805.10(a)(1)).

In connection with its decision on the Proposed Action, BLM will also consider potential amendments to the CDCA Plan. The CDCA plan, while recognizing the potential compatibility of solar energy facilities on public lands, requires that all sites associated with power generation or transmission not identified in the plan be considered through the land use plan amendment process. The BLM policy encourages the avoidance of development on lands with high conflict or sensitive resource values (Instruction Memorandum (IM) 2011-061). While the BLM is not required to formally determine whether certain high conflict lands are or are not suitable for solar energy development, if BLM decides to make that decision, it must amend the CDCA plan. Here, BLM is potentially deciding whether to amend the CDCA plan to identify the Project site as suitable or unsuitable for solar energy development. At the same time, BLM will also decide whether to amend the CDCA plan to make high conflict or sensitive resource value areas within the project application area unavailable for solar development.

2.0 Overview of Alternatives

In the PA/EIS/EIR, BLM evaluated four action alternatives consisting of a Plan Amendment and project components, one No Action alternative, and two No Project alternatives. Revised Alternative 3 was identified as the BLM's preferred alternative.

Proposed Action – 300 MW generated on 2,143 Ac (Alternative 1). This alternative consists of the use of cadmium-telluride (CdTe)-based PV panels designed to generate 300 MW of electrical energy on a single, contiguous footprint comprising 2,143 acres of public lands (see Figure 1-1 in the PA/EIS/EIR). This alternative would also include modification of the boundaries of the Ivanpah Desert Wildlife Management Area (DWMA), resulting in a net addition of 23,363 acres to the existing DWMA, by BLM. This alternative would require a CDCA Plan Amendment (see Section 10.2, below, regarding the CDCA Plan amendment and conformance with the CDCA Plan).

2,385-Acre Alternative (Alternative 2). This alternative consists of the use of CdTe-based PV panels designed to generate 300 MW of electrical energy on 2,385 acres (see Figure 2-2 in the PA/EIS/EIR). Under this alternative, the solar panels would be developed in a bifurcated footprint (two separate arrays). This alternative would also include modification of the boundaries of the Ivanpah DWMA, resulting in a net addition of 23,121 acres to the existing DWMA, by BLM. This alternative would require a CDCA Plan Amendment.

1,685-Acre Alternative (Revised Alternative 3). This alternative consists of the use of CdTe-based PV panels designed to generate 300 MW of electrical energy on a single, contiguous footprint comprising 1,685 acres of public lands (see Figure 2-4 in the PA/EIS/EIR). The footprint of this alternative would be adjusted from that proposed in Alternative 1 in order to reduce impacts to environmental resources. This alternative would also include modification of the boundaries of the Ivanpah DWMA, resulting in a net

addition of 23,821 acres to the existing DWMA, by BLM. This alternative would require a CDCA Plan Amendment.

Reduced Acreage Alternative (Alternative 4). This alternative consists of the use of CdTe-based PV panels designed to generate 232 MW of electrical energy on a single, contiguous footprint comprising 1,766 acres of public lands (see Figure 2-7 in the PA/EIS/EIR). The footprint of this alternative would be the same as the northern portion of the bifurcated footprint in Alternative 2. This alternative would also include modification of the boundaries of the Ivanpah DWMA, resulting in a net addition of 23,740 acres to the existing DWMA, by BLM. This alternative would require a CDCA Plan Amendment.

No Action Alternative (Alternative 5). Under the No Action alternative, the BLM would deny the Applicant's ROW grant application and no CDCA Plan Amendment would be required. Under this alternative there would also be no modification of the boundaries of the Ivanpah DWMA.

No Project, Exclude Solar on Site Alternative (Alternative 6). Under this alternative, there would be no issuance of a ROW grant. This alternative would include modification of the boundaries of the Ivanpah DWMA, resulting in a net addition of 25,506 acres to the existing DWMA. This alternative would include approval of a LUP Amendment finding that the site is not suitable for solar energy development.

No Project, Approve Solar on Site Alternative (Alternative 7). Under this alternative, there would be no issuance of a ROW grant, and no modification of the boundaries of the Ivanpah DWMA. This alternative would include approval of a LUP Amendment finding that the site is suitable for solar energy development.

Section 2.8 of the PA/EIS/EIR describes alternative sites, technologies, and methods that were considered as alternatives to the Proposed Action, but not carried forward for detailed analysis. These alternatives included sites located on private land, BLM-administered land, and on brownfields/degraded lands identified by the U.S. Environmental Protection Agency. Additionally, the BLM considered alternative types of energy projects, including solar power tower, distributed solar generation, and wind energy, among others. The BLM also considered conservation and demand-side management as a potential alternative to the Project. In each instance, for the reasons set forth in Section 2.8 of the PA/EIS/EIR, the BLM eliminated these alternatives from detailed analysis based on one or more of the following reasons, the alternatives would: (i) not respond to the BLM's purpose and need; (ii) be technically or economically infeasible; (iii) be inconsistent with the basic policy objectives for the management of the area; implementation of the alternative would be remote or speculative; (iv) be substantially similar in design to an alternative that is analyzed; and/or, would have substantially similar effects to an alternative that is analyzed.

2.1 Environmentally Preferred Alternative

In accordance with 40 CFR 1505.2(b), the BLM has identified Alternative 6, the No Project, Exclude Solar on Site Alternative, as the environmentally preferred alternative. Along with Alternatives 5 and 7, Alternative 6 would cause the least damage to the biological and physical environment in the Project area because it would not create a disturbance in the near term. However, of these 3 alternatives, Alternative 6 would exclude the site from future solar development, and would also include the entire project area within the expanded boundaries of the Ivanpah DWMA. Out of the action alternatives, the environmentally preferred alternative would be Revised Alternative 3 (the Agency Preferred Alternative). This alternative would result in less ground disturbance than any of the other alternatives, and also incorporates site preparation techniques which minimize ground disturbance and vegetation removal.

3.0 Decision

The decision is hereby made to approve the Agency Preferred Alternative (Revised Alternative 3) described in this section by amending the CDCA Plan to allow solar energy-related use of the specified property and to expand the Ivanpah DWMA, approving a ROW grant for land managed by the BLM in San Bernardino County, California, and modifying the configuration of open routes within the Project's footprint. These decisions fulfill the applicable legal requirements for managing public lands. Granting the ROW contributes to the public interest in developing renewable power to meet state and federal renewable energy goals.

This ROD approves the construction, operation and maintenance, and decommissioning of the up-to 300-MW SSFP on BLM-administered public lands in eastern San Bernardino County, California, analyzed as the SSFP Agency Preferred Alternative in the PA/EIS/EIR, which was noticed in the November 15, 2013, Federal Register (78 FR 68860). The Agency Preferred Alternative also is referred to as the Selected Alternative in this ROD.

This approval will take the form of a FLPMA ROW grant, issued in conformance with Title V of FLPMA (42 USCA §1761 et seq.) and its implementing regulations (43 CFR §2801 et seq.). In order to approve the site location for the SSFP, BLM also approves a land use plan amendment to the CDCA Plan. The decisions contained herein apply only to the BLM administered public lands within the boundary of the Selected Alternative. The Project site is located in the northeastern Mojave desert, approximately 2 miles southwest of Primm, Nevada, 1 mile west of Interstate 15 (I-15) in San Bernardino County, California, within Sections or portions of Sections 13, 14, 23, 24, 26, and 26, Township 17N, Range 14E. Figure 1, provided in Appendix 1 of this ROD, shows the location of the project site.

The ROW grant authorization will allow the Applicant to use, occupy, and develop the described public lands; and to construct, operate and maintain, and decommission a solar PV electric generating facility with a capacity of up to 300 MW. Within the ROW area, construction and operation would permanently disturb approximately 1,685 acres for a solar plant site and linear facilities outside the solar plant site (including a gen-tie line and access road).

The total site construction period would consist of approximately 2 to 4 years. The ROW grant will be issued to the Applicant for a term of 30 years with a right of renewal provided the lands are being used for the purposes specified in the grant. The BLM requires the initiation of project construction within two years of the issuance of a ROW grant. In addition, initiation of construction will be conditioned on the issuance of a Notice to Proceed (NTP) for construction. If the approved Project does not progress to construction or operation or is changed to the extent that it appears to the BLM to be a new project proposal on the approved Project site, that new proposal may be subject to additional review under NEPA and may require additional approval from the BLM.

The Project site under the Selected Alternative includes three routes of travel designated by BLM as open routes. These routes include route 699226 (1.9 miles encompassed by Alternative 3), 699198 (2.0 miles), and 699238 (1.3 miles). Through the ROD, BLM is approving the relocation of these off-road, recreational vehicle routes outside of the Project's boundary fence and designation of the re-located routes as open routes. The re-located routes will be constructed by the Applicant prior to the fencing off of the existing routes. The locations of the re-located routes are shown in Figure 2.

The ROW is subject to the grant's terms and conditions; implementation of the approved mitigation measures provided in Appendix 4 of this ROD; those measures included in the Biological Opinion (BO)

issued by the United States Fish and Wildlife Service (FWS), which is provided in Appendix 2 of this ROD; and the issuance of all other applicable local, state, and federal approvals, authorizations, and permits.

The current and expanded boundaries of the Ivanpah DWMA are shown in Figure 3, and the acreage to be included in the expanded DWMA is shown in Table 1.

Table 1. Acreage to be Modified in Ivanpah DWMA, Selected Alternative

Land Area	Acreage in Land Area
Original Ivanpah DWMA	37,280 ac
Total in Northern Ivanpah Unit	+ 29,110 ac
Ivanpah Solar Electric Generation System (ISEGS)	-3,471 ac
Caltrans JPOE	-133 ac
Stateline Selected Alternative	-1,685 ac
Subtotal New Acreage Added to DWMA	**23,821 ac**
Removal of Ivanpah Playa	-2,997 ac
Net Acreage Added to DWMA	*+20,824*
Final Total in Expanded DWMA	**58,104 ac**

The portion of the Northern Ivanpah Valley Unit in the expanded DWMA is the original 29,110 acres of the Northern Ivanpah Valley Unit area, but without the acreage associated with the ISEGS (3,471 acres) project, the CalTrans Joint Port of Entry (133 acres), or the SSFP Project (1,685 acres). In addition, the boundary of the DWMA is revised on the Ivanpah Dry Lake to allow land sailing in this area which does not support tortoise habitat. This later modification removes 2,997 acres that were in the original DWMA from the final DWMA boundaries. Therefore, the total acreage added under the Proposed Action is 23,821 ac, less the acreage removed in connection with the Ivanpah Playa (2,997 ac), results in a total acreage within the expanded DWMA of 58,104 acres (20,824 net ac added).

The management prescriptions for the current Ivanpah DWMA were developed for the protection of desert tortoises, and are defined in Appendix A, Section A.2, of the NEMO Final EIS (BLM 2002). These same prescriptions apply to the expanded portion of the DWMA. The area incorporated into the Ivanpah DWMA is also subject to all associated land use restrictions, including:

- Authorized ground-disturbing activities shall normally be authorized only between November 1 and March 1. If ground-disturbing activities must be authorized outside this window, an on-site biological monitor shall be required throughout activities, as well as other stipulations to prevent take.
- New surface disturbing projects shall include specific design features (see mitigation measures in Attachment 1 of Appendix A of the NEMO Final EIS) to minimize potential impacts to desert tortoise and desert tortoise habitat.
- Reclamation would be required for activities that result in loss or degradation of desert tortoise habitat within the desert tortoise wildlife management area, to as close to pre-disturbance condition as practicable.
- Cumulative new surface disturbance on public lands administered by BLM within any desert tortoise wildlife management area shall be no more than one percent of BLM Lands.
- Compensation for disturbances of public lands within the desert tortoise ACEC's shall be required at the rate of five acres for each acre disturbed.

This ROD applies only to BLM administered lands, and to BLM's decision on the SSFP. It does not apply to private lands or other lands outside the BLM's jurisdiction. Other agencies, including, but not

limited to, San Bernardino County, and California Department of Fish and Wildlife (CDFW), are responsible for issuing their own decisions and applicable authorizations for the SSFP.

4.0 Management Considerations in Selecting the Preferred Alternative

The BLM selected Revised Alternative 3 as the Agency's Preferred Alternative. The selection of this Preferred Alternative reflects careful balancing of many competing public interests in managing public lands in accordance with the multiple use mandate and other obligations in FLPMA. It also is based on comprehensive environmental analysis and full public involvement in accordance with NEPA.

4.1 Federal Land Policy and Management Act of 1976

The FLPMA establishes policies and procedures for the management of public lands. In Section 102(a)(8), Congress declared that it is the policy of the United States that:

> ". . . the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use (43 U.S.C.1701(a)(8))."

Title V of FLPMA (43 USC 1761-1771) and the BLM's ROW regulations (43 CFR Part 2800) authorizes BLM, acting on behalf of the Secretary of the Interior, to authorize a ROW grant on, over, under, and through the public lands for systems for generation, transmission, and distribution of electric energy. The BLM Authorized Officer (AO) administers the ROW authorization and ensures compliance with the terms and conditions of the ROW lease. This authority is derived from the authority of the Secretary of the Interior, and may be revoked at any time. With respect to this ROW grant, this authority has been delegated to the Field Manager of the Needles Field Office, who will be responsible for managing the ROW grant for the SSFP. The grant includes terms and conditions, including compliance with the BO and adopted mitigation measures identified in Appendix 4, as well as compliance with any other applicable Federal rules and regulations, that are designed to protect public health and safety, prevent unnecessary damage to the environment, and ensure that the project will not result in unnecessary or undue degradation of public lands.

4.2 National Environmental Policy Act and Public Involvement

Section 102(c) of NEPA (42 USC 4321 et seq.) and the CEQ and DOI implementing regulations (40 CFR Parts 1500–1508 and 43 CFR Part 46) provide for the integration of NEPA directives into agency planning to ensure appropriate consideration of NEPA's policies and to eliminate delay. When taking actions such as approving CDCA Plan amendments and ROW grants, the BLM complies with the applicable requirements of NEPA, the CEQ's NEPA regulations, and the agency's own regulations and policies for the implementation of NEPA. Compliance with the NEPA process is intended to assist Federal officials in making decisions about a project that are based on an understanding of the environmental consequences of the decision, and identifying actions that protect, restore, and enhance the environment. The Draft PA/EIS/EIR, Proposed PA/Final EIS/EIR, and this ROD document the BLM's compliance with the requirements of NEPA for the SSFP.

The BLM engaged highly qualified technical experts to analyze the environmental effects of the SSFP and alternatives. The BLM and the County, along with other consulting agencies, including USFWS, CDFW and affected tribes, used their expertise and best available information to address potential resource issues associated with the Proposed Action and alternatives. During the scoping process and following the publication of the Draft PA/EIS/EIR, members of the public submitted comments that were also part of BLM's consideration of the potential environmental impacts associated with the SSFP. Appendix G of the Final PA/EIS/EIR includes responses to all of the comments submitted on the Draft PA/EIS/EIR.

Chapter 4 of the PA/EIS/EIR presents an analysis of the environmental consequences that would result from each of the seven alternatives described above, including their effectiveness in meeting the BLM's purpose and need for action, which includes consistency with the requirements of the FLPMA, the policy and legal directives encouraging renewable energy development on BLM-administered public lands, and basic policy objectives for the management of the lands governed by the CDCA Plan. The BLM's purpose and need is described in Section 1 of this ROD.

The MW capacity associated with the Preferred Alternative will assist the BLM in addressing several management and policy objectives. The Project will provide clean electricity for homes and businesses, and bring much-needed jobs to the area. It is also expected to provide climate and energy security benefits to California and the Nation. The project is also expected to create 400 jobs during the construction period and up to 10 permanent, full-time jobs during its operation.

The expansion of the boundaries of the Ivanpah DWMA evaluated in the PA/EIS/EIR will assist BLM in addressing several management and policy objectives related to the protection of desert tortoise. It will also help mitigate the impacts of the Proposed Action. Members of the public proposed the expansion during the public scoping process.[1] In response to the ROW application and in consideration of the scoping comments, BLM identified a need to consider modification of the boundaries of the currently-existing Ivanpah DWMA in order to provide additional protection to tortoise populations in the project area. The BLM determined that special management attention is needed for the desert tortoise based on the potential approval of the Proposed Action or an alternative. In response, the BLM identified a need to modify the boundary of the Ivanpah DWMA, established in 2002, to align its boundaries with those of the Ivanpah Critical Habitat Unit (CHU) and the Eastern Mojave Recovery Unit desert tortoise populations by including a portion of the Northern Ivanpah Valley Unit. Modification of the DWMA boundary will also serve to provide protection for translocated tortoises by limiting future land uses in the proposed translocation areas.

5.0 Notice of Clarifications of the Final PA/EIS/EIR

Minor corrections to and clarifications of the PA/EIS/EIR are provided in Appendix 3. These minor revisions have been made as a result of and in response to additional input received on the document (see Section 9.3 of this ROD) and internal BLM review. None of the minor corrections and clarifying statements affects the adequacy of the underlying FLPMA or NEPA analysis in the PA/EIS/EIR, nor do they affect the location, features, components, or activities associated with the Selected Alternative.

[1] Basin and Range Watch nominated an area covering 98,300 acres of land in Nevada and 31,079 acres of land in California for consideration as an Area of Critical Environmental Concern (ACEC). The DWMA expansion area authorized by this area is within the area nominated for ACEC designation in California. The evaluation of the California Portion of the Basin and Range Watch's ACEC nomination is contained in Appendix D of the PA/EIS/EIR.

6.0 Consistency and Consultation Review

6.1 San Bernardino County CEQA Review

As part of the Proposed Action, the Applicant has submitted well construction permits to the County for up to two groundwater production wells and three groundwater monitoring wells. The wells would be used to produce groundwater for dust suppression, fire response during construction, and for fire response and sanitary purposes during operations. Under Memorandum of Understanding (MOU) Agreement No. 03-1211 between BLM and the County, facilities requiring groundwater wells fall under the County's jurisdiction, and would therefore be required to comply with County Ordinance No. 3872 regarding permitting and monitoring of groundwater extraction wells. Because the Proposed Action would include installation of groundwater extraction wells, implementation of the proposed facility would require discretionary approval from the County with respect to issuance of well permits from the Environmental Health Services Department. Because the County must take a discretionary action, the Project warranted environmental review under CEQA. The County will be responsible for certifying the Final PA/EIS/EIR after reviewing the document for consistency with CEQA requirements (CEQA Guidelines §15090). If the Final EIS/EIR demonstrates that the Proposed Action would have significant and unavoidable (not mitigable) impacts and the County decides to approve the well permits, then the County will need to adopt a "Statement of Overriding Considerations" explaining the reasons for approving the well permits despite its significant impacts (CEQA Guidelines §15093).

6.2 Governor's Consistency Review

The FLPMA requires the Secretary of the Interior to "coordinate the land use inventory, planning, and management activities of or for such lands with the land use planning and management programs of other Federal departments and agencies and of the States and local governments within which the lands are located." 43 USC § 1712(c)(9). It further directs the Secretary to "assure that consideration is given to those State, local and tribal plans that are germane in the development of land use plans for public lands" and "assist in resolving, to the extent practical, inconsistencies between Federal and non-Federal Government plans." Regulations implementing FLPMA, 43 CFR §1610.3-2(e), generally require a 60-day period for Governor's consistency review; however, by agreement, this review period here has been expedited. The purpose of the review is to identify inconsistencies of the proposed PA with State and local plans, programs, and policies. On November 15, 2013, BLM initiated the period of Governor's Consistency Review for the PA/EIS/EIR in accordance with FLPMA. The Governor's Office of Planning and Research provided a formal response dated December 16, 2013, which did not identify any inconsistencies between the PA and any State or local plans, programs, and policies.

6.3 Government-to-Government Consultation with Tribes

As described in detail in Section 5.2.3 of the PA/EIS/EIR, BLM conducted government-to-government consultation with 10 federally recognized Tribal governments in accordance with several authorities including, but not limited to, NEPA, the National Historic Preservation Act (NHPA), the American Indian Religious Freedom Act, Executive Order 13175, and Executive Order 13007. The BLM initiated consultation on November 21, 2007, prior to the publication of the Notice of Intent to prepare the Draft PA/EIS/EIR, reaffirmed its commitment to government-to-government consultation in the August 4, 2011 Notice of Intent (76 Fed. Reg. 47235), and provided other public notices about the project to provide reasonable notice of and seek input about how potential project-related changes could affect the use of sacred sites or their physical integrity. Individual government-to-government meetings with Indian tribes provide a separate forum for tribes to share information and concerns openly and candidly in an

individual context, apart from other consulting parties and about other issues not necessarily related to the Section 106 process. In addition to Section 106 consultation meetings with all consulting parties, BLM held individual meetings with interested Tribes along with other efforts, which included site visits, individual meetings with tribal members and tribal council members, undertaken by BLM as part of the government-to-government consultation process. These efforts are summarized in PA/EIS/EIR Section 5.2.3.

Information and major concerns raised through correspondence and shared during group and individual meetings with tribes, as well as the actions that were undertaken during the consultation process, revealed concerns about the importance and sensitivity of cultural resources on and near the SSFP site and concerns about cumulative effects to cultural resources. As a result of this consultation process, many important cultural resources that had been identified in the project study area were subsequently avoided by the footprint proposed as part of the Selected Alternative.

6.4 NHPA Section 106 Compliance

Pursuant to Section 106 of the NHPA and the implementing regulations, the BLM consulted with the California State Historic Preservation Officer (CA SHPO), the Advisory Council on Historic Preservation (ACHP), interested tribal members, other consulting parties, and federally recognized Tribes. Section 106 of the NHPA requires Federal agencies to take into account the potential effects of a proposed undertaking on historic properties eligible for or listed in the National Register of Historic Places. The steps in the NHPA Section 106 process are described in Section 5.2.2 of the PA/EIS/EIR. The BLM made adjustments to the proposed undertaking to avoid potential adverse effects. In the case of the Proposed Action and all action alternatives, all efforts were made to avoid direct effects to historic properties. The BLM's determinations and findings, provided in a letter to the SHPO and other consulting parties dated November 1, 2012, concluded that there will be no adverse effects on historic properties from this undertaking. On January 9, 2013, BLM completed the consultation process with a Documentation of Non-Response, Section 106 consultation with the State Historic Preservation Office, that described the consultation which had occurred for the Project and documented that none of the consulting parties or the SHPO responded to BLM's determination of no adverse effect within 30 days of when BLM's determination letter was issued. Based on BLM's determination that no adverse effects to historic properties would occur (36 CFR 800.5(b)), no MOA or Programmatic Agreement is required for the Project.

6.5 Endangered Species Act—Section 7 Compliance

Section 7 of the Endangered Species Act (ESA) requires Federal agencies to ensure that their actions do not jeopardize the continued existence of threatened or endangered species or result in the destruction of their designated critical habitat. It also requires consultation with the FWS in making that determination. On January 2, 2013, BLM initiated formal consultation with the USFWS under Section 7 of the ESA regarding the Project's potential impacts on desert tortoise, through the submission of a Biological Assessment (BA).

On March 4, 2013, the FWS sent a memorandum requesting the batching of two requests for formal consultation under ESA Section 7 – one for the SSFP (BA received on January 4, 2013), and the other for the Silver State South Project in Nevada (BA received on February 11, 2013). At issue in the combined Section 7 consultation were the effects of those projects on the federally threatened desert tortoise (*Gopherus agassizzi*). The FWS reasoned that due to the (1) proximity of the projects, (2) timing of the consultations, (3) similarity between the effects of the projects, (4) fact that the same company proposed both projects, and (5) need to comprehensively address impacts to habitat and connectivity in the North

East Recovery Unit, conservation of the desert tortoise in Ivanpah Valley was best addressed by batching these projects instead of approaching the requests for consultation separately. The BLM agreed with the request to batch the consultations, and FWS accepted a BA for each of the two projects. Consultation officially began on March 12, 2013, and BLM received a final BO on September 30, 2013. The Final BO is attached as Appendix 2 of this ROD. The FWS issued an errata for the BO on December 6, 2013.

The batched BO contains a comprehensive analysis of the impacts to desert tortoise, habitat, and connectivity in the Ivanpah Valley from existing development in the Ivanpah Valley, the Proposed Action and the Silver State South Project. Within the BO, BLM requested two project-specific incidental take statements associated with applicable Terms and Conditions and conservation measures for each of the covered projects to ensure clarity in agency and applicant responsibility with respect to each.

With respect to the SSFP, the entire Project site is desert tortoise habitat, although its quality varies and none of the Project site is within designated critical habitat. Fourteen adult desert tortoises were observed in the area of the Selected Alternative during spring 2012 surveys. As a result, the PA/EIS/EIR included a variety of mitigation measures mandating specific survey, handling, translocation, and compensation requirements for the desert tortoise. To offset the loss of desert tortoise habitat the BLM and the Applicant proposed several projects that would be funded by the Applicant including:

- The retirement of 53,000 ac of the Clark Mountain Grazing Allotment, of which 40,000 ac is potential Desert Tortoise habitat[2], consistent with PL 112-74, Section 122(b) and BLM policy;[3]
- Restoration along 20 acres of the Kern River Pipeline ROW located north of the Project site and within a 6.4-acre area along the west side of Whiskey Pete's, located approximately 1.5 miles northeast of the Project site; and
- The restoration of 30 closed/unauthorized routes located within the Eastern Mojave Recovery Unit and fencing along 13 miles of Morningstar Mine Road, located within the Mojave National Preserve.

Implementation of these measures is mandatory and has been included as a stipulation in the Project's ROW grant. To address potential habitat connectivity impacts, careful consideration was taken in the siting and modification of the Project to allow for reasonable desert tortoise movement around the Project site. Although the BO acknowledged that tortoises may occasionally move through Stateline Pass to the north of the project, it concluded that Stateline Pass was unlikely to support a long-term population of tortoises, and does not provide a demographic connection between Ivanpah Valley and areas outside of Ivanpah Valley. Specifically, the BO observed, in concurring that the Project is not likely to measurably affect connectivity with Ivanpah Valley, that:

> The northern edge of the Stateline Project would be located approximately 0.9 mile from the southernmost point of the eastern arm of the Clark Mountains. The resulting linkage between the Stateline facility and the Clark Mountains would connect desert tortoises to the northeast of the project with animals to the west, in the remaining habitat west of Interstate 15. Although this width is less than a single desert tortoise lifetime utilization area (i.e., 1.4 miles), the linkage will

[2] As explained in the PA/EIS/EIR, the BLM notified the Clark Mountain Grazing Allotment leaseholder by certified letter on October 19, 2011, that the land within the Project site was being considered for another purpose that could result in a partial or complete reduction in the leaseholder's permitted use of the Project area. On February 21, 2013, the leaseholder signed a waiver allowing BLM to cancel, in whole or part, the lease as a result of the proposed alternative land use within the Project footprint.

[3] Future management actions by the BLM concerning the retired portion of the Clark Mountain Grazing Allotment will consider the mitigation purposes for which the retirement will be obtained, consistent with PL 112-74, Section 122(b).

likely remain functional because its length is very short; the southernmost extension of the Clark Mountains is shaped like a peninsula and the linkage becomes wider immediately to the east and west of the narrowest point. Additionally, even without the proposed project, the width of the area where Stateline detected desert tortoises south of the "peninsula" is less than 1.4 miles because the substrate becomes silt-like as the alluvial fan levels out and approaches Ivanpah Dry Lake. (FWS, 2013).

Based on the foregoing, after reviewing the current status of the desert tortoise, environmental baseline for the action area, the effects of the Proposed Action and Silver State South, and cumulative effects from existing development in the Ivanpah Valley on the desert tortoise, the BO concluded that the SSFP is not likely to jeopardize the continued existence of the desert tortoise. This determination was based on the following considerations:

1) The USFWS does not expect that the issuance of a ROW grant for the Proposed Action would affect the reproductive capacity of desert tortoises in the action area because neither translocation nor construction activity are likely to cause any long-term decrease in the reproduction of individuals.

2) The BLM and the Applicant have proposed numerous measures to minimize injury and mortality of desert tortoises including translocation of desert tortoises from the Project site. Information from previous large-scale translocations has demonstrated that it can be an effective tool for reducing mortality at project sites. Consequently, the Proposed Action is not likely to appreciably reduce the number of desert tortoises in the Eastern Mojave Recovery Unit.

3) The Proposed Action will not appreciably reduce the distribution of the desert tortoise in the action area because it would result in the loss of approximately 0.3 percent of suitable habitat in the Eastern Mojave Recovery Unit. Construction of the Project would result in a net loss of desert tortoise habitat and is likely to impair connectivity to some degree in the linkage between the Project site and the Clark Mountains. This linkage has already been compromised to a large degree by the ISEGS, DesertXpress, Primm, and the Large-Scale Translocation Site. Additionally, and as discussed above, the point of constriction that the Proposed Action would cause would be short in length and natural features in that area also pose constraints to connectivity. The BLM and the Applicant will fund and implement numerous measures to improve management of the remaining habitat for desert tortoises in the surrounding area. These measures include expanding the Ivanpah DWMA by approximately 42 square miles; this change in management direction would increase the emphasis on protection of desert tortoises in the remaining habitat.

The BO also identified reasonable and prudent measures that would reduce adverse impacts to the species, compliance with which is a condition of the ROW grant.

With respect to the overall impact to desert tortoises in the area of the Project, the BO concluded that expansion of the DWMA in California and the designation of an ACEC in Nevada would contribute to the protection of desert tortoises within the relevant portion of the Ivanpah Valley because those designations are likely to reduce the amount of human disturbance in these areas. This reduced disturbance is likely to benefit desert tortoises by reducing the number of animals that are killed and the amount of habitat that is lost or degraded. In particular, BLM's prohibition of site-type ROWs larger than 5 acres in Nevada and the high compensation requirement and limit on cumulative disturbance in California would serve to prevent (in Nevada) or strongly discourage (in California) the loss of large areas of habitat.

6.6 California Department of Fish and Wildlife

The CDFW (formerly Department of Fish and Game) has the authority to protect water resources of the state through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The BLM and the Applicant have provided information to CDFW to assist in their determination of the impacts to streambeds, and identification of permit and mitigation requirements.

The CDFW is a trustee agency that has jurisdiction over CEQA projects that involve fish and wildlife, rare and endangered native plants, wildlife areas, and ecological reserves. Although CDFW does not have authority to approve or disapprove of the Proposed Action, the County, as the lead CEQA agency for purposes of permitting water wells, has consulted with CDFW. The CDFW has commented on the Draft and Final EIS/EIR, and has made recommendations regarding those resources within its jurisdiction. Those recommendations, along with detailed comments on the Desert Tortoise translocation plan and comments on the technical studies, have been considered. Consultation with the CDFW has been ongoing with the Applicant, BLM and CDFW to resolve concerns with the accounting for all desert tortoises that may occur on the site. The applicant will be required to obtain a subsequent permit and meet those information requirements prior to construction.

6.7 Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

The loss of active migratory bird nests or young is regulated by the Federal Migratory Bird Treaty Act (MBTA) and by California Fish and Game Code section 3503. The Bald and Golden Eagle Protection Act (BGEPA) prohibits any form of possession or taking of either bald eagles or golden eagles, which is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs."

The PA/EIS/EIR included evaluation of Project impacts associated with both migratory birds and golden eagles, based on the Bird and Bat Conservation Strategy developed by the Applicant, in consultation with BLM, USFWS, and CDFW. In accordance with BLM Instruction Memorandum 2010-156 dated July 9, 2010, BLM made a determination that the project is not likely to result in the take of golden eagles and would not disrupt essential breeding behavior. This conclusion, and the supporting rationale, was provided to the FWS in a letter dated April 22, 2013. The letter summarized observed golden eagle activity in the vicinity since 2010, and concluded that the existing projects in that area had not affected behavior.

The BLM's April 22, 2013 letter also summarized the Applicant's commitments for conservation measures, as specified in their Bird and Bat Conservation Strategy, and concluded that the document included the same essential elements as an Eagle Conservation Plan (BBCS). The BBCS was prepared consistent with APM Wild-5 and MM Wild-11 and Wild-12 found in the PA/EIS/EIR. It includes a number of different conservation measures designed to minimize the Project's impacts on migratory birds and golden eagles, including specific measures to be implemented during construction, post construction monitoring and reporting. Additional measures aimed at further reducing risks to birds and bats may be implemented through adaptive management if the results from avian mortality monitoring and agency consultation warrant such action.

The BLM acknowledges that preliminary monitoring of other utility-scale solar energy projects in the CDCA has shown avian fatalities have occurred in association with solar project development. Because the current information is preliminary and the implications of it are still being evaluated, the BLM has determined that this information does not represent significant new circumstances or information relevant

to environmental concerns under NEPA, and does not require supplementation of the current analysis. Also, as noted above, MM-Wild-11 requires implementation of a BBCS that includes avian mortality monitoring that will provide additional data for the BLM and USFWS to evaluate. The BLM will continue to monitor this and other solar energy projects within the CDCA, and if it becomes necessary, BLM may amend the terms and conditions under the applicable grants per 43 CFR 2805.15.

7.0 Mitigation Measures

As required in the BLM *NEPA Handbook H-1790-1* and consistent with 40 CFR 1505.2(c), all practicable means to avoid or minimize environmental harm from the SSFP have been adopted by this ROD. The ROW grant authorizations are subject to the following measures, terms, and conditions:

> Terms and Conditions in the USFWS BO, provided in Appendix 2 of this ROD, as such may be amended over time; and Avoidance, Minimization, and Mitigation Measures provided in PA/EIS/EIR Chapter 4, *Environmental Consequences*, as modified, which are provided in their final form in Appendix 4 of this ROD. The Environmental Construction and Compliance Monitoring Program (ECCMP) provided in Appendix 5 of this ROD.

Subsequent to publication of the Final EIS/EIR, BLM identified additional clarifications to the mitigation measures as published in that document. The final measures are provided in Appendix 4, along with the rationale for the clarification being made. These measures, terms, and conditions are determined to be in the public interest pursuant to 43 CFR 2805.10(a)(1) and have been incorporated as terms and conditions of the ROW grant. Failure on the part of the Applicant to adhere to these terms and conditions could result in various administrative actions up to and including a termination of the ROW grant and requirement to remove the facilities and rehabilitate disturbances.

Additional mitigation may be necessary to mitigate certain potential effects of the project under State standards (including CEQA) in connection with discretionary approvals from the County and other entities. Those measures are outside of BLM's jurisdiction and are not associated with the scope of this ROD; however, the ROW grant does require generally that the applicant comply with all applicable state standards.

8.0 Monitoring and Adaptive Management

A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation (40 CFR 1505.2(c)). Agencies may provide for monitoring to assure that their decisions are carried out and should do so in important cases. Mitigation and other conditions established in the PA/EIS/EIR or during its review and committed as part of the decision shall be implemented by the lead agency or other appropriate consenting agency. As the Federal lead agency for the SSFP under NEPA, BLM is responsible for ensuring compliance with all adopted mitigation measures for the project in the PA/EIS/EIR. The Project's ECCMP, attached as Appendix 5 to this ROD, facilities that objective.

Adaptive management has been incorporated into the mitigation measures and ECCMP adopted for the Selected Alternative. Adaptive management is a system of management practices based on clearly identified outcomes, monitoring to determine if management actions are meeting outcomes, and, if not, facilitating management changes that will best ensure that outcomes are met or to reevaluate the outcomes.

9.0 Public Involvement

9.1 Scoping

The NOI was published in the Federal Register (FR; Volume 76, No. 150) on August 4, 2011. The BLM and San Bernardino County hosted one public scoping meeting on Wednesday, August 31, 2011, from 6:00 pm to 8:00 pm at the Primm Valley Golf Clubhouse with a total attendance of 44 individuals. The BLM also established a website that described the project, the process, and various methods for providing public input, including the phone number where BLM's Project Manager for the project could be reached, physical addresses where project documents could be reviewed, and an e-mail address where comments could be sent electronically. Results of scoping were discussed in the Draft PA/EIS/EIR and are detailed in the scoping report available as part of this project record and on the BLM website.

9.2 Public Comments on the Draft PA/EIS/EIR

The Notice of Availability of the Draft PA/EIS/EIR was published in the Federal Register on November 23, 2012 (77 Fed. Reg. 70182). Three public comment meetings were held to provide information on the Draft EIS/EIR and solicit public comments. These meetings were held at:

- Primm Valley Golf Club, January 9, 2013, at 2:00 pm.
- Primm Valley Golf Club, January 9, 2013, at 6:00 pm
- Holiday Inn Express, Barstow, California, January 10, 2013, at 6:00 pm.

The public comment period on the Draft EIS/EIR closed on February 21, 2013. Seventy-six comment letters were received and provided as Appendix F to the Final PA/EIS/EIR. Responses to all letters were provided in Appendix G of the Final PA/EIS/EIR, and all comments received from agencies, members of the public, and internal BLM review were considered and incorporated as appropriate into the Final PA/EIS/EIR. Input received resulted in the addition of clarifying text, modification of the project footprint to avoid resource conflicts, and changes to the site preparation method to reduce ground disturbance and vegetation removal. These changes were to the physical aspect of the project and did not significantly change proposed land use plan decisions.

9.3 Public Comments on the Final PA/EIS/EIR

The BLM received three comment letters following the publication of the NOA for the Final PA/EIS/EIR:

- California Department of Fish and Wildlife, November 26, 2013;
- Clark County Department of Aviation (Clark County), December 10, 2013;
- U.S. Environmental Protection Agency (EPA), December 16, 2013; and
- Laborers International Union of North America (LiUNA), Local Union 783, February 4, 2014.

While there was no comment period provided on the Final PA/EIS/EIR, nor was one required under NEPA, BLM did consider the comments made in these letters to the extent practical. This consideration did not result in changes in the design, location, or timing of the Selected Alternative in a way that would

cause significant effects to the human environment outside of the range of effects analyzed in the PA/EIS/EIR. Similarly, none of the letters identified new significant circumstances or information relevant to environmental concerns that bear on the project and its effects. To the contrary, revisions to the PA/EIS/EIR made on the basis of BLM's consideration of comments received did not result in new or different effects relative to the range of effects previously analyzed. The comments resulted in minor corrections to and clarifications of the PA/EIS/EIR, which are provided in Appendix 3. Attached at Appendix 6 is a response to the concerns raised in the letter submitted by LiUNA. The BLM determined that similar responses were not required for the letters from CDFW, Clark County, or the U.S. EPA.

9.4 Protests

Pursuant to BLM's land use planning regulations in 43 CFR 1610.5-2, any person who participated in the land use planning process for the SSFP and who has an interest that is or may be adversely affected by the planning decision may protest approval of the proposed Plan Amendment contained in the PA/EIS/EIR within 30 days from date the EPA publishes the Notice of Availability (NOA) in the Federal Register. Detailed information on protests may be found on the BLM Washington Office website: http://www.blm.gov/pgdata/content/wo/en/prog/planning/planning_overview/protest_resolution.html. Specifically, the plan amendment decisions subject to protest are: (i) whether to find the project location suitable or unsuitable for solar energy development, (ii) whether to amend the CDCA Plan to authorize the Stateline Project, and (iii) whether to modify the boundaries of the Ivanpah DWMA.

The BLM timely received 7 protest letters. The Director has resolved all protests. In general, protesters were not in support of the proposed plan amendments identified above and raised the following issues, among others: the BLM's purpose and need for the project, the range of alternatives analyzed in the EIS, potential impacts to desert species habitat and project infrastructure, and cumulative effects. All protesting parties received response letters from the BLM Director conveying the Director's decision on the concerns raised in their protests. The responses concluded that BLM followed the applicable laws, regulations, and policies and considered all relevant resource information and public input in developing the Draft and Final PA/EIS/EIR. Therefore, all protests were denied, and no changes were made to the decision as a result of the protests. Detailed information on protests can be found on BLM Washington Office's website: http://www.blm.gov/wo/stlen/prog/planning/protestresolution.html.

9.5 Availability of the Record of Decision

Electronic copies of this ROD with the approved Plan Amendment are available on the Internet at http://www.blm.gov/ca/st/en/fo/cdd.html. Paper and electronic copies may be viewed at the following locations:

California Desert District
22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553

Needles Field Office
1303 S. Hwy. 95
Needles, California 92363

10.0 Consideration of Other BLM Plans and Policies

10.1 Relationship of the Selected Alternative to the Solar PEIS

The SSFP is not subject to the Solar PEIS ROD, or the CDCA Plan amendments made as a result of that decision. Appendix B of the Solar PEIS ROD defines "pending" applications as "any applications... filed within SEZs before June 30, 2009." The SSFP Applicant's initial CACA-048669 application was filed on December 14, 2006. Section B. 1.2 of the Solar PEIS ROD (p. 146) states, "Pending applications are not subject to any of the decisions adopted by this ROD." Consequently, the SSFP is not subject to the Solar

PEIS ROD or to the CDCA Plan amendments made in that decision. Instead, it remains subject to the pre-Solar PEIS ROD requirements of the CDCA Plan.

10.2 Conformance with the CDCA Plan

In furtherance of its authority under FLPMA, BLM manages public lands in the California Desert District, including the SSFP site, pursuant to the CDCA Plan, as amended. The CDCA Plan is a comprehensive, long-range plan that was adopted in 1980; it since has been amended many times. The CDCA is a 25-million-acre area that contains over 12 million acres of BLM-administered public lands in the California Desert, which includes the Mojave Desert, the Sonoran Desert, and a small part of the Great Basin Desert. By contrast, the site of the Selected Alternative includes approximately 1,685 acres of BLM-administered land in the CDCA.

The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not specifically identified in the CDCA Plan be considered through the Plan Amendment process. As described in Section 3 of this ROD, the CDCA Plan has been amended to identify the SSFP site as a site specifically associated with power generation and transmission.

The SSFP site is classified as Multiple-Use Class (MUC) L (Limited Use) in the CDCA Plan. The Limited Use classification is intended to protect sensitive, natural, scenic, ecological, and cultural resource values. Public lands classified as Limited Use are managed to provide for multiple use of resources at a lower intensity, ensuring that sensitive values are not significantly diminished. Based on CDCA Plan Table 1, Multiple Use Class Guidelines, and CDCA Plan Chapter 3, Energy Production and Utility Corridors Element, solar generating uses are conditionally allowed in the Multiple Use Class L designation contingent on the CDCA Plan amendment process and NEPA requirements being met. Because the SSFP site was not identified in the CDCA Plan for such use when the SSFP application was filed, a CDCA Plan Amendment is required in connection with the approval for the Selected Alternative. The PA/EIS/EIR met the Plan's requirement that a NEPA analysis be conducted.

The CDCA Plan Amendment to identify the site of the Selected Alternative for solar energy generation is provided in the ROD through the following Land Use Plan amendment analysis.

10.2.1 Required CDCA Plan Determinations

As discussed in CDCA Plan, Chapter 7, BLM must make certain determinations in amending the CDCA Plan. The required determinations and how they were made for the CDCA Plan Amendment for the SSFP and the DWMA expansion are provided below.

> **Required Determination:** Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.

The Applicant's request for a ROW grant and the public comment requesting consideration of an expanded DWMA were properly submitted; the PA/EIS/EIR was the mechanism for evaluating and disclosing environmental impacts associated with both actions. No law or regulation prohibits granting the CDCA Plan Amendment.

> **Required Determination:** Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.

Neither the Selected Alternative nor the DWMA expansion requires a change in the MUC classification for any area within the CDCA.

> **Required Determination:** Determine the environmental effects of granting and/or implementing the applicant's request.

The PA/EIS/EIR evaluated the environmental effects of approving the CDCA Plan Amendment and the ROW grant application for the SSFP, as well as the impacts of the DWMA expansion.

> **Required Determination:** Consider the economic and social impacts of granting and/or implementing the applicant's request.

The PA/EIS/EIR evaluated the economic and social impacts of the Plan Amendment, ROW grant, and DWMA expansion.

> **Required Determination:** 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.

Opportunities for and consideration of public comment on the proposed amendment, including input from the public and from Federal, state, and local government agencies that were provided are described in Section 9 of this ROD.

> **Required Determination:** Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

The balance between resource use and resource protection is evaluated in the PA/EIS/EIR. The FLPMA Title VI, as addressed in the CDCA Plan, provides for the immediate and future protection and administration of the public lands in the California Desert within the framework of a program of multiple use and sustained yield, and maintenance of environmental quality. Multiple use includes the use of renewable energy resources, and, through Title V of FLPMA, BLM is authorized to grant ROWs for the generation and transmission of electric energy. The BLM is also authorized to establish DWMAs in areas where necessary to protect resources which meet the criteria identified in the BLM ACEC Manual 1613. The acceptability of use of public lands within the CDCA for generation of solar energy is recognized through the CDCA Plan's approval of solar generating facilities on MUC L Class L lands after applicable requirements are met. The PA/EIS/EIR identifies resources that may be adversely affected by the approval of the SSFP and expanded DWMA, evaluates alternative actions that may accomplish the purpose and need with a lesser degree of resource impacts, and identifies mitigation measures that, when implemented, would reduce the extent and magnitude of the impacts and provide a greater degree of resource protection.

10.2.2 Conformance with CDCA Plan MUC Guidelines

The proposed Land Use Plan Amendments to be made by BLM include a site identification decision for the solar energy ROW, and the expansion of the DWMA. Because the proposed solar project and its alternatives are located within MUC L, the classification designation governs the type and degree of land use action allowed within the classified area. All land use actions and resource management activities on public lands within a MUC designation must meet the guidelines for that class. These guidelines are

listed in Table 1, *Multiple Use Class Guidelines*, in the CDCA Plan. The specific application of the MUC designations and resource management guidelines for a specific resource or activity are further discussed in the plan elements section of the CDCA Plan. In the Class L designation, BLM Authorized Officer (AO) is directed to use his/her judgment in allowing for consumptive uses by taking into consideration the sensitive natural and cultural values that might be degraded. The MUC L allows electric generation plants for solar facilities after NEPA requirements are met. The site for the SSFP meets the MUC Guidelines (as applicable to this project and site) for the reasons discussed in PA/EIS/EIR Section 4.6.3 (p. 4.6-1 et seq.).

The expansion of the DWMA is also consistent with MUC L guidelines. The MUC L is designated to protect sensitive, natural, ecological, and cultural resource values, and public lands designated as Class L are managed to provide for generally lower-intensity, carefully control multiple use of resources, while ensuring that sensitive values are not diminished. Appendix D of the PA/EIS/EIR evaluated the resources with respect to the relevance and importance criteria in BLM ACEC Manual 1613, and concluded that the desert tortoise population met the criteria. In addition, the DWMA already exists. The current action of expansion of the DWMA is an adjustment of those boundaries in response to the acquisition of better data related to the presence and movement of desert tortoise within the local area.

10.2.3 CDCA Plan Decision Criteria

The CDCA Plan defines specific Decision Criteria to be used by BLM in evaluating applications in the Energy Production and Utility Corridors Element of Chapter 3. The consideration of these Decision Criteria for the SSFP is described below.

> **Decision Criterion:** Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors.

This decision criterion is not applicable to the SSFP because the SSFP is not a corridor planning exercise.

> **Decision Criterion:** Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables.

The SSFP encourages the joint-use of corridors for transmission lines and cables and does not create conflicts. The solar plant site would partially overlap Corridors D and BB (also designated as the West-Wide Energy Corridor 225-27 in this area). The analysis in Section 4.6.3.1 of the PA/EIS/EIR documented that the amount of overlap could eliminate some potential uses of the corridors, but that the space remaining in the corridors would still allow future use of the corridors for linear projects.

> **Decision Criterion:** Provide alternative corridors to be considered during processing of applications.

The BLM considered alternative footprints in evaluating the SSFP; however, each would require use of the same corridors for the gen-tie line to access the Ivanpah Substation.

> **Decision Criterion:** Avoid sensitive resources wherever possible.

The extent to which the SSFP has been located and designed to avoid sensitive resources is addressed throughout the PA/EIS/EIR. The BLM and other Federal regulations and policies were considered in the original siting process used by the Applicant to identify potential sites for the project locations. The alternatives analysis considered whether the purpose and need of the project could be achieved with a

different build alternative, but with a lesser effect on sensitive resources. That analysis indicated that the Selected Alternative would have the lowest impacts to sensitive resources of any of the action alternatives.

Decision Criterion: Conform to local plans whenever possible.

As explained in Section 6.2 above, BLM initiated the period of Governor's Consistency Review for the PA/EIS/EIR in accordance with FLPMA (43 USC 1712(c)(9)) on November 15, 2013. The purpose of the review is to identify inconsistencies of the proposed PA with State and local plans, programs, and policies. No inconsistencies were identified. The entire SSFP is on BLM-administered lands and conforms to BLM land use plans, policies and regulations.

Decision Criterion: Consider wilderness values and be consistent with final wilderness recommendations.

There are no National Wilderness Areas or lands with wilderness characteristics within or adjacent to the solar plant site.

Decision Criterion: Complete the delivery systems network.

This decision criterion is not applicable to the SSFP.

Decision Criterion: Consider ongoing projects for which decisions have been made.

The BLM approved a ROW grant for the ISEGS, located to the west of the SSFP, in October 2010. The project is currently under construction, and is expected to become operational in 2014. The SSFP and Ivanpah SEGS will share the Ivanpah Substation. The BLM also approved a ROW grant for the Silver State North project, and is currently considering a ROW grant for the Silver State South project. These projects are outside of the CDCA in Nevada, but are located within a few miles of the SSFP. Impacts associated with all of these projects were considered in the cumulative analysis in the PA/EIS/EIR for the Proposed Action.

Decision Criterion: Consider corridor networks which take into account power needs and alternative fuel resources.

This decision criterion is not applicable to the SSFP. The project does not involve the consideration of an addition to or modification of the corridor network.

10.2.4 Revisions to Open Routes

In 2002, BLM updated access plans and routes in the Northern and Eastern Mojave Desert Management Plan (NEMO) Amendment to the CDCA Plan. The NEMO amendment assigned and/or revised access for off-highway vehicle (OHV) routes in the northern and eastern Mojave Desert. Currently, there are three open routes traversing the project site: Route 699226 (1.9 miles encompassed by the Selected Alternative), 699198 (2.0 miles), and 699238 (1.3 miles). As part of Project construction, the portions of these routes within the Project boundaries will be closed as the phased construction and fencing of the Project site occurs. In their place, new routes will be constructed around the perimeter of the facility, as shown in Figure 2, and will be designated as open routes.

The process for changing routes is described in the CDCA Plan Motorized Vehicle Access Element and BLM guidance on the Comprehensive Travel and Transportation Management (CTTM) program. Pursuant to BLM IM No. 2008-014 - Clarification of Guidance and Integration of Comprehensive Travel and Transportation Management Planning into the Land Use Planning Selection – the designation of individual routes within a Limited area is an implementation process that may be completed concurrent with the Land Use Plan, but is not a Land Use Plan decision. Changes to a travel network in a Limited area may be made through activity level planning or with site-specific NEPA analysis. They do not require a Land Use Plan amendment. Therefore, revision processes recognize the changing contexts and need for flexibility in allowing OHV public access on BLM-managed lands. The Motorized Vehicle Access Element of the CDCA Plan (page 82) describes the process for changing the designations of vehicle access routes as:

> "Decisions affecting vehicle access, such as area designations and specific route limitations, are intended to meet present access needs and protect sensitive resources. Future access needs or protection requirements may require changes in these designations or limitations, or the construction of new routes...Access needs for other uses, such as roads to private lands, grazing developments, competitive events, or communication sites, will be reviewed on an individual basis under the authority outlined in Title V of FLPMA and other appropriate regulations. Each proposal would be evaluated for environmental effects and subjected to public review and comment. As present access needs become obsolete or as considerable adverse impacts are identified through the monitoring program, area designations or route limitations will be revised. In all instances, new routes for permanent or temporary use would be selected to minimize resource damage and use conflicts, in keeping with the criteria of 43 CFR 8342.1."

The aforementioned process was used to revise the affected segments of the open routes within the Project site to closed routes. The perimeter maintenance roadways authorized under non-exclusive FLPMA right-of-way grants in connection with the Project will remain open for public use to connect around the perimeter of the solar facility to mitigate for the loss of closed routes across the Project site for the term of the Project's ROW grant. Upon decommissioning of the Project, BLM will revisit the travel needs of the area, and determine whether changes are needed at that time.

11.0 Final Agency Action

11.1 Land Use Plan Amendment

It is the decision of BLM to approve the Proposed Plan Amendment to the California Desert Conservation Area Land Use Management Plan (CDCA Plan, 1980, as amended), to identify the project site as available for solar energy development and approve the SSFP, and to modify the boundaries of the Ivanpah DWMA to encompass 58,104 acres total, as shown in Figure 3 of this ROD. I have resolved all protests on the Proposed Plan Amendment and, in accordance with BLM regulations, 43 CFR 1610.5-2, my decision on the protests is the final decision of the Department of the Interior.

Based on the recommendation of the State Director, California, I hereby approve the Proposed Plan Amendment. This approval is effective on the date this Record of Decision is signed.

Approved by:

Neil Kornze — Date: 2/14/14

Neil Kornze
Principal Deputy Director
Bureau of Land Management
U.S. Department of the Interior

11.2 Right-of-Way Authorization and Route Designation

It is my decision to approve a solar energy right-of-way lease/grant to Desert Stateline, LLC, subject to the terms, conditions, stipulations, Plan of Development, and environmental protection measures developed by the Department of the Interior and reflected in this Record of Decision. It is further my decision to modify the configuration of open routes within the footprint of the solar project as described in this Record of Decision and Final EIS. This decision is effective on the date this Record of Decision is signed.

Approved by:

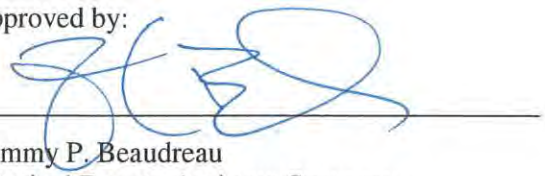
Neil Kornze — Date: 2/14/14

Neil Kornze
Principal Deputy Director
Bureau of Land Management
U.S. Department of the Interior

11.3 Secretarial Approval

I hereby approve these decisions. My approval of these decisions constitutes the final decision of the Department of the Interior and, in accordance with the regulations at 43 CFR 4.410(a)(3), is not subject to appeal under Departmental regulations at 43 CFR Subpart 4.400. Any challenge to these decisions, including BLM Authorized Officer's issuance of the right-of-way as approved by this decision, must be brought in the Federal District Court.

Approved by:



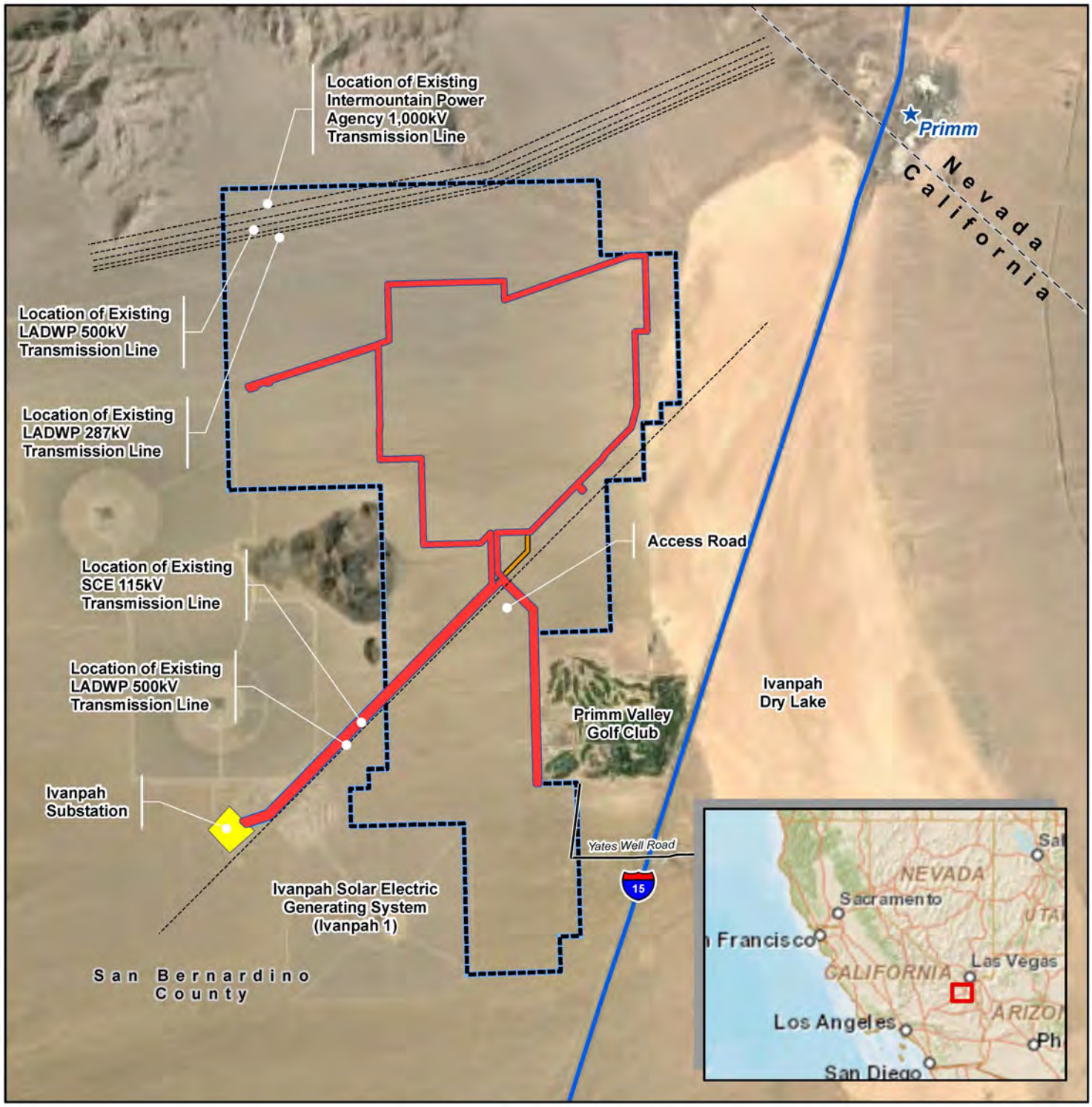
Feb 14, 2014

Tommy P. Beaudreau
Principal Deputy Assistant Secretary,
Land and Minerals Management
U.S. Department of the Interior

Date

APPENDIX 1

LOCATION MAPS



0 2,500 5,000 10,000 Feet

Legend

- ---------- Other Large Transmission Lines
- Revised Alternative 3 Footprint
- Project Study Area
- Gen-Tie Corridor
- Ivanpah Substation

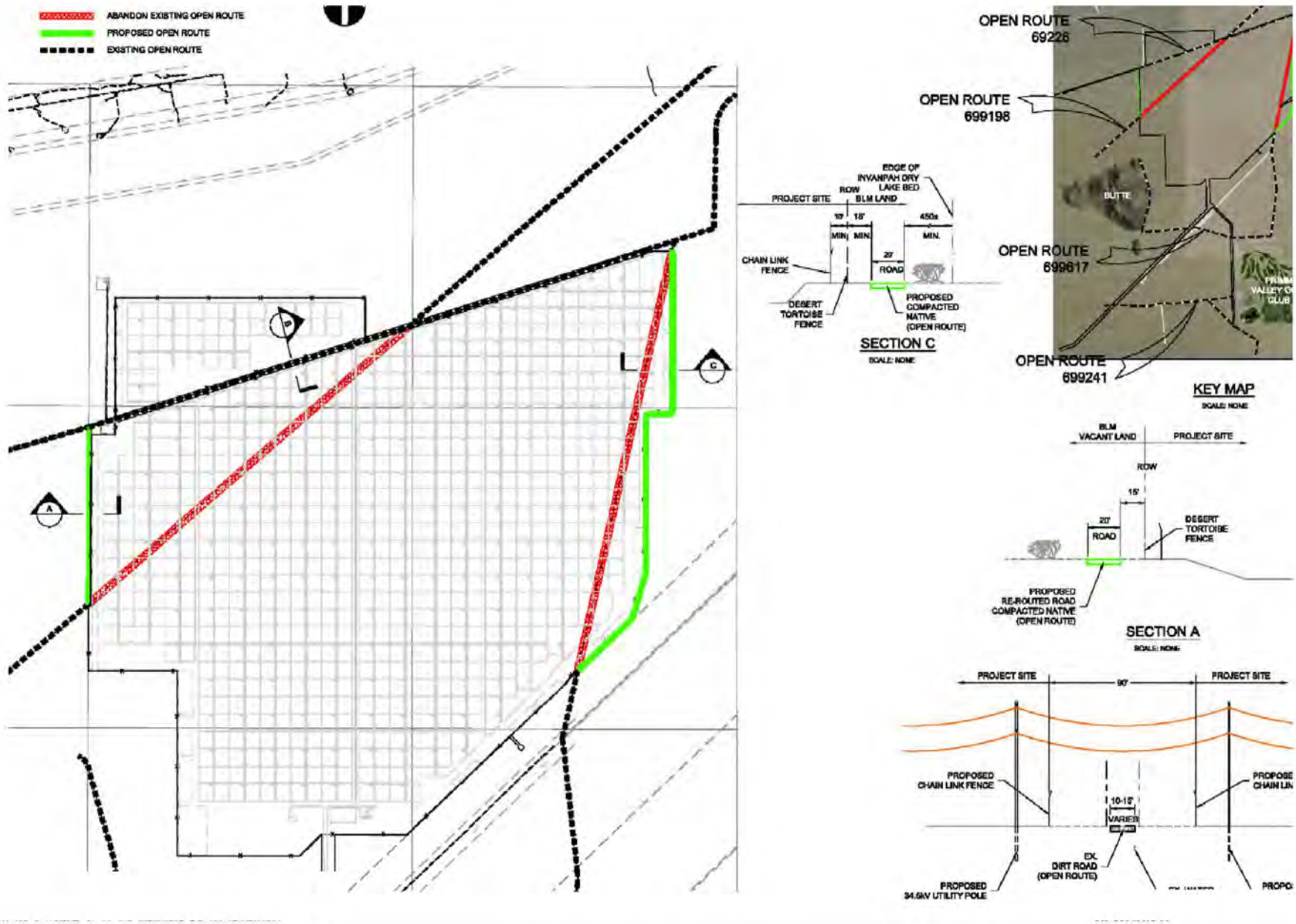
Ref: Desert Stateline. 2013. Plan of Development Stateline Solar Farm.

N

AECOM

Figure 1
General Location Map

Stateline Solar Farm Project



AECOM

Figure 2
Proposed Re-Routing of Existing Routes and Facilities - Revised Alt 3

Stateline Solar Farm Project

Date: 1/16/2014
Path: L:\Group\IT_GIS\GIS Projects\Stateline\MXDs\2014-Jan-16\Figure 2 Proposed Re-Routing of Existing Routes and Facilities Rev Alt 3.mxd

0 7,500 15,000 30,000
Feet

N

Legend

Proposed Modification

AECOM

Figure 3
Proposed Ivanpah DWMA Boundaries

Stateline Solar Farm Project

APPENDIX 2

BIOLOGICAL OPINION

United States Department of the Interior

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

IN REPLY REFER TO:
08EVEN-2013-F-0105

September 30, 2013

Memorandum

To: Field Manager, Needles Field Office, Bureau of Land Management, Needles, California

Assistant Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada

From: Acting Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

Subject: Biological Opinion for the Stateline Solar and Silver State Solar South Projects, San Bernardino County, California, and Clark County, Nevada (Stateline: 2800(P), CACA-048669, CAD090.01; Silver State South: 6840 (NV-052)) (Stateline: 8-8-13-F-43; Silver State South: 84320-2010-F-0208-R003)

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Bureau of Land Management's (Bureau) proposed issuance of right-of-way grants for the Stateline and Silver State South solar projects and their effects on the federally threatened desert tortoise (*Gopherus agassizii*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The proposed Stateline Solar Project involves the construction, operation, maintenance, and decommissioning of a 300-megawatt solar photovoltaic power plant and associated infrastructure and facilities on 1,685 acres of Bureau-managed lands; the applicant for the Stateline Solar Project is Desert Stateline, LLC (Stateline). The proposed Silver State South Project involves the construction, operation, maintenance, and decommissioning of a 250-megawatt solar photovoltaic power plant and associated infrastructure and facilities on 2,427 acres of Bureau-managed lands; the applicant for the Silver State South Project is Silver State Solar Power South, LLC (Silver State). We explain the rationale behind our consolidation of these two consultations in the Consultation History section of this biological opinion.

This biological opinion is based on information that accompanied your requests for consultation, including the biological assessments (Bureau 2013a, Bureau 2013c) and draft environmental impact statements (Bureau 2012a, Bureau 2012b); we also used information that the Bureau and the applicants provided during consultation and our files. The Service can make a complete record of this consultation available at the Ventura Fish and Wildlife Office and the Southern Nevada Field Office.

With one exception, the proposed actions would not occur within the boundaries of critical habitat of the desert tortoise or directly or indirectly affect the primary constituent elements of critical habitat. The one exception is that the Bureau and Silver State propose to use a portion of the Piute-Eldorado Critical Habitat Unit as an alternative site for translocation of desert tortoises, if needed. If the Bureau used this area, vehicles would remain on open routes and workers would access off-road sites on foot. Consequently, this activity is not likely to adversely affect critical habitat of the desert tortoise. Therefore, we do not address critical habitat in this biological opinion.

Consultation History

On September 16, 2010, the Service (2010a) issued a biological opinion encompassing three phases of the proposed 400 MW Silver State Solar Project. On October 12, 2010, the Bureau (2010a) issued a record of decision approving phase I and indicating that subsequent phases may require supplemental analysis under the National Environmental Policy Act. The Bureau incorporated the Service's biological opinion (Service 2010a) as a term and condition of the right-of-way grant for phase I, which is referred to as the Silver State Solar North Project and is owned by Silver State Solar Power North, LLC[1].

On January 2, 2013, the Bureau (2013c) requested initiation of formal consultation for the issuance of a right-of-way grant for the construction, operation, maintenance and decommissioning of the Stateline Project. On February 11, 2013, the Bureau (2013d) requested re-initiation of formal consultation for phases II and III of the Silver State Solar Project, which are collectively referred to as the Silver State South Project.

By memorandum dated March 4, 2013, the Service (2013a) requested that the Bureau consolidate the two consultation requests due to the proximity of the projects to each other, the timing of the consultations, the fact that the same parent company proposed both projects, the similarity between the effects of the projects, and the need to comprehensively address impacts to habitat and connectivity in the Eastern Mojave Recovery Unit of the desert tortoise. In the memorandum, the Service noted that conservation of the desert tortoise in Ivanpah Valley and the Eastern Mojave Recovery Unit was best addressed by analyzing the effects of these projects in a single document instead of approaching the requests for consultation separately.

The Bureau (2013e) agreed to consolidate the two consultations by memorandum dated March 12, 2013. Subsequently, the Bureau, the Applicants, and the Service engaged in a series of discussions regarding both project layouts to reduce the effects of the proposed actions on the

[1] This consultation does not address the Silver State Solar North Project (Phase I). Because the Silver State Solar North Project is encompassed by the 2010 biological opinion (Service 2010a), the conclusions and terms and conditions for the Silver State Solar North Project contained in the "Operation and Maintenance of Project Facilities" and "Restoration and Decommissioning of Facilities" provisions set forth in Sections A.3 and A.4 of the 2010 biological opinion remain in effect.

desert tortoise and a means of monitoring project impacts. Stateline reduced the overall acreage of the Stateline facility and shifted the entire project to the east, placing the eastern boundary of the facility in close proximity to Ivanpah Dry Lake. Silver State also moved phase II of the Silver State South facility to the west and removed phase III from the proposed project.

The Bureau provided the Service with revised biological assessments reflecting changes in the proposed projects for Silver State South (Bureau and Ironwood 2013c) on July 3, 2013 and for Stateline (Bureau 2013a) on July 5, 2013.

On September 11, 2013, the Service (2013f) provided the Bureau with a draft biological opinion. The Bureau shared the draft with First Solar and Southern California Edison. The Bureau (Cota 2013b, LaPre 2013b) provided comments on the draft biological opinion on September 18, 2013; we have incorporated the Bureau's comments into this biological opinion, as appropriate. The Bureau's comments included some changes to the proposed actions that we have incorporated into this final biological opinion.

DESCRIPTION OF THE PROPOSED ACTIONS

Introduction

The Bureau proposes to issue two separate right-of-way grants to the respective applicants for the proposed Stateline and Silver State South projects. The Bureau also proposes to issue a third right-of-way grant to Southern California Edison to operate the proposed Primm Substation and related facilities (loop-in lines, telecommunications site, fiber optic installation and separate access road on approximately 28 acres) that would be associated with and located near the Silver State South Project. The Silver State South Project and the Southern California Edison facilities would be constructed at the same time, use the same data sets with regard to the desert tortoise, and are located in close proximity to each other. For the sake of brevity, we will refer to the Silver State South Project and Southern California Edison facilities associated with that project throughout this biological opinion collectively as the Silver State South Project and to Silver State as the entity conducting work. However, because the Bureau is proposing to issue separate right-of-way grants to Silver State and Southern California Edison, we have included separate conclusions and incidental take statements for the right-of-way grants. We also included a separate conclusion and incidental take statement for the right-of-way grant for the Stateline Project.

We will refer to Silver State and Stateline collectively as the "Applicants" herein when the reference applies similarly, but individually, to both projects. However, each project and applicant is a separate legal entity and the conclusions and incidental take statements in this biological opinion apply to the applicant for each project individually.

Both solar projects generally include similar processes for construction, operation, maintenance and decommissioning of a photovoltaic facility and a generation-tie (gen-tie) transmission line.

The proposed Stateline and Silver State South projects would be located approximately 2 miles southwest and less than a mile east of Primm, respectively.

Unless otherwise noted, we summarized the following description of the proposed action from the biological assessments for Stateline and Silver State South projects (Bureau 2013a, Bureau and Ironwood 2013c).

Construction

Construction of the Stateline and Silver State South facilities would take 2 to 4 years from pre-construction surveys to operation. The combined monthly construction workforce for the projects would be approximately 700 to 900 people.

In the following paragraphs, we provide a description of the key components associated with development of the two projects. Based on similarities in the two solar facilities, we have merged features that are common to both projects. We will address features that are specific to Stateline and Silver State South separately. The following figures show the Stateline and Silver State South project foot prints and components.

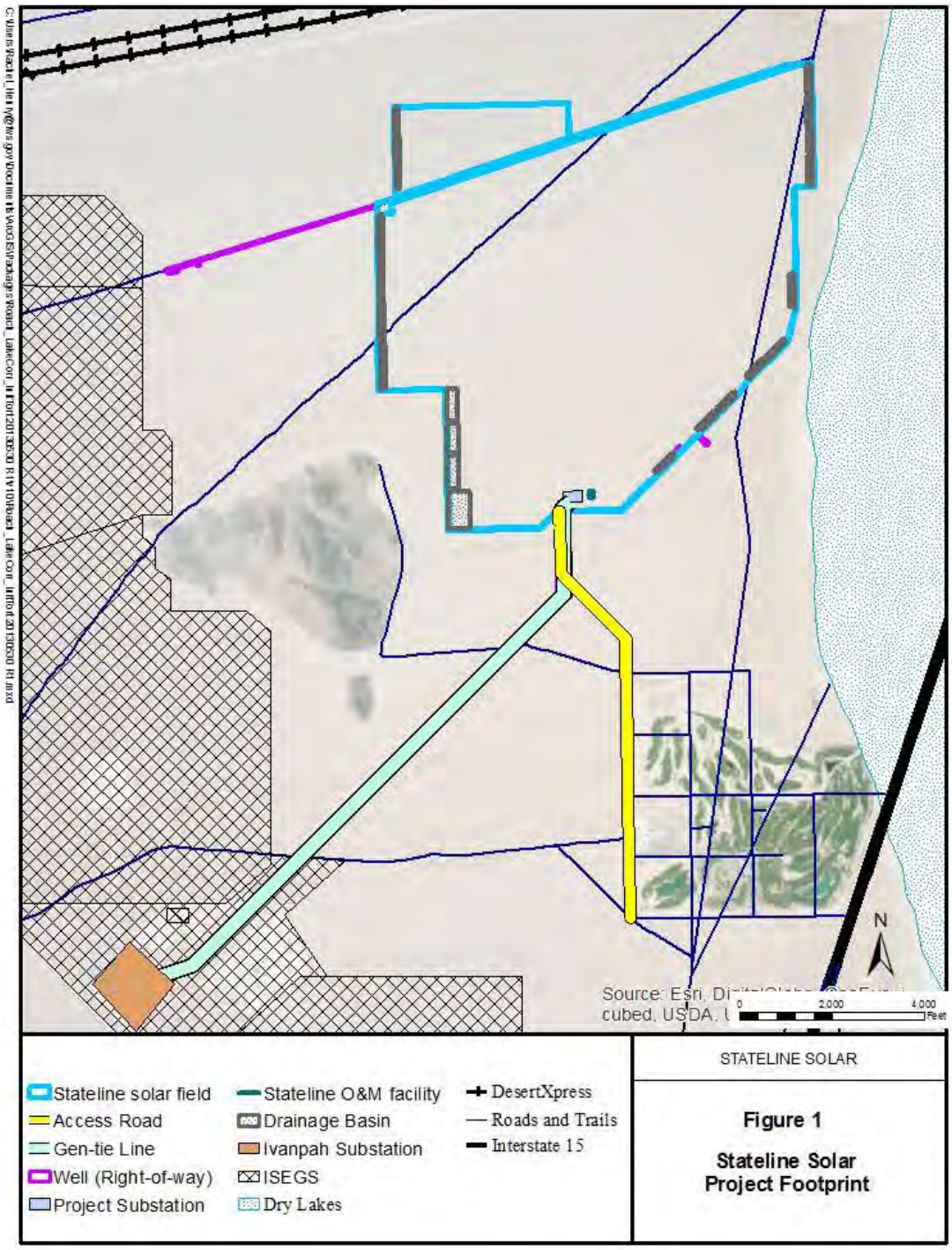
Features Common to Both Stateline and Silver State South

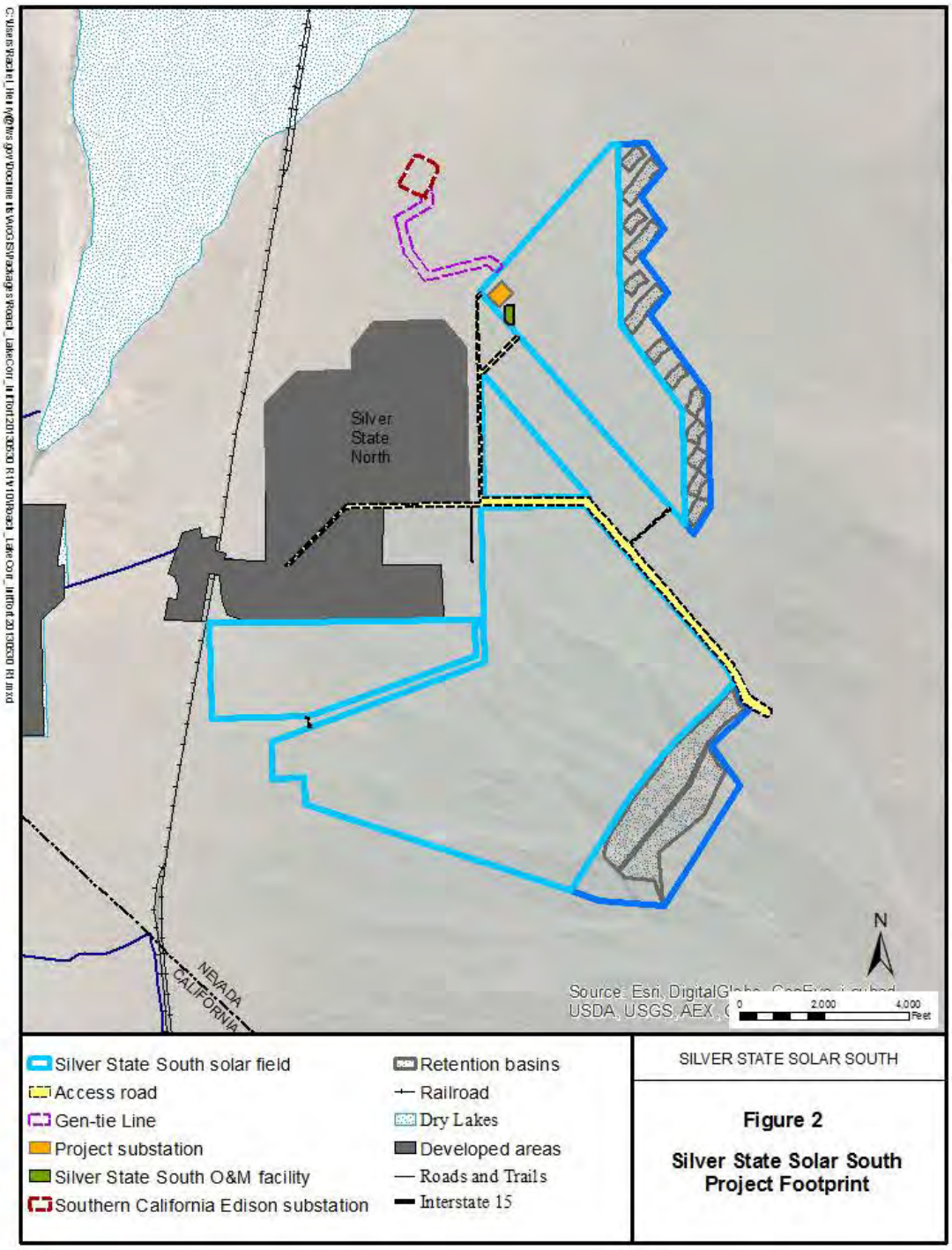
Prior to commencement of the construction process, the Applicants will conduct environmental clearance surveys along with the installation of desert tortoise fencing. Project construction would take place in two general phases: construction mobilization, which includes preconstruction surveys, construction of access roads, and installation of construction trailers, laydown areas, and materials storage areas; and construction and assembly of the solar fields and gen-tie lines.

The Applicants would remove vegetation from permanent facility sites, such as the operation and maintenance facilities, roads, and project substations. At other locations, such as within the solar array field and facility roadways, the site would be prepared with a combination of mowing, disking and rolling, and/or grading (Bureau 2012a, 2012b).

Temporary Construction Areas

Upon completion of the environmental clearance activities, the Applicants would develop temporary construction areas within the project footprints for laydown areas, offices, trailers, parking areas, and tool sheds. Temporary fencing would surround the staging and office areas while the sites' perimeter fences are under construction.


N
0
2,000
4,000
Feet
Stateline solar field
Access Road
Gen-tie Line
Well (Right-of-way)
Project Substation
Stateline O&M facility
Drainage Basin
Ivanpah Substation
ISEGS
Dry Lakes
DesertXpress
Roads and Trails
Interstate 15
STATELINE SOLAR
Figure 1
Stateline Solar
Project Footprint


Silver State North
NEVADA
CALIFORNIA
N
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, (
0
2,000
4,000
Feet
Silver State South solar field
Access road
Gen-tie Line
Project substation
Silver State South O&M facility
Southern California Edison substation
Retention basins
Railroad
Dry Lakes
Developed areas
Roads and Trails
Interstate 15
SILVER STATE SOLAR SOUTH
Figure 2
Silver State Solar South
Project Footprint

Solar Panel Arrays

The Applicants would mount the photovoltaic modules on steel columns approximately 10 feet apart. The photovoltaic modules would be placed in linear arrays with positioning of the arrays based on various site constraints, including the location of other site facilities, topography, and biological concerns. When completed, the arrays would be approximately 6 to 8 feet high for fixed-tilt and 13 feet high for trackers and a minimum of 18 inches above the ground surface.

Substations

Each project would have a corresponding substation where voltage produced by the solar array fields would be centrally collected and transferred off-site. Stateline's substation would be centrally located within the project area north of the existing transmission lines. The substation for Silver State South would be located along the northernmost western edge of the project footprint.

Gen-tie Line

Electricity from each substation would be transferred by way of a 220-kilovolt above-ground gen-tie line. A fiber-optic communication line would be suspended on each gen-tie line and an additional fiber-optic communication line would be buried within the transmission rights-of-way.

The gen-tie line of the Stateline facility would exit the southern portion of the project site and would connect to the Ivanpah Substation approximately 2.7 miles to the southwest. The gen-tie line of the Silver State South facility would exit the northwest portion of the project site and connect to the Eldorado- Ivanpah Transmission Line by way of the Primm Substation, which will be constructed by Southern California Edison. Figures 1 and 2 depict the gen-tie line rights-of-way for both projects.

Operation and Maintenance Facility

The operations and maintenance facilities for both projects would be constructed next to the project's substation. The facilities would consist of a building designated for storage of maintenance equipment and replacement parts and would contain the plant power and security monitoring systems.

Fencing and Security

The Applicants would surround the solar facilities with a chain-link fence that is at least 6 feet tall. Silver State would surround the Primm Substation with an 8-foot-tall pre-fabricated concrete perimeter wall and the Primm Microwave Communication Site with a combination of an approximately 10-foot-tall barrier wall with a chain-link fence on top. Each component

would include desert tortoise exclusion fencing, as appropriate, to implement minimization measures.

The solar facilities' perimeters would not include lights to minimize the visual impact on surrounding receptors and roads. Exterior lights at the operations and maintenance facilities, substation, temporary construction areas, and power conversion station shelters would be shielded and focused downward and toward the interior of the site to minimize lighting impacts to neighboring areas.

Features Specific to the Stateline Project

We summarized the following information from the biological assessment for the Stateline Project (Bureau 2013a) and draft environmental impact statement (Bureau 2012a).

Geotechnical Investigation

The first step in the construction process would be the completion of geotechnical studies to gather the information necessary to determine soil stability and the required depths of footings for site structures. The investigations would occur throughout the proposed solar farm site, the gen-tie route, the on-site substation, and the access route. Testing would consist of test pile driving, test pits, and soil borings at 23 locations. Each test location would comprise an area of no more than 15 feet by 20 feet or 300 square feet. The total acreage affected by the testing would comprise less than 0.2 acre.

Groundwater Production and Monitoring Wells

The Stateline facility would include the construction and operation of up to two groundwater production wells and three groundwater monitoring wells. The primary production well would be located on the southeastern corner of the facility; a secondary well would be located approximately 4,577 feet from the western edge of the facility (see Figure 1). One monitoring well would be installed for the primary well and two for the secondary well. Water would be conveyed through a 6-inch-diameter buried pipeline to the Project site and then to 5 temporary water storage ponds spaced throughout the solar arrays.

Primary Access Road

Access to the Stateline Project would occur via the Yates Well Road exit from Interstate 15. Yates Well Road, which is equipped with fencing to exclude desert tortoises, terminates at Silverton Road. Silverton Road runs west of and adjacent to the Primm Valley Golf Club. The primary access to the project site would be from the terminus of Silverton Road at Saragossa Drive at the northwest corner of the Primm Valley Golf Club (Figure 1).

Debris and Sediment Basins

The upstream perimeter of the proposed facility would include debris basins. The downstream perimeter of the proposed facility would include sediment basins. The purpose of the debris and sediment basins would be to capture any stormwater flowing on or off the site, allowing any solid materials (debris, sediment, plant material, and any other material) to settle out and remain within the basin, and then releasing stormwater at a lower velocity. All of the basins would be located within the perimeter fence of the Stateline facility.

Features Specific to the Silver State South Project

We summarized the following information from the biological assessment for the Silver State South project (Bureau and Ironwood 2013c) and draft supplemental environmental impact statement (Bureau 2012b).

Drainage Control Features

Silver State proposes to install detention basins upstream of the project site to control drainage outside of the eastern edge of the perimeter fence. The detention basins would be large-volume facilities cut below existing grade to detain and discharge water at a lower flow rate, at or below historic conditions downstream of the project site. All of the basins would be located within the perimeter fence of the Silver State South facility.

Primary Access Road

Silver State would access the Silver State South Project from Primm Boulevard using a portion of the same access road constructed for the Silver State North Project. Silver State would extend that road further to access the project operations and maintenance building, other ancillary facilities within the project site, and the Primm Substation.

Operation and Maintenance

Activities would include road maintenance, vegetation management, scheduled maintenance of electrical equipment, and occasional replacement of equipment. With the exception of linear facilities, operation and maintenance activities associated with the solar facilities would occur within the fenced perimeter of the Stateline and Silver State South projects. The biological assessments (Bureau 2013a, Bureau and Ironwood 2013c) for the Stateline and Silver State South projects provide additional details on these activities.

Decommissioning

The projects would have anticipated economic lifespans of up to 30 years. Because site conditions and agency requirements may change over the course of the project lifespan, final

decommissioning plans would be developed prior to termination of the right-of-way authorizations and be approved by the Bureau, dependent on the future use of the sites. If a site would continue to be used for industrial or commercial purposes, certain facilities may be left in place under a new right-of-way authorization. If no further use as a developed site is planned, the site would be restored in accordance with the approved decommissioning plan.

In this biological opinion, we are consulting on the issuance of the Bureau's right-of-way grants for the projects, which the environmental impact statements describe as 30 years for the 2 solar facilities. We based our analysis on this assumption. If the Bureau determines that it wishes to extend the right-of-way grants beyond this time frame, this extension would constitute a modification of the agency action causing an effect to the listed species that we did not consider in this biological opinion ((50 Code of Federal Regulations 402.16) and necessitate re-initiation of consultation with the Service, pursuant to section 7(a)(2) of the Endangered Species Act.

Minimization Measures

General Protective Measures

To minimize adverse effects to the desert tortoise, the Bureau will ensure the Applicants implement the following protective measures during construction, operation, maintenance, and decommissioning activities. To some degree, we have collated protective measures from throughout the biological assessments and changed the wording of some measures to improve clarity, but we have not changed the substance of the measures that the Applicants and the Bureau have proposed. The biological assessments contain more detailed descriptions of the proposed protective measures.

1. The Applicants will employ authorized biologists, approved by the Service, and desert tortoise monitors to ensure compliance with protective measures for the desert tortoise. Use of authorized biologists and desert tortoise monitors will be in accordance with the most up-to-date Service guidance (2010b) and will be required for monitoring of any construction, operation, maintenance, or decommissioning activities that may wound or kill desert tortoises.

2. The Applicants will provide the credentials of all individuals seeking approval as authorized biologists to the appropriate jurisdictional office of the Bureau in California and Nevada. The Bureau will review these and provide the credentials of appropriate individuals to the Service for approval at least 30 days prior to the time they must be in the field.

3. The Applicants will designate a field contact representative who will oversee compliance with protective measures during construction, operation, maintenance, and decommissioning activities that may result in wounding or mortality of desert tortoises. If the field contact representative, authorized biologist, or desert tortoise monitor

identifies a violation of the desert tortoise protective measures, they will halt work until the violation is corrected.

4. Authorized biologists and qualified desert tortoise monitors will capture and handle desert tortoises in compliance with the most up-to-date guidance from the Service (2009a).

5. The Applicants will develop and implement an environmental awareness program for all workers (construction, operation, maintenance, and decommissioning) that will address the following: a) types of construction activities that may affect the desert tortoise, b) the required desert tortoise protective measures, c) desert tortoise life history and threats, d) legal protections and penalties, and e) reporting requirements.

6. The Applicants will permanently fence the boundaries of the project sites (i.e., the areas where the solar fields, drainage basins, and ancillary buildings are located) and clear these areas of all desert tortoises prior to construction. We have provided a description of the procedures for clearance, translocation, and monitoring of these animals below.

7. Desert tortoise guards will be placed at all road access points, where desert tortoise-proof fencing is interrupted, to exclude desert tortoises from the road and solar facilities. The Applicants will coordinate with the Service on placement and design of the guards and their connection with the fencing to ensure that the guards provide a functional barrier to desert tortoises. The Applicants will inspect the guards quarterly and maintain them to ensure they continue to function as a barrier.

8. Authorized biologists will perform clearance surveys of unfenced work areas outside of the main project sites and construction logistics areas (e.g., utility rights-of way, etc.) immediately prior to the onset of construction, operation, or maintenance activities.

9. The Applicants will employ an appropriate number of authorized biologists and desert tortoise monitors to provide full coverage monitoring of construction, operation, maintenance, and decommissioning activities that occur in any unfenced work areas. Authorized biologists or desert tortoise monitors will flag all desert tortoise burrows for avoidance in areas adjacent to work areas.

10. The Applicants will confine all construction activities, project vehicles, and equipment within the delineated boundaries of areas that authorized biologists or designated desert tortoise monitors have identified and cleared of desert tortoises. The Applicants will confine all work areas to the smallest practical area, considering topography, placement of facilities, location of burrows, public health and safety, and other limiting factors. The Applicants will use previously disturbed areas to the extent feasible.

11. Any non-emergency expansion of activities into areas outside of the areas considered in this biological opinion will require the Bureau's approval and desert tortoise clearance surveys. These expanded activities may require re-initiation of consultation with the Service.

12. The Applicants will prohibit project personnel from driving off road or performing ground-disturbing activities outside of designated areas during construction, operation, maintenance, or decommissioning.

13. During operation and maintenance at the completed project sites, the Applicants will confine all vehicle parking, material stockpiles, and work-related equipment and materials to the permanently fenced project sites and logistics areas. However, under circumstances when space is limited, vehicles may be parked outside the walled Primm Substation where the undercarriage of all parked vehicles will be inspected for desert tortoise prior to continued operation.

14. The Applicants will confine project access to one major road for construction, operation, maintenance, and decommissioning of each facility.

    14a. At the Stateline facility, Stateline will confine project access to the road extending from the northwestern corner of the Primm Valley Golf Course for construction, operation, maintenance, and decommissioning activities. Stateline will install temporary fencing along this road during construction and decommissioning, when traffic volumes will be greater; it will also establish a 15-mile-per-hour speed limit for project-related travel when desert tortoises are active.

    14b. At the Silver State South facility, Silver State will confine project access to a road that would be constructed from the existing Silver State North Project maintenance road for construction, operation, maintenance, and decommissioning activities. This road would be located inside a permanent fence.

    14c. To reduce the potential for vehicle strikes of desert tortoises on unfenced access roads (i.e., gas line road, fiber optic right-of-way road, etc.), the Applicants will enforce a 15-mile-per-hour speed limit for project-related travel (i.e., construction, operation, maintenance, and decommissioning) in these areas when desert tortoises are active.

    The authorized biologist will inform Stateline when he or she is aware that desert tortoises are active. The Applicants will post speed limit signs along all access routes.

15. Project personnel who are working outside fenced areas will check under vehicles or equipment before moving them. If project personnel encounter a desert tortoise, they will contact an authorized biologist. The desert tortoise will be allowed to move a safe

distance away prior to moving the vehicle. Alternatively, an authorized biologist or desert tortoise monitor may move the desert tortoise to a safe location to allow for movement of the vehicle.

16. An authorized biologist or desert tortoise monitor will inspect all excavations that are not within desert tortoise exclusion fencing on a regular basis (several times per day) and immediately prior to filling of the excavation. If project personnel discover a desert tortoise in an open trench, an authorized biologist or desert tortoise monitor will move it to a safe location. The Applicants will cover or temporarily fence excavations that are outside of the permanently fenced project areas at the end of each day to prevent entrapment of desert tortoises during non-work hours.

17. The authorized biologist or desert tortoise monitor will check and repair all fencing (if necessary) on a daily basis during installation to ensure its integrity and identify any desert tortoises that may be fence-walking.

18. When outside of the fenced project areas, project personnel will not move construction pipes greater than 3 inches in diameter if they are stored less than 8 inches above the ground until they have inspected the pipes to determine whether desert tortoises are present. As an alternative, the Applicants may cap all such structures before storing them outside of fenced areas.

19. A biological resources monitor will be at each of the geotechnical test sites for all activities. This monitor will have the authority to micro-site the geotechnical test locations and stop work, if necessary, to avoid sensitive resources.

Management of Common Ravens

The Bureau will ensure the Applicants implement protective measures to reduce the adverse effects associated with predation of desert tortoises by common ravens (*Corvus corax*). In general, the Bureau and the Applicants propose to manage common ravens by designing facilities to discourage common raven use, minimizing or eliminating food and water subsidies, providing training to on-site personnel, monitoring the presence of common ravens and their use of subsidies, and developing educational materials regarding subsidies and predation on desert tortoises. The management plans for common ravens for the Stateline and Silver State South Projects (Ironwood 2012a, Bureau et al. 2013) contain more detailed information on these actions.

Weed Management

The Bureau will ensure that the Applicants implement weed management measures to reduce adverse effects to desert tortoises and their habitat during construction, operation, maintenance, and decommissioning of the solar facilities. A primary objective of the Applicants' weed

management plans is to ensure that the presence of weed populations on and adjacent to the projects do not increase due to the projects (Desert Stateline 2013, Ironwood 2013). In general, the Bureau and the Applicants propose to manage noxious weeds and control any potential infestations that may occur by identifying potential weed infestations at the facilities and prescribing treatment, limiting ground disturbance to the minimum necessary, monitoring construction sites, cleaning equipment, providing training to on-site personnel, and submitting a pesticide use proposal prior to beginning construction.

Translocation Strategy

To minimize impacts associated with the projects, the Applicants have proposed to translocate desert tortoises from within the proposed solar facilities and any other areas that would be fenced. The Bureau (2013f) and the Bureau and Ironwood (2013b) provided us with translocation plans for the Stateline and Silver State South projects, respectively, during development of the draft biological opinion. Discussions among the Service, Bureau, and Applicants resulted in several changes to these translocation plans; we based the following description on the Bureau (2013f) and the Bureau and Ironwood (2013b) translocation plans and these discussions.

To assist in preparing the translocation plans, the Applicants analyzed home range size, distribution, habitat use and selection, disease prevalence, and contaminant exposure of desert tortoises within the Ivanpah Valley. These data sets will inform translocation activities and provide baseline data for future monitoring as the study area encompasses the project sites and contiguous recipient sites. In 2012, the Applicants initiated research efforts to locate, attach transmitters to, and conduct health evaluations on desert tortoises in the Stateline and Silver State South project sites. To date, the Applicants have attached transmitters to approximately 34 and 80 desert tortoises in and around the Stateline and Silver State South project sites, respectively. The Applicants used these data to establish an activity area for each desert tortoise.

Monitoring of Translocated Desert Tortoises

BrightSource Energy is currently constructing the Ivanpah Solar Electric Generating System, which is located to the west of the proposed Stateline Solar Project. As a condition of the approval of that project, BrightSource Energy is monitoring translocated, resident, and control desert tortoises in the Ivanpah Valley. The Bureau will maintain a database that will allow it and the Service to determine mortality rates of these desert tortoises.

The Bureau and Applicants have proposed to use information from this database to compare the mortality rates of BrightSource Energy's control animals to assess whether translocation is affecting the survival rate of desert tortoises translocated from the sites of the Stateline Solar and Silver State South projects. Data from some of the resident animals that BrightSource Energy is monitoring may also serve as information regarding residents for the Stateline Solar Project. The Bureau proposed to use these data because the desert tortoises that BrightSource Energy is

monitoring are close enough in proximity that the same environmental factors (e.g., weather conditions, habitat quality, etc.) are likely to affect the recipient sites for the Stateline Solar and Silver State South projects and the control site. Currently, BrightSource Energy is monitoring 136 desert tortoises as controls (Davis 2013a).

The Bureau and Silver State have proposed to monitor the translocated and resident desert tortoises for 1 year after the initial translocation (Cota 2013b). The Bureau has determined that Stateline will conduct 5 years of post-translocation mortality monitoring of the desert tortoises, if it approves the Stateline Solar Project. During the course of this consultation, the Bureau, Service, and First Solar engaged in several discussions regarding reducing the duration of monitoring of translocated desert tortoises because of the results of studies on translocated animals. After agreeing that one year of post-translocation monitoring would be sufficient for the Silver State South and Stateline Solar projects, the California Department of Fish and Wildlife notified the Bureau and Stateline that it intended to require Stateline to monitor translocated desert tortoises for 5 years in its incidental take permit under the California Endangered Species Act. Consequently, although the Nevada and California offices of the Bureau are requiring one year of post-translocation monitoring, the Bureau in California recognizes that 4 additional years of monitoring will take place at Stateline because of the requirement of the California Department of Fish and Wildlife (LaPre 2013d).

If BrightSource Energy discontinues its monitoring of desert tortoises before Stateline's commitment ends, the Bureau will require Stateline to track an appropriate number of animals as controls and residents (Fesnock 2013a). At the end of 5 years, the agencies will determine if additional study is warranted (e.g., mortality rates are significantly different from resident or control populations) with regard to the desert tortoises translocated from the Stateline Solar Project or if the individuals could or should be incorporated in an existing regional study (Fesnock 2013b).

The Applicants have already attached transmitters to many desert tortoises at both sites. They will maintain these transmitters on animals after translocation and attach transmitters to any new desert tortoises discovered during pre-construction clearance surveys prior to being translocated (provided that it is large enough to support one). The details of translocation methodologies and frequency of monitoring are located in the translocation plans for the projects (Bureau 2013f, Bureau and Ironwood 2013b); the plans generally followed the most recent guidance for post-translocation monitoring (Service 2011a).

Recipient Sites

The Bureau based its selection criteria to identify recipient sites for each project on the Service's (2011a) translocation guidance. The Bureau selected areas within approximately 40 kilometers of the Stateline and Silver State South project sites that meet all or most of the criteria in the guidance. The Bureau evaluated recipient sites for suitability of both within-home-range translocation (for animals moved up to 500 meters from their original location) and outside-

home-range translocation (for animals moved greater than 500 meters from their original location).

The Bureau evaluated one within-home-range recipient site (Perimeter) and two outside-home-range recipient sites (North and East Lake) for the Stateline Project. (The Stateline translocation plan describes three outside-home-range recipient sites in the translocation plan but the Bureau deleted one during consultation (LaPre 2013c).) The Perimeter site is located immediately adjacent to the northern and western boundaries of the project site. Data on desert tortoises within the Perimeter site were derived from protocol surveys conducted in 2011 and 2012. Based on these surveys and the Service's translocation guidelines (2011a), the Perimeter site can hold approximately 35 additional large desert tortoises without exceeding a post-translocation density of 15 large individuals per square mile. (We define large desert tortoises as any animal that is 160 millimeters or greater in length and explain our use of this term, rather than "adult," in the Environmental Baseline - Status of the Desert Tortoise in the Action Area section of this biological opinion. We based the post-translocation density on one standard deviation of the mean density of desert tortoises in the Eastern Mojave Recovery Unit, which is 15 individuals per square mile (Service 2011a).) The North site is approximately 1.2 miles north of the Stateline Project site, extending up the alluvial fan towards the Stateline Pass. The site is contiguous with the Perimeter recipient site; however, because of its distance from the project, Stateline would use it for outside-home-range translocation.

The Bureau also evaluated East Lake as an additional recipient site for the Stateline Project. The East Lake recipient site is located along the east side of Ivanpah Dry Lake approximately 3.1 miles east of the project site. The Bureau is not proposing this site for use at this time because the Perimeter and North recipient sites should be sufficient to meet the objectives of the translocation plan. However, if the number of large desert tortoises found within the project site exceeds the capacity of the primary recipient sites, the Bureau would consider the East Lake site as an alternative recipient site.

The Bureau identified three proposed recipient sites for the Silver State South Project, referred to as the Corridor, Crescent and Rucker sites. The Corridor site lies to the east of the project, extends into the foothills of the Lucy Grey Mountains and includes the area immediately surrounding the project. The Bureau prefers this site for translocation because Silver State has extensive information on densities, disease status, and activity areas of its desert tortoises. Based on surveys it has conducted and the Service's translocation guidelines (2011a), Silver State could translocate approximately 100 large desert tortoises into the Corridor site without exceeding the post-translocation limit, which is 15 large individuals per square mile. The Crescent site is within the Piute-Eldorado Critical Habitat Unit and the Piute-Eldorado Valley Area of Critical Environmental Concern near the southern end of the Lucy Grey and McCullough mountains; it lies 8.7 miles southeast of the project area. The Rucker site is located approximately 7.5 miles northeast of the southern portion of the Silver State South Project. The Bureau would use these translocation areas if the number of large desert tortoises from the Silver State South Project site exceeds the capacity of the Corridor site.

Translocation Procedures

This section provides details of the steps that the Applicants would undertake to translocate desert tortoises. The installation of the exclusion fence would preclude desert tortoises that were outside the fence line at the time from re-entering the project sites. After the Applicants install the exclusion fence, it would translocate individuals with attached transmitters and then conduct clearance surveys to find and translocate any remaining individuals.

The Applicants will conduct health assessments to the extent possible on small desert tortoises, if their size allows. The Applicants have already completed health assessments on the individuals it has been tracking in the project areas. If these results are more than a year old at the time of translocation, the Applicants will reassess those desert tortoises and include this information in the disposition plan. The Applicants would use the Service's (2013d) guidelines for assessing the health of desert tortoises and transport any individuals showing severe injury or severe clinical signs of disease at the time of translocation to an agency-approved quarantine facility.

The biological assessments state that the Applicants would translocate desert tortoises in the spring or fall when rainfall has been "adequate." Because rainfall may not reach 40 millimeters, which the biological assessments describe as adequate, and research has demonstrated that the amount of rainfall does not affect the survival rates of translocated desert tortoises, the Bureau agreed on the following change to the proposed actions (Cota 2013a, LaPre 2013a).

The Applicants would translocate desert tortoises in the spring or fall, when animals are active. Individuals authorized by the Service to conduct health assessments as described in the Service's (2013d) health assessment procedures will evaluate the suitability of desert tortoises for translocation. Depending on environmental conditions and their perceived hydration state, the authorized biologists will provide supplemental hydrating fluids to desert tortoises within 12 hours of translocation. (In addition, all desert tortoises that void will be given hydrating fluids.) The authorized biologists will decide on the necessity of supplemental hydration in close coordination with the Service as part of the individual disposition plans for the desert tortoises.

The Applicants will conduct clearance surveys as described in the translocation plans (Bureau 2013f, Bureau and Ironwood 2013b) and in the Service's (2010c) current guidance. The Applicants will divide the area within the perimeter fence into subsections with interior fencing. Clearance surveys will continue in each subsection until at least two consecutive perpendicular passes are completed without a desert tortoise or new active sign (additional individuals, active burrows, recent scat, tracks, or mating rings) being found, at which time construction may commence in that unit. Desert tortoises found during clearance surveys will remain in situ until a disposition plan is approved; if an animal's health assessment is more than a year old, the Applicant will complete a new assessment for the disposition plan. All desert tortoise burrows within the cleared area will be completely and carefully excavated to seek out viable nests.

Each applicant will attempt to conduct clearance surveys only during the active season for desert tortoises; however, they may need to begin work in some areas (e.g., staging area) outside the active season. Construction of linear components of the projects may occur at any time of the year (Bureau 2013f). Any desert tortoises found during clearance of linear components will be moved out of harm's way to adjacent habitat following current clearance and handling procedures (Service 2009a). The Applicants will not attach transmitters to these individuals or track or test them for disease; they will conduct visual health assessments of these desert tortoises to determine if they exhibit clinical signs of disease.

Handling and Release of Translocated Desert Tortoises

The following description of the methodology for moving and releasing desert tortoises is from the translocation plan for the Stateline Solar Project (Bureau 2013f). The translocation plan for the Silver State South Project did not address this methodology; however, Silver State will follow procedures outlined in the Service's guidance similar to the Stateline Solar Project.

Only authorized biologists will handle desert tortoises during translocation. Desert tortoises will be hydrated according to the Service's (2011a) protocol; all desert tortoises that void their bladders will be hydrated according to the Service's protocols. Animals will be transported to their release sites in clean, ventilated protective containers. If these containers are re-used, they will be disinfected according to existing protocols. All individuals will be released at unoccupied shelter sites such as soil burrows, spaces within rock outcrops, caliche caves, or the shade of shrubs. Release locations will be identified ahead of time and specified in the disposition plan. Spatial distribution patterns between desert tortoises will be maintained as consistently as possible to those found on the project site. Releases will take place between 0700 and 1600 hours and will occur when temperatures range from 65 to 85°F and are not forecasted to exceed 90°F within 3 hours of release. The Applicants will not release desert tortoises if daily low temperatures are forecasted to be cooler than 50°F for one week post-release. Temperatures will be taken at approximately 2 inches above ground in a recently shaded area.

Handling of Desert Tortoise Nests

The Applicants will completely and carefully excavate all desert tortoise burrows within the cleared area to ensure that no viable nests remain. If the Applicants locate a viable nest, they will move it as described in the Desert Tortoise Field Manual (Service 2009a). Section 6.6 of the field manual recommends that relocated nests be monitored by an authorized biologist according to a monitoring program to be developed in consultation with the Service.

Monitoring of Demographic and Genetic Stability

The Applicants have separately agreed to fund a program, developed by the U.S. Geological Survey and the Bureau, to monitor regional desert tortoise populations for changes in demographic and genetic stability. Each project would separately begin its respective

monitoring as soon as November of 2013 and continue it for the term defined in Nussear et al. (2013). The monitoring study will address genetic and demographic connectivity, changes in health status of populations in response to habitat changes, and the effects of climate and between-site habitat suitability on connectivity between populations. We have summarized the following description of the monitoring strategy from Nussear et al. (2013).

The monitoring strategy is designed to examine connectivity among pre-selected study sites in the Ivanpah Valley by monitoring genetic connectivity using a multifaceted approach. The U.S. Geological Survey will assess genetic connectivity by using blood samples to provide baseline information on population genetics (i.e., genetic variation and genetic structure of the population). The U.S. Geological Survey will sample each of the 10 1-square-kilometer study sites approximately every 3 to 5 years; the time between samples is appropriate, given the long generation times of desert tortoises. The data will also provide estimates of differentiation among individuals and populations to assess whether developments and habitat barriers affect the genetic structure of the population in the valley. These samples will infer changes in genetic structure and the relative connectivity among these populations over time. If connectivity among sites is severed, genetic differentiation among sites would likely increase over time.

Because long periods of study may be required to detect changes in gene flow given the desert tortoise's slow reproduction and long generation times, monitoring programs may not be able to detect broken linkages with sufficient time to implement conservation decisions informed by genetic analyses alone. For this reason, the U.S. Geological Survey will also measure individual movement and fine-scale connectivity annually by using radio telemetry to measure the coincident locations of desert tortoises and subsequent overlap of home ranges at two of the study sites. The U.S. Geological Survey will then use micro-dataloggers attached to desert tortoises that will record contacts and relay the chain of connectivity through a corridor as individuals encounter one another on the landscape. This system will allow the U.S. Geological Survey to measure connectivity using the relay of contacts among desert tortoises throughout the corridor; the rates of contact will then be compared to rates of contact and connectivity in uncompromised habitats.

The U.S. Geological Survey will attach a radio transmitter to each new animal encountered within the study site (provided that it is large enough to carry a transmitter). Information from capture-recapture surveys will provide local estimates of density, immigration, and emigration; quantify demographic structure; facilitate the collection of new genetic material, disease and health status; quantify mortality estimates during the surveys; and potentially document demographic exchange of individuals among sites over time. The U.S. Geological Survey will also genotype desert tortoise scat as a second method of capture-recapture to increase the number of individuals that can be detected and sampled. Scat genotyping provides a non-invasive sampling technique for future genetic population monitoring. Nussear et al. (2013) contains additional information on the U.S. Geological Survey's methodologies.

Measures to Offset Adverse Effects

The Bureau will require the individual applicants to offset the loss of desert tortoise habitat in accordance with the relevant land use plans.

Stateline Project

The Bureau and Stateline have proposed several projects to offset the adverse effects of the Stateline Solar Project. First, Stateline will fund the retirement of 40,000-acres of the Clark Mountain Grazing Allotment, which occupies the area west of Interstate 15 between the Clark Mountains and the state line. Second, Stateline will fund restoration work along 20 acres of the Kern River Pipeline right-of-way located north of the project site and within a 6.4-acre area along the west side of Whiskey Pete's, located approximately 1.5 miles northeast of the proposed project site. Third, Stateline will restore 30 closed/unauthorized routes located within the Eastern Mojave Recovery Unit. Lastly, Stateline will fund fencing along 13 miles of Morningstar Mine Road, located within the Mojave National Preserve.

Stateline will also provide funding to the regional management for common ravens by paying a one-time fee of $105 per acre of disturbance for 1,685 acres of desert tortoise habitat that will be adversely affected by the project. The Service will use this funding to implement various management actions for common ravens, as described in the environmental assessment for the management of this species in the California desert (Service 2008).

Silver State South Project

The Bureau and Silver State have proposed actions to offset the adverse effects of the Silver State South Project. Silver State will fund the Bureau to perform health and genetic testing of desert tortoises in the Large-Scale Translocation Site to determine if connectivity can be restored by removing or reconfiguring the site's perimeter fence without additional management actions. The Bureau will, with technical assistance from the Service as needed, develop and implement appropriate adaptive management strategies to allow eventual removal or reconfiguration of the perimeter fence in appropriate locations to improve connectivity. If initial testing results or subsequent adaptive management strategies indicate that removal or reconfiguration of the perimeter fence is feasible, Silver State's funding will be used by the Bureau for the removal or reconfiguration of the perimeter fence, as appropriate, in consultation with the Service. If testing indicates that improving connectivity through the Large-Scale Translocation Site is not feasible for genetic, disease, or other reasons, the Bureau would instead fence portions of Highway 93 from where fencing exists to the north to reduce the mortality of desert tortoises.

Silver State will fund the Bureau to perform restoration work to ensure that areas important for connectivity adjacent to the project site are improved (e.g., restoring disturbed area, etc.); it will also fund law enforcement personnel for up to 3 years to ensure that land management regulations and protections enacted by the Bureau in these areas are enforced. Silver State will

fund the Bureau for a study to assess the effects of dust palliatives on the desert tortoise, if these substances are used at the project site.

Silver State and Southern California Edison will also provide the Bureau with the standard remuneration fee of $824 per acre of disturbance for their respective disturbances totaling 2,427 acres of desert tortoise habitat, in addition to the funds required to implement the projects described in this section. If Silver State's payment to the Bureau for improving connectivity though the Large-Scale Translocation Site is not sufficient, the Bureau would use funds from the standard remuneration fee to complete the work. The Bureau will use any remaining remuneration funds for other projects to promote the conservation of the desert tortoise in Nevada.

Changes in Land Use Plans

The Bureau has proposed related actions to create a new proposed area of critical environmental concern in Nevada (Bureau 2013g) in relation with the Silver State South Project approval, and to expand the Ivanpah Desert Wildlife Management Area in California (Bureau 2012a) in relation with the Stateline Project approval. The new proposed area of critical environmental concern would result in the addition of approximately 50 square miles to existing conservation areas; it would encompass most of the Lucy Gray Mountains and adjacent valley floors and extend north to the Sheep Mountains. The area of expansion of the Ivanpah Desert Wildlife Management Area would encompass the remaining desert tortoise habitat in California outside the footprints of the Stateline Solar Project, Ivanpah Solar Electric Generating System, and the Primm Valley Golf Course; this expansion would add approximately 37 square miles to this conservation area. The desert wildlife management area and proposed area of critical environmental concern would be contiguous at the state boundary east of Interstate 15 with approval of a land use plan amendment.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 Code of Federal Regulations 402.02).

The jeopardy analysis in this biological opinion relies on four components in relation to the desert tortoise: (1) the *Status of the Desert Tortoise*, which describes the range-wide condition of the desert tortoise, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to its survival and recovery; (3) the *Effects of the Action*, which determines the direct and indirect

impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the desert tortoise; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the desert tortoise.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the desert tortoise and, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both its survival and recovery in the wild.

STATUS OF THE DESERT TORTOISE

Section 4(c)(2) of the Act requires the Service to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review); these reviews, at the time of their completion, provide the most up-to-date information on the range-wide status of the species. For this reason, we are appending the 5-year review of the status of the desert tortoise (Appendix 1; Service 2010d) to this biological opinion and are incorporating it by reference to provide most of the information needed for this section of the biological opinion. The following paragraphs provide a summary of the relevant information in the 5-year review.

In the 5-year review, the Service discusses the status of the desert tortoise as a single distinct population segment and provides information on the Federal Register notices that resulted in its listing and the designation of critical habitat. The Service also describes the desert tortoise's ecology, life history, spatial distribution, abundance, habitats, and the threats that led to its listing (i.e., the 5-factor analysis required by section 4(a)(1) of the Act). In the 5-year review, the Service concluded by recommending that the status of the desert tortoise as a threatened species be maintained.

With regard to the status of the desert tortoise as a distinct population segment, the Service concluded in the 5-year review that the recovery units recognized in the original and revised recovery plans (Service 1994 and 2011b, respectively) do not qualify as distinct population segments under the Service's distinct population segment policy (61 Federal Register 4722; February 7, 1996). We reached this conclusion because individuals of the listed taxon occupy habitat that is relatively continuously distributed, exhibit genetic differentiation that is consistent with isolation-by-distance in a continuous-distribution model of gene flow, and likely vary in behavioral and physiological characteristics across the area they occupy as a result of the transitional nature of, or environmental gradations between, the described subdivisions of the Mojave and Colorado deserts.

In the 5-year review, the Service summarizes information with regard to the desert tortoise's ecology and life history. Of key importance to assessing threats to the species and to developing and implementing a strategy for recovery is that desert tortoises are long lived, require up to 20

years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential. The number of eggs that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition. Predation seems to play an important role in clutch failure. Predation and environmental factors also affect the survival of hatchlings.

In the 5-year review, the Service also discusses various means by which researchers have attempted to determine the abundance of desert tortoises and the strengths and weaknesses of those methods. Due to differences in area covered and especially to the non-representative nature of earlier sample sites, data gathered by the Service's current range-wide monitoring program cannot be reliably compared to information gathered through other means at this time.

The Service provides a summary table of the results of range-wide monitoring, initiated in 2001, in the 5-year review. This ongoing sampling effort is the first comprehensive attempt to determine the densities of desert tortoises across their range. Table 1 of the 5-year review provides a summary of data collected from 2001 through 2007; we summarize data from the 2008 through 2012 sampling efforts in subsequent reports (Service 2012a, 2012b, 2012e, 2012f).

Allison (2013b) analyzed long-term monitoring data for desert tortoise conservation areas to evaluate whether densities are changing across the range of the species. The data best fit a model in which densities are declining across the Western Mojave, Eastern Mojave, Colorado Desert, and Upper Virgin River recovery units and increasing across all conservation areas in the Northeastern Mojave Recovery Unit. The data do not support alternative models of stable population abundance. Trends in the Upper Virgin River and Northeastern Mojave recovery units are significant at the alpha = 0.10 level, but the rate of population change is not statistically significant elsewhere.

Allison (2013b) also evaluated changes in size distribution of desert tortoises since 2001. In the Western Mojave, Eastern Mojave, and Colorado Desert recovery units, the median size of large individuals has increased, indicating less recruitment of younger (therefore smaller) desert tortoises. In the Western Mojave and Colorado Desert recovery units, the relative number of smaller desert tortoises is about half what it was in 2001. Taken together, these trends suggest fewer small desert tortoises are reaching sexual maturity, which may be explained because they comprise a smaller proportion of the population or possibly because their survival rates are relatively lower than those of adults. Either possibility indicates that smaller size classes, like adults, are affected by ongoing threats; however, because most small desert tortoises die before reaching 180 millimeters in length, we do not know whether the reduced number of small animals has directly contributed to the observed declining trends in adults. For instance, a small increase in adult mortality would have a much larger effect on adult densities. None of these demographic rates have been measured in parallel with this study, so we cannot point to specific demographic rates that are associated with these overall population declines.

In the 5-year review, the Service provides a brief summary of habitat use by desert tortoises; more detailed information is available in the revised recovery plan (Service 2011b). In the absence of specific and recent information on the location of habitable areas of the Mojave Desert, especially at the outer edges of this area, the 5-year review also describes and relies heavily on a quantitative, spatial habitat model for the desert tortoise north and west of the Colorado River that incorporates environmental variables such as precipitation, geology, vegetation, and slope and is based on occurrence data of desert tortoises from sources spanning more than 80 years, including data from the 2001 to 2005 range-wide monitoring surveys (Nussear et al. 2009). The model predicts the probability that desert tortoises will be present in any given location; calculations of the amount of desert tortoise habitat in the 5-year review and in this biological opinion use a threshold of 0.5 or greater predicted value for potential desert tortoise habitat. The model does not account for anthropogenic effects to habitat and represents the potential for occupancy by desert tortoises absent these effects.

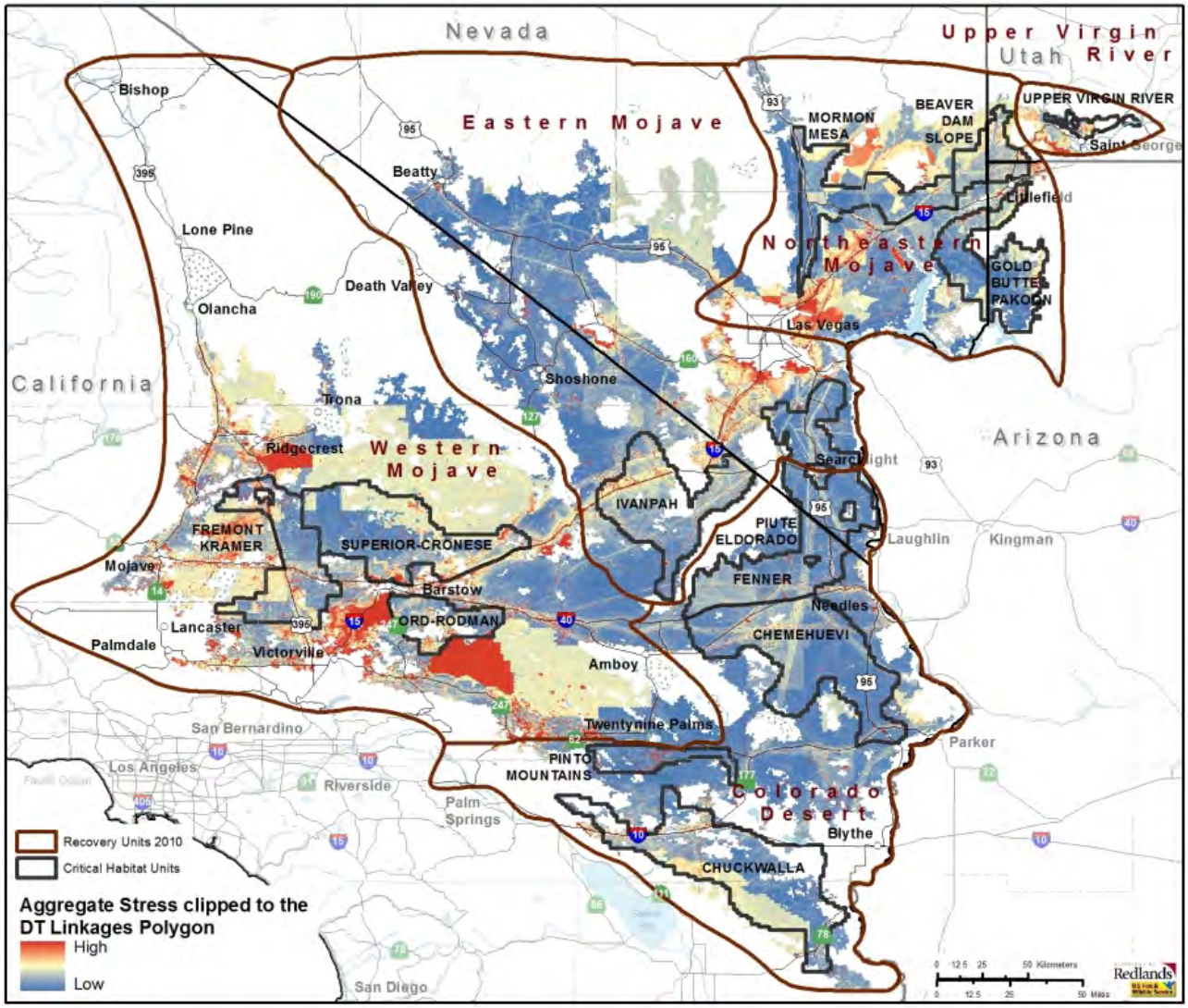
To begin integrating anthropogenic activities and the variable risk levels they bring to different parts of the Mojave and Colorado deserts, the Service completed an extensive review of the threats known to affect desert tortoises at the time of their listing and updated that information with more current findings in the 5-year review. The review follows the format of the five-factor analysis required by section 4(a)(1) of the Act. The Service described these threats as part of the process of its listing (55 Federal Register 12178; April 2, 1990), further discussed them in the original recovery plan (Service 1994), and reviewed them again in the revised recovery plan (Service 2011b).

To understand better the relationship of threats to populations of desert tortoises and the most effective manner to implement recovery actions, the Desert Tortoise Recovery Office is developing a spatial decision support system that models the interrelationships of threats to desert tortoises and how those threats affect population change. The spatial decision support system describes the numerous threats that desert tortoises face, explains how these threats interact to affect individual animals and habitat, and how these effects in turn bring about changes in populations. For example, we have long known that the construction of a transmission line can result in the death of desert tortoises and loss of habitat. We have also known that common ravens, known predators of desert tortoises, use the transmission line's pylons for nesting, roosting, and perching and that the access routes associated with transmission lines provide a vector for the introduction and spread of invasive weeds and facilitate increased human access into an area. Increased human access can accelerate illegal collection and release of desert tortoises and their deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive plants (Service 2011b). Changes in the abundance of native plants because of invasive weeds can compromise the physiological health of desert tortoises, making them more vulnerable to drought, disease, and predation. The spatial decision support system allows us to map threats across the range of the desert tortoise and model the intensity of stresses that these multiple and combined threats place on desert tortoise populations.

The threats described in the listing rule and both recovery plans continue to affect the species. Indirect impacts to desert tortoise populations and habitat occur in accessible areas that interface with human activity. Most threats to the desert tortoise or its habitat are associated with human land uses; research since 1994 has clarified many mechanisms by which these threats act on desert tortoises. As stated earlier, increases in human access can accelerate illegal collection and release of desert tortoises and deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive weeds.

Some of the most apparent threats to the desert tortoise are those that result in mortality and permanent habitat loss across large areas, such as urbanization and large-scale renewable energy projects, and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle activity, and habitat invasion by non-native invasive plant species. However, we remain unable to quantify how threats affect desert tortoise populations. The assessment of the original recovery plan emphasized the need for a better understanding of the implications of multiple, simultaneous threats facing desert tortoise populations and of the relative contribution of multiple threats on demographic factors (i.e., birth rate, survivorship, fecundity, and death rate; Tracy et al. 2004).

The following map that depicts the 12 critical habitat units of the desert tortoise and the aggregate stress that multiple, synergistic threats place on desert tortoise populations. The map also depicts linkages between conservation areas for the desert tortoise (which include designated critical habitat) recommended in the revised recovery plan (Service 2011b) that are based on an analysis of least-cost pathways (i.e., areas with the highest potential to support desert tortoises) between conservation areas for the desert tortoise. This map illustrates that areas under the highest level of conservation management remain subjected to numerous threats and stresses and that current conservation actions for the desert tortoise are not substantially reducing mortality sources across its range.



land within critical habitat and desert wildlife management areas and funding for the implementation of various actions that are intended to promote the recovery of the desert tortoise. Although most of these mitigation measures are consistent with recommendations in the recovery plans for the desert tortoise and the Service continues to support their implementation, we cannot assess how desert tortoise populations will respond because of the long generation time of the species.

The following table summarizes information regarding the proposed solar projects that have undergone formal consultation with regard to the desert tortoise. Data are from Service 2010a [Silver State North]; b [Genesis], c [Chevron Lucerne Valley]; d [Abengoa Harper Lake], e [Blythe], h [Palen], i [Desert Sunlight]; 2011c [BrightSource Ivanpah], d [Rice]; 2013b [Desert Harvest], 2013c [McCoy]; and Burroughs (2012, Nevada projects; 2013c, Moapa). Projects are in California, unless noted.

Project	Acres of Desert Tortoise Habitat	Estimated Number of Desert Tortoises Onsite*	Recovery Unit
BrightSource Ivanpah	3,582	1,136	Eastern Mojave
Silver State North - NV	685	37	Eastern Mojave
Amargosa Farm Road - NV	4,350	4	Eastern Mojave
Abengoa Harper Lake	Primarily in abandoned agricultural fields	4	Western Mojave
Chevron Lucerne Valley	516	10	Western Mojave
Nevada Solar One - NV	400	**	Northeastern Mojave
Copper Mountain North - NV	1,400	30 **	Northeastern Mojave
Copper Mountain - NV	380	**	Northeastern Mojave
Moapa K Road Solar - NV	2,152	157	Northeastern Mojave
Genesis	1,774	8	Colorado
Blythe	6,958	30	Colorado
Palen	1,698	18	Colorado
Desert Sunlight	4,004	56	Colorado
McCoy	4,533	15	Colorado
Desert Harvest	1,300	5	Colorado
Rice	1,368	18	Colorado
Total	35,100	1,529	

*The numbers in this column are not necessarily comparable because the methodologies for estimating the numbers of desert tortoises occasionally vary between projects.
** These projects occurred under the Clark County Multi-species Habitat Conservation Plan; we estimate that all three projects combined will affect fewer than 30 desert tortoises.
The Service completed consultation on the Calico project, located in the Western Mojave Recovery Unit; however, the applicant has abandoned the project and the Bureau has withdrawn the request for consultation (Bureau 2013b).

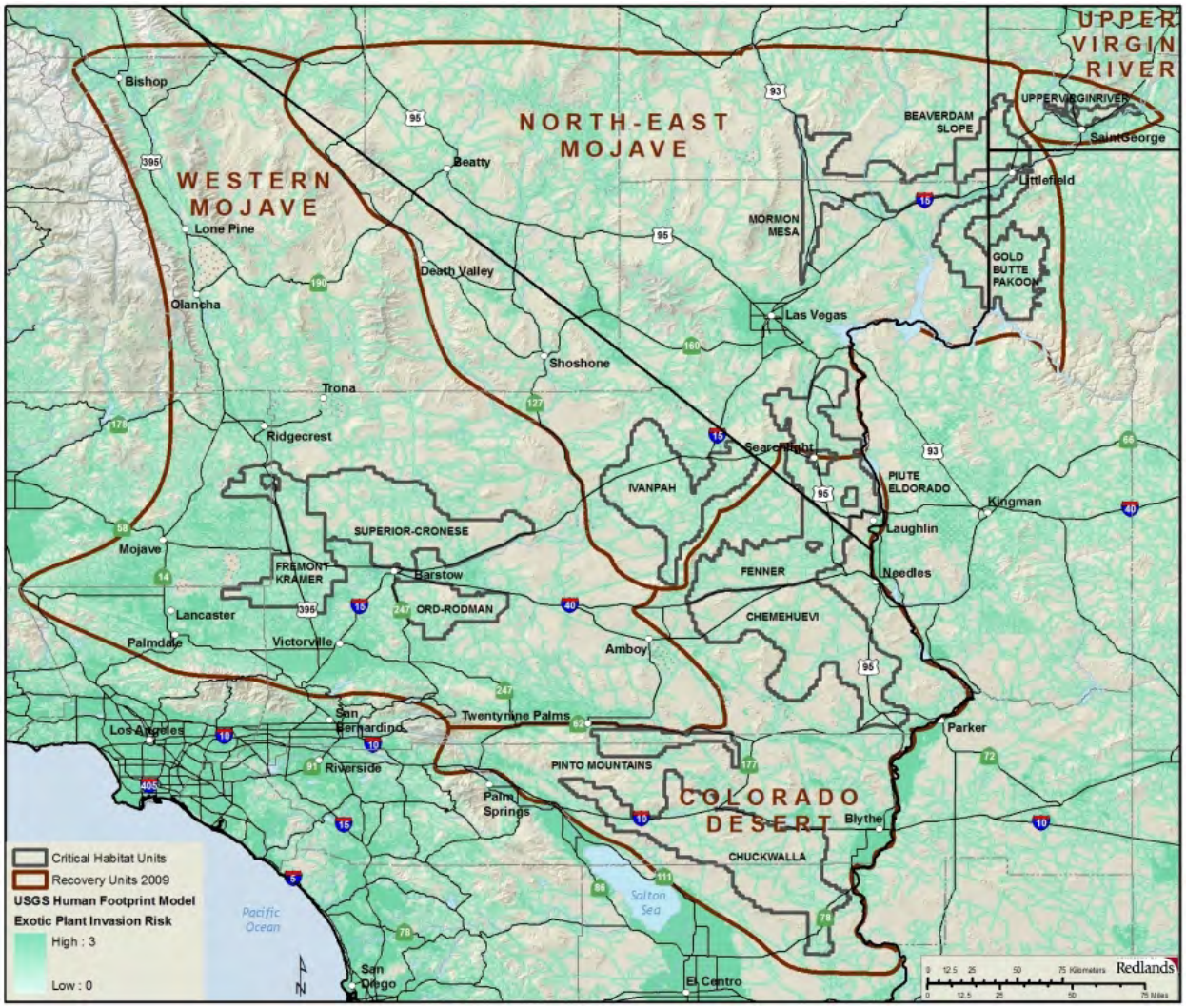
In addition to the biological opinions issued for solar development within the range of the desert tortoise, the Service (2012c) also issued a biological opinion to the Department of the Army for the use of additional training lands at Fort Irwin. As part of this proposed action, the Army removed approximately 650 desert tortoises from 18,197 acres of the southern area of Fort Irwin, which had been off-limits to training. The Army would also use an additional 48,629 acres that lie east of the former boundaries of Fort Irwin; much of this parcel is either too mountainous or too rocky and low in elevation to support numerous desert tortoises.

The Service also issued a biological opinion to the Marine Corps that considered the effects of the expansion of the Marine Corps Air Ground Combat Center at Twentynine Palms (Service

2012d). We concluded that the Marine Corps' proposed action, the use of approximately 167,971 acres for training, was not likely to jeopardize the continued existence of the desert tortoise. Most of the expansion area lies within the Johnson Valley Off-high Vehicle Management Area.

The incremental effect of the larger actions (i.e., solar development, the expansions of Fort Irwin, and the Marine Corps Air Ground Combat Center) on the desert tortoise is unlikely to be positive, despite the numerous conservation measures that have been (or will be) implemented as part of the actions. The acquisition of private lands as mitigation for most of these actions increases the level of protection afforded these lands; however, these acquisitions do not create new habitat and Federal, State, and privately managed lands remain subject to most of the threats and stresses we discussed previously in this section. Although land managers have been implementing measures to manage these threats, we have been unable, to date, to determine whether the measures have been successful, at least in part because of the low reproductive capacity of the desert tortoise. Therefore, the conversion of habitat into areas that are unsuitable for this species continues the trend of constricting the desert tortoise into a smaller portion of its range.

As the Service notes in the 5-year review (Service 2010d), "(t)he threats identified in the original listing rule continue to affect the (desert tortoise) today, with invasive species, wildfire, and renewable energy development coming to the forefront as important factors in habitat loss and conversion. The vast majority of threats to the desert tortoise or its habitat are associated with human land uses." Oftedal's work (2002 in Service 2010d) suggests that invasive weeds may adversely affect the physiological health of desert tortoises. Current information indicates that invasive species likely affect a large portion of the desert tortoise's range (see following map). Furthermore, high densities of weedy species increase the likelihood of wildfires; wildfires, in turn, destroy native species and further the spread of invasive weeds.



Global climate change is likely to affect the prospects for the long-term conservation of the desert tortoise. For example, predictions for climate change within the range of the desert tortoise suggest more frequent and/or prolonged droughts with an increase of the annual mean temperature by 3.5 to 4.0 degrees Celsius. The greatest increases will likely occur in summer (June-July-August mean increase of as much as 5 degrees Celsius [Christensen et al. 2007 in Service 2010d]). Precipitation will likely decrease by 5 to 15 percent annually in the region, with winter precipitation decreasing by up to 20 percent and summer precipitation increasing by 5 percent. Because germination of the desert tortoise's food plants is highly dependent on cool-season rains, the forage base could be reduced due to increasing temperatures and decreasing precipitation in winter. Although drought occurs routinely in the Mojave Desert, extended periods of drought have the potential to affect desert tortoises and their habitats through physiological effects to individuals (i.e., stress) and limited forage availability. To place the consequences of long-term drought in perspective, Longshore et al. (2003) demonstrated that even short-term drought could result in elevated levels of mortality of desert tortoises.

Therefore, long-term drought is likely to have even greater effects, particularly given that the current fragmented nature of desert tortoise habitat (e.g., urban and agricultural development, highways, freeways, military training areas, etc.) will make recolonization of extirpated areas difficult, if not impossible.

The Service notes in the 5-year review that the combination of the desert tortoise's late breeding age and a low reproductive rate challenges our ability to achieve recovery. When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would "reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 Code of Federal Regulations 402.02). Although the Service does not explicitly address these metrics in the 5-year review, we have used the information in that document to summarize the status of the desert tortoise with respect to its reproduction, numbers, and distribution.

In the 5-year review, the Service notes that desert tortoises increase their reproduction in high rainfall years; more rain provides desert tortoises with more high quality food (i.e., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave desert tortoises vulnerable to disease (Oftedal 2002 in Service 2010d), and the reproductive rate of diseased desert tortoises is likely lower than that of healthy animals. Young desert tortoises also rely upon high-quality, low-fiber plants (e.g., native forbs) with nutrient levels not found in the invasive weeds that have increased in abundance across its range (Oftedal et al. 2002; Tracy et al. 2004). Compromised nutrition of young desert tortoises likely represents an effective reduction in reproduction by reducing the number that reaches adulthood. Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the desert tortoise has the potential to negatively affect the reproduction of desert tortoises and recruitment into the adult population.

Data from long-term study plots, which were first established in 1976, cannot be extrapolated to provide an estimate of the number of desert tortoises on a range-wide basis; however, these data indicate, "appreciable declines at the local level in many areas, which coupled with other survey results, suggest that declines may have occurred more broadly" (Service 2010d). Other sources indicate that local declines are continuing to occur. For example, surveyors found "lots of dead [desert tortoises]" in the western expansion area of Fort Irwin (Western Mojave Recovery Unit) in 2008 (Fort Irwin Research Coordination Meeting 2008). After the onset of translocation, coyotes killed 105 desert tortoises in Fort Irwin's southern translocation area (Western Mojave Recovery Unit); other canids may have been responsible for some of these deaths. Other incidences of predation were recorded throughout the range of the desert tortoise during this time (Esque et al. 2010). Esque et al. (2010) hypothesized that this high rate of predation on desert tortoises was influenced by low population levels of typical prey for coyotes due to drought conditions in previous years. Recent surveys in the Ivanpah Valley (Eastern Mojave Recovery Unit) for a proposed solar facility detected 31 live desert tortoises and the carcasses of 25

individuals that had been dead less than 4 years (Ironwood 2011); this ratio of carcasses to live individuals over such a short period of time may indicate an abnormally high rate of mortality for a long-lived animal. In summary, the number of desert tortoises range-wide likely decreased substantially from 1976 through 1990 (i.e., when long-term study plots were initiated through the time the desert tortoise was listed as threatened), although we cannot quantify the amount of this decrease. Additionally, more recent data collected from various sources throughout the range of the desert tortoise suggest that local declines continue to occur (e.g., Bureau et al. 2005, Esque et al. 2010).

The distribution of the desert tortoise has not changed substantially since the publication of the original recovery plan in 1994 (Service 2010d) in terms of the overall extent of its range. Prior to 1994, desert tortoises were extirpated from large areas within their distributional limits by urban and agricultural development (e.g., the cities of Barstow, Lancaster, Las Vegas, St. George, etc.; agricultural areas south of Edwards Air Force Base and east of Barstow), military training (e.g., Fort Irwin, Leach Lake Gunnery Range), and off-road vehicle use (e.g., portions of off-road management areas managed by the Bureau and unauthorized use in areas such as east of California City). Since 1994, urban development around Las Vegas has likely been the largest contributor to habitat loss throughout the range. Desert tortoises have been essentially removed from the 18,197-acre southern expansion area at Fort Irwin (Service 2012c).

The following table depicts acreages of habitat (as modeled by Nussear et al. 2009) within various regions of the desert tortoise's range and of impervious surfaces as of 2006 (Xian et al. 2009). Impervious surfaces include paved and developed areas and other disturbed areas that have zero probability of supporting desert tortoises.

Regions[1]	Modeled Habitat (acres)	Impervious Surfaces within Modeled Habitat	Percent of Modeled Habitat that is now Impervious
Western Mojave	7,582,092	1,864,214	25
Colorado Desert	4,948,900	494,981	10
Northeast Mojave	7,776,934	1,173,025	15
Upper Virgin River	232,320	80,853	35
Total	20,540,246	3,613,052	18

[1]The regions do not correspond to recovery unit boundaries; we used a more general separation of the range for this illustration.

On an annual basis, the Service produces a report that provides an up-to-date summary of the factors that were responsible for the listing of the species, describes other threats of which we are aware, describes the current population trend of the species, and includes comments of the year's findings. The Service's (2011e) recovery data call report describes the desert tortoise's status as 'declining,' and notes that "(a)nnual range-wide monitoring continues, but the life history of the desert tortoise makes it impossible to detect annual population increases (continued monitoring

will provide estimates of moderate- to long-term population trends). Data from the monitoring program do not indicate that numbers of desert tortoises have increased since 2001. The fact that most threats appear to be continuing at generally the same levels suggests that populations are still in decline. Information remains unavailable on whether mitigation of particular threats has been successful."

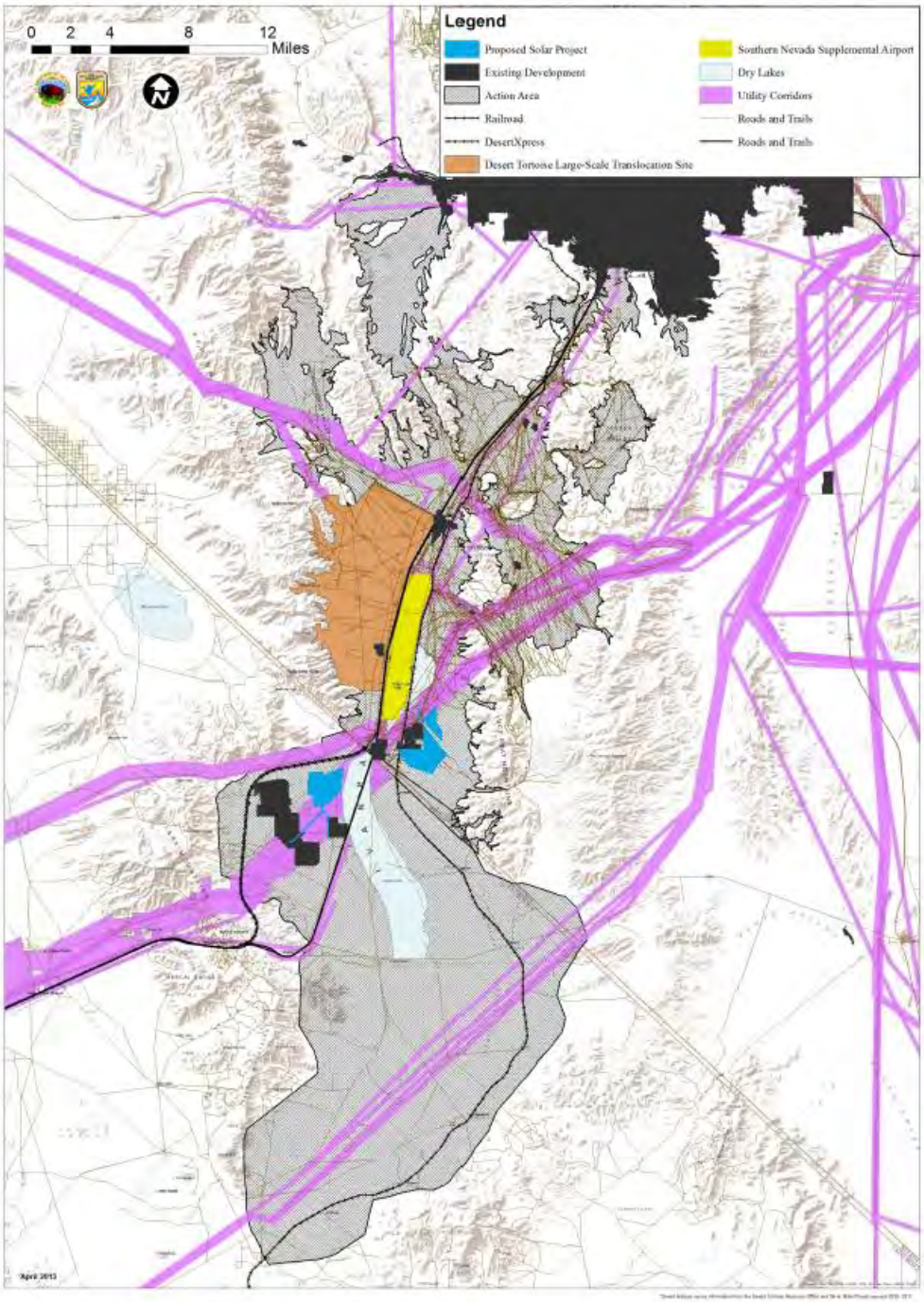
In conclusion, we have used the 5-year review (Service 2010d), revised recovery plan (Service 2011b), and additional information that has become available since these publications to review the reproduction, numbers, and distribution of the desert tortoise. The reproductive capacity of the desert tortoise may be compromised to some degree by the abundance and distribution of invasive weeds across its range; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species. Prior to its listing, the number of desert tortoises likely declined range-wide, although we cannot quantify the extent of the decline; since the time of listing, data suggest that declines continue to occur throughout most of the range, although recent information suggests that densities may have increased slightly in the Northeastern Mojave Recovery Unit. The continued increase in human access across the desert continues to expose more desert tortoises to the potential of being killed by human activities. The distributional limits of the desert tortoise's range have not changed substantially since the issuance of the original recovery plan in 1994; however, desert tortoises have been extirpated from large areas within their range (e.g., Las Vegas, other desert cities). The species' low reproductive rate, the extended time required for young animals to reach breeding age, and the multitude of threats that continue to confront desert tortoises combine to render its recovery a substantial challenge.

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations 402.02). For the purposes of this biological opinion, we consider the action area to include the entire Ivanpah Valley in California and Nevada. We have defined the action area in this manner because of the potential effects of the Stateline and Silver State South projects on connectivity for the desert tortoise within the entire valley.

By including all contiguous desert tortoise habitat within the Ivanpah Valley, we are accounting for all areas that desert tortoises could move to following translocation based on the presence of movement barriers and the post-translocation distances observed in previous studies (Berry 1986, Field et al. 2007, Nussear 2004) and areas that would be potentially vulnerable to fragmentation of the local population. The action area defined for this biological opinion is approximately 328,640 acres (Darst 2013). This acreage does not include dry lake beds and developed areas, such as the town of Primm.


0 2 4 8 12
Miles
Legend
Proposed Solar Project
Existing Development
Action Area
Railroad
DesertXpress
Desert Tortoise Large-Scale Translocation Site
Southern Nevada Supplemental Airport
Dry Lakes
Utility Corridors
Roads and Trails
Roads and Trails
April 2013

Habitat Characteristics of the Action Area

The following information provides a summary of the discussion of habitat characteristics from the biological assessments (Bureau 2013a, Bureau and Ironwood 2013c) and draft environmental impact statements for Stateline and Silver State South (Bureau 2012a, 2012b). The Ivanpah Valley is bounded by the Ivanpah Mountains, Mescal Range, and Clark Mountain to the west; the Spring Mountain Range and Stateline Hills to the north; the Lucy Gray Range, Sheep Mountain and McCullough Mountains to the east; and the New York Mountains and the Mid Hills to the south. The action area is characterized by two broad alluvial fans, one spreading eastward from the Clark Mountains and one spreading westward from the Lucy Gray Mountains at a 0 to 5 percent grade. The alluvial fans drain into both the Ivanpah Dry Lake running through the Ivanpah Valley, and to the Roach Dry Lake to the northwest. Elevations within the action area range from approximately 2,600 to 3,700 feet above mean sea level.

The Stateline project site supports two primary vegetation communities. The majority of the site supports a creosote bush-white bursage series. The eastern extent of the site borders Ivanpah Dry Lake and supports mixed saltbush series. This community is situated within a relatively narrow band around the western edge of the unvegetated dry lake.

The Silver State South project site comprises three primary vegetation communities. Mojave yucca series is found at higher elevations along the alluvial fan; habitat then transitions to a creosote bush-white bursage series in the mid-elevation range, with a mixed saltbush series occurring along the eastern edge of the unvegetated dry lake.

All portions of the action area contain habitat features that the U.S. Geological Survey has mapped as conducive to desert tortoise occupancy (Nussear et al. 2009).

Existing Conditions in the Action Area

In this section, we discuss the anthropogenic and natural conditions in the action area as they relate to desert tortoises and their habitat. Unless we have noted otherwise by citing a biological opinion, the anthropogenic conditions present in the action area were constructed or instituted prior to the listing of the desert tortoise. Various factors within areas that contain barriers have the potential to influence desert tortoise movement; these factors include, but are not limited to: culvert dimensions, road width, height of boundary fence, and complexity of the vegetation along the route (Yanes et al. 1995). For the purpose of analyzing the various types of barriers impeding upon desert tortoise movement within the action area, we classify the barriers based on "permeability." We consider linear barriers equipped with culverts that allow desert tortoise passage and aid in connectivity to be semi-permeable barriers; large developments, most of which remove large expanses of desert tortoise habitat with no means of connectivity, are considered impermeable barriers to movement.

Land Management

The Federal government owns most of the land in the action area. A few sections of the Ivanpah Valley are owned by the State of California and State of Nevada and a few small areas are privately owned. The Primm Valley Golf Course and the communities of Nipton, California, and Primm, Jean, and Goodsprings, Nevada, are the main areas of privately owned land in the Ivanpah Valley. Habitat for desert tortoises has been removed from the areas of the golf course and the communities. In addition to the habitat that has been directly disturbed as a result of the development of these areas, we expect that desert tortoise habitat immediately adjacent to these areas is somewhat degraded.

The National Park Service manages the southernmost portion of the Ivanpah Valley, from the southern end of the valley where it begins at Cima Dome to the south side of Nipton Road. The Service issued a biological opinion regarding the effects of the management of Mojave National Preserve on the desert tortoise and its critical habitat on July 6, 2001 (Service 2001); in this biological opinion, we concluded that the proposed management was not likely to jeopardize the continued existence of the desert tortoise because most of the proposed actions would improve the condition of habitat within the Mojave National Preserve and reduce the level or mortality of desert tortoises. We concluded that relatively few desert tortoises were likely to be killed or wounded on an annual basis as a result of the ongoing casual use of the Mojave National Preserve.

With the exception of the National Park Service, state, and private lands mentioned above, the Bureau manages the remainder of the land within the Ivanpah Valley. The Service (2005) issued a biological opinion to the Bureau regarding its amendment to the California Desert Conservation Area Plan for the Northern and Eastern Mojave Desert planning area, which encompasses the California portion of the action area for this consultation. We concluded that the proposed amendment to the California Desert Conservation Area Plan was not likely to jeopardize the continued existence of the desert tortoise because all of the management direction that the Bureau proposed would either retain the current management direction or provide new direction that was intended to contribute to the recovery of the desert tortoise. New management direction included restrictions on casual off-road vehicle use, designations of desert wildlife management areas, reducing the number of burros in herd management areas, and addition of a disturbance cap for new development on public lands. The biological opinion addressed management direction for future actions that would require additional consultation if the Bureau proposed a specific action and numerous ongoing activities, such as casual use with regard to mining and recreation, burro gathers (the active removal of burros from public land), and cattle grazing. A portion of the lands in California north of the Mojave National Preserve and south and east of Interstate 15 lies within the Ivanpah Desert Wildlife Management Area; the Bureau manages these lands for conservation of desert tortoises. We concluded that relatively few desert tortoises were likely to be killed or injured on an annual basis as a result of the ongoing casual use of these lands.

In California, the Bureau does not manage the remainder of its lands in the valley specifically to ensure the long-term conservation of the desert tortoise. In general, the public's ability to conduct casual use with regard to mining and recreation in these areas is greater than in the desert wildlife management area; additionally, the Bureau will entertain proposals for larger scale projects, such as renewable energy projects, in such areas. Consequently, the desert tortoises are generally at higher risk of injury or mortality in these areas.

In Nevada, most of the Bureau's lands in the action area are within the Jean-Roach Special Recreation Management Area. The Service (1998) issued a programmatic biological opinion to the Bureau regarding the Las Vegas District's proposed resource management plan, which encompasses the Nevada action area for this consultation. We concluded that approval and implementation of the plan was not likely to jeopardize the continued existence of the desert tortoise. Our conclusion was based on our analysis of programmatic-level actions proposed in the resource management plan and management actions contributing to the recovery of the desert tortoise. The resource management plan includes restrictions on casual and competitive off-highway vehicle use, designations of areas of critical environmental concern for the desert tortoise that primarily overlap designated critical habitat, management of wild horses and burros for zero appropriate management level in areas of critical environmental concerns, closure of grazing allotments in areas of critical environmental concerns, reduction of the number of burros in herd management areas, reducing the size of off-highway vehicle events, and a disturbance cap by program of activity.

In 2013, the Service (2013g) issued a programmatic biological opinion for future actions in the area that the Bureau's Southern Nevada District Office manages. The 1998 resource management plan remains in effect but the 2013 programmatic biological opinion replaces our 1998 document, which covered a 10-year period. The action area includes all land managed by the Bureau in Clark and southern Nye counties excluding Red Rock Canyon National Conservation Area and Sloan Canyon National Recreation Area. The biological opinion established a disturbance cap of 13,005 acres for land disposals, leases, rights-of way, mining, recreation, fuel breaks, and vegetation and resource management. We concluded that approval and implementation of the plan was not likely to jeopardize the continued existence of the desert tortoise and 15 other threatened or endangered species.

The Bureau issues special use permits for organized high-speed racing events in this area that may include up to hundreds of racing and spectator vehicles per event (Bureau 1998, Service 2010f). We expect that these events likely result in the death or injury of desert tortoises on occasion; we do not have definitive information on their effect of the regional density of desert tortoises but expect that they have led to an overall decrease in the number of individuals in this area. Beginning in 2009, the Bureau prohibited high-speed events in the area during the months of April, May, September, and October, when desert tortoises are most active, in an attempt to reduce the number of mortalities (Burroughs 2013a).

On August 5, 1995, the Service issued an incidental take permit, pursuant to section 10(a)(1)(B) of the Endangered Species Act, to Clark County; subsequent to the issuance of this permit, the Service issued a multi-species incidental take permit to Clark County, the cities within the county, and the Nevada Department of Transportation that addressed impacts to the desert tortoise, several other federally listed species, numerous unlisted species (RECON 2000). The county-wide incidental take permit allows the incidental take of covered species for various development activities for 30 years on 145,000 acres of non-Federal land in Clark County and within the Nevada Department of Transportation rights-of-way, south of the 38th parallel in Nevada; we issued the incidental take permit on January 9, 2001. The habitat conservation plan associated with the permit provides details on the proposed measures to minimize, mitigate, and monitor the effects of covered activities (RECON 2000).

As part of the incidental take permits issued to Clark County, participants in the plan developed the Large-Scale Translocation Site, which is located between Jean and Primm (RECON 2000). The site is bounded by State Route 161 on the north, which is fenced to exclude desert tortoises; the similarly fenced Interstate 15 on the east; the high elevation of the Spring Mountains on the west; and a desert tortoise-proof fence approximately 3 miles north of the California state line on the south. The Large-Scale Translocation Site encompasses approximately 28,000 acres of public land managed by the Bureau; it will not entertain proposals for utility-scale renewable energy projects within this area. Over 8,000 desert tortoises have been released into the Large-Scale Translocation Site since 1997.

The Service has issued two biological opinions for the construction and operation of two photovoltaic solar facilities located within the action area. The Ivanpah Solar Electric Generating System is located approximately 4.5 miles southwest of Primm and includes 3 solar electric generating plants and associated facilities, covering approximately 3,582 acres (Service 2011c). Although the Service concluded that the proposed action was not likely to jeopardize the continued existence of the desert tortoise, we expressed concern that this solar facility would impede connectivity within this portion of Ivanpah Valley. During project clearance surveys, BrightSource found 173 desert tortoises inside the project area. BrightSource has translocated the larger animals to habitat offsite. Approximately 110 desert tortoises smaller than 120 millimeters remain in the holding pens (Bransfield 2013); these animals will be released when they reach 120 millimeters in length or at the end of 5 years (Service 2011c). BrightSource will monitor translocated, resident, and control desert tortoises for 5 years. To date, 25 desert tortoises have died but no significant difference exists among control, resident, and translocated animals (Service 2013e; see following table); most of the deaths resulted from predation. Two deaths can be attributed to project activities. We expect that at least a few additional animals died during construction and were not detected.

Cause of Death	Treatment of Desert Tortoises				Total
	Control	Resident	Translocated	Holding Pen	
Canid Predation	2	5	4	-	11
Hyperthermia[1]	2	2	1	-	5
Vehicle Strike	1	1	-	-	2
Livestock Trampling	-	-	1	-	1
Unknown	2	1	1	1	5
Total	7	9	7	1	24

[1] All but one of the animals that died of hyperthermia were found on their backs. We do not know why they were on their backs but the potential exists that they could have been overturned during a fight with another desert tortoise. Desert tortoises with hyperthermia have abnormally elevated body temperatures as a result of overexposure to heat.

A 0.5-mile-wide constriction point exists between the southern unit of this facility and the Primm Valley Golf Course. North of the constriction point, Colosseum Road runs perpendicularly across this linkage and is lined by fencing to exclude desert tortoises. BrightSource will install three corrugated pipe culverts under Colosseum Road in the future to reduce habitat and population fragmentation (Bureau and Ironwood 2013a). Currently, this fenced road prevents connectivity. Interstate 15 is an additional barrier to the movement of desert tortoises; it lies 0.8 mile to the east of the Ivanpah Solar Electric Generating Station System; approximately 1.1 miles separates the northern unit of the Ivanpah Solar Electric Generating Station System from the mountains to the north.

The Service (2010g) issued a biological opinion for the 3,796-acre Silver State Solar Project, located approximately 0.9 mile east of Primm. The Bureau (2010a) issued a record of decision for only the 618-acre first phase of the project, known as the Silver State North Solar Project. This facility has been built and is currently operating. Silver State North translocated four desert tortoises from this site into surrounding habitat (Cota 2013b). Although the Service concluded that the proposed action was not likely to jeopardize the continued existence of the desert tortoise, we expressed concern that this solar facility would impede connectivity between the northern and southern portions of the Ivanpah Valley. We expect that at least a few additional animals died during construction and were not detected.

To the east of Interstate 15 in Nevada, the connectivity of desert tortoise habitat is naturally constrained between the steep Lucy Gray Mountains and unvegetated Roach Lake. This constriction is further reduced by the Silver State North Project, the Walter M. Higgins Generating Station, an existing railroad, and the portion of Primm that lies east of the freeway.

The Jean Airport is located immediately southeast of Jean to the east of Interstate 15 and west of a rail line. East of the rail line, approximately 0.4 mile from the western edge of Sheep Mountain, is Jean Conservation Camp. This concentration of development in and around Jean

has removed a large portion of desert tortoise habitat between Interstate 15 and Sheep Mountain, creating a constriction point in the habitat connectivity to the north and south.

The site of the proposed Southern Nevada Supplemental Airport is north of Primm, east of Interstate 15, and west of the Union Pacific Railroad. The southern boundary of the site is within approximately 1 mile of the northern portion of the Silver State South Project. In 2000, Congress enacted legislation to authorize the sale of approximately 6,000 acres of lands managed by the Bureau to Clark County for the proposed airport (Christ 2013). This sale has already occurred; therefore, we consider the sale to be part of the environmental baseline for this consultation. The 6,000-acre parcel largely covers Roach Dry Lake; see figure 3.5-1of the final supplemental environmental impact statement for the Silver State South Project (Bureau 2013g). Although desert tortoises may occasionally cross a dry lake bed, they do not reside in such areas because the substrate is not suitable for burrowing and these areas lack the annual plants and shrubs that provide food and shelter. Because of the fine (and occasionally saline) substrate at the edge of dry lakes, desert tortoises also are generally scarce in such areas. For these reasons, development on this parcel would not result in the loss of a substantial amount of desert tortoise habitat, based on the information we have available to us at this time. If any desert tortoises are located within this 6,000-acre parcel, they would be addressed under the authority of Clark County's incidental take permit, which we discussed previously in this section. Additionally, because the 6,000-acre parcel is situated between Interstate 15 and the Union Pacific Railroad and is not located on the alluvial fan that extends to the Lucy Gray Mountains to the east, we do not expect that its development would have a measurable effect on connectivity in the Ivanpah Valley.

Congress also enacted legislation that identified a 17,000-acre noise overlay district for transfer to Clark County. This transfer would not occur until the Federal Aviation Administration and Bureau complete compliance with the National Environmental Policy Act and sign a record of decision (Christ 2013). The lands to be transferred would surround the 6,000-acre parcel discussed in the previous paragraph. The Bureau and the Federal Aviation Administration were preparing an environmental impact statement for a proposed Southern Nevada Supplemental Airport in Clark County, Nevada; however, the agencies have suspended work on the environmental impact statement and do not know when work on it will resume.

As of August 2013, Clark County has submitted right-of-way applications to the Bureau for necessary storm water, flood control, and materials transport facilities associated with the Southern Nevada Supplemental Airport. Three modified retention facilities, one of which falls within the proposed area of critical environmental concern, are proposed. In addition, Clark County has proposed a temporary conveyor system to transport mineral materials for use in construction of the airport. A section of the conveyor belt route falls within the proposed area of critical environmental concern. Any roadway, utility or other infrastructure associated with the Southern Nevada Supplemental Airport would be subject to an approved final environmental impact statement and record of decision and subject to compliance with the Endangered Species Act.

We acknowledge the existence of these potential actions but are not including them as part of the environmental baseline for the Silver State South and Stateline projects under consideration in this biological opinion because the actual transfer of the noise overlay district and other activities related to development of the proposed Southern Nevada Supplemental Airport that may occur on Bureau lands are future Federal actions that are subject to the consultation requirements of section 7(a)(2) of the Endangered Species Act (50 Code of Federal Regulations 402.02). According to the Congressional legislation, the 17,000 acres of the noise overlay district would not be transferred to Clark County and the 6,000 acres already transferred to Clark County would revert to the Bureau if the Federal Aviation Administration and Bureau do not approve the airport in the record of decision.

Use by Feral and Domestic Livestock

Grazing by cattle and burros affects desert tortoises in several ways. Desert tortoises can be killed or injured during the construction, maintenance, and use of range improvements. Cattle and burros have trampled desert tortoises and also damage or destroy their burrows. Predators, such as common ravens, can be attracted to livestock waters, carcasses of livestock, and some range improvements; predators attracted to these features could feed on desert tortoises and the subsidies that common ravens derive from the livestock and range improvements can contribute to increasing their reproductive capacity. Cattle and burros affect the habitat of desert tortoises by disturbing substrates and their crusts, grazing and trampling of shrubs and annual plants, and introducing and spreading weeds. Effects to desert tortoises and their habitat are most pronounced near range improvements (e.g., corrals, water tanks, etc.).

The action area contains several grazing allotments. The Clark Mountain and Jean Lake allotments are located in California. The Clark Mountain Allotment occupies the area west of Interstate 15 between the Clark Mountains and the state line. It is authorized through September 30, 2013, and may be re-authorized through a Congressional extension. Up to 124 head of cattle can graze year round, depending on the availability of forage (Bureau 2012a). In California, the Jean lake Allotment extends from the state line partially into the valley. Although it is considered an active allotment, it has been in non-use status for many years. All allotments in the portion of the Ivanpah Valley within the Mojave National Preserve have been retired.

The Nevada portion of the action area comprises four cattle grazing allotments: Jean Lake (a different allotment from the one in California), Roach Lake, Table Mountain and Hidden Valley. The Jean Lake Allotment, covering the portion of the Ivanpah Valley east of the railroad line, extends from the state line partially into the valley. The Roach Lake Allotment is located immediately east of the Jean Lake Allotment. Currently, both allotments are closed to grazing (Bureau 2012b). The Jean Lake Allotment closed in 2006 and the Roach Lake Allotment closed in 2000. The Hidden Valley allotment is open and extends east of Interstate 15 and south of the Las Vegas Valley. Only the southernmost portion of the Hidden Valley allotment lies within the action area. The Table Mountain allotment occurs between Interstate 15 to the east and

Amargosa Valley to the west; it was closed in the Bureau's 1998 resource management plan (Bureau 1998).

In California, the action area includes the Clark Mountain Herd Management Area; the Bureau designates these areas for the management of burros. The Northern and Eastern Mojave Plan Amendment (Bureau 2002 in Bureau 2012a) reduced the animal management level in this herd management area to 0. The purpose of this amendment was to reduce grazing and assist the recovery of the desert tortoise. The Bureau has removed nearly 100 burros from this area; however, burros continue to persist here (Bureau 2012a). The Nevada portion of the action area does not contain any herd management areas.

The effects of cattle grazing and the presence of wild burros on desert tortoises and their habitat varies with the intensity of grazing, the time since an area was last grazed, weather conditions, and the type of habitat. We do not have quantitative information on the condition of habitat in the action area with relation to past grazing and the presence of wild burros; however, even in areas where grazing by cattle and burros has not occurred for decades, non-native plants persist and heavily used areas near range improvements often exhibit visible disturbance.

Non-native Species

During surveys of the project site, Ironwood Consulting identified numerous non-native plant species including: Sahara mustard (*Brassica tournefortii*), salt cedar (*Tamarix ramosissima*), red brome (*Bromus madritensis ssp. rubens*), cheatgrass (*Bromus tectorum*), red-stemmed filaree (*Erodium cicutarium*), foxtail barley (*Hordeum murinum*), Russian thistle (*Salsola tragus*), and common Mediterranean grass (*Schismus barbatus*) (Bureau 2013a, Bureau and Ironwood 2013b). These species likely occur throughout the remainder of the action area; however, we expect the abundance of these species to be lower in portions of the action area that have not experienced cattle grazing in recent years. The abundance and diversity of non-native species in any area vary in relation to the seasonal weather; consequently, the composition of the non-native plant flora may be substantially different from year to year. An overabundance of weedy species likely compromises the nutritional status of desert tortoises, as we discussed in the Status of the Species section of this biological opinion. We do not have specific information on the distribution of non-native species nor on their specific effects on desert tortoises in the action area.

Paved and Unpaved Roads

Interstate 15 roughly bisects the northern portion of the action area, from the area just south of Clark Mountain to its northern terminus. The construction of Interstate 15 resulted in the loss of hundreds of acres of habitat and the likely degradation of additional areas as sheet flow across the valley's alluvial fans was disrupted. We also expect that desert tortoise densities adjacent to the freeway are depressed, as discussed by Hoff and Marlow (2002), but we are not aware of surveys that quantify this effect.

Due to the size and heavy traffic, Interstate 15 is mostly an impermeable barrier to movement of desert tortoises; we anticipate that at least a few desert tortoises are killed on this road annually. Interstate 15 in Nevada is fenced with desert tortoise exclusion fencing that only allows passage of individuals at a few culverts and bridges; however, due to the proximity of these culverts near the development of Primm and near Roach Dry Lake (just to the north of Primm), desert tortoises may not use them frequently. In California, the west side of Interstate 15 is equipped with fencing to exclude desert tortoises from the freeway; exclusionary fencing will be installed along the eastern portion of Interstate 15 (Service 2006a, 2011c). In California, two bridges over washes south of the Primm Valley Golf Course allow desert tortoises to cross underneath the freeway.

To the southeast of Interstate 15, in California, three paved roads traverse the action area. Morning Star Mine Road runs the length of the valley at the base of the Ivanpah Mountains. This road does not constitute an impermeable barrier; desert tortoises are routinely killed on this road by motorists traveling to Las Vegas at high speeds (National Park Service 2009). We expect that desert tortoise densities in this portion of the valley are likely depressed adjacent to the road, as discussed by Hoff and Marlow (2002).

Morning Star Mine Road terminates at Ivanpah Road, approximately 3 miles southwest of Nipton Road. Nipton Road bisects the valley, roughly from Interstate 15 in the west, through the town of Nipton, and into Nevada in the east. Ivanpah Road extends from Nipton Road to the south, where it leaves Ivanpah Valley. The National Park Service has informed us of desert tortoises being killed on Ivanpah Road. We are not aware of desert tortoises being killed on Nipton Road; the lack of reports may be due more to the fact that Nipton Road is outside of the boundaries of the Mojave National Preserve than lack of mortalities.

To the northwest of Interstate 15 in California, Yates Well Road exits from the freeway and intersects Colosseum Road, which extends from the Primm Valley Golf Club into the Clark Mountains. These roads are fenced to reduce injury and mortality to desert tortoises associated with its use as the access to the Ivanpah Solar Electric Generating System. To reduce habitat and population fragmentation associated with this barrier, BrightSource will install three culverts under Colosseum Road to allow movement of desert tortoises under the road.

To the north of Primm in Nevada, three paved roads cross the action area. State Route 604 (Las Vegas Boulevard) enters the action area from the north running south from Las Vegas parallel to Interstate 15. State Route 604 comes to an end approximately 5 miles south of Jean. An unnamed paved road extends to the south from Prison Road in Jean and turns east to a sand and gravel mine located at the north end of the Lucy Gray Mountains. State Route 161 (Goodsprings Road) traverses the northwest part of the action area extending to the west from Jean to Goodsprings. These three paved roads are unfenced. We expect traffic along these roads likely results in the death or injury of desert tortoises.

In addition to the paved roads within the Ivanpah Valley, unpaved roads traverse the action area within the Mojave National Preserve and on Bureau and non-federal lands in both states. Most of these roads are used in association with various utility facilities and recreational off-highway vehicle use; we expect that most use is for recreation. These unpaved roads are not a barrier to movement, but their use results in occasional injuries to and mortalities of desert tortoises (National Park Service 2009).

Utilities

Three transmission lines, travelling adjacent to and parallel to one another, cross the southern portion of the valley from Cima Dome in the south to where they leave the valley east of the town of Nipton. To the north and east of Primm, approximately nine large (230 to 500 kilovolt) transmission lines tie either into the Walter M. Higgins Electrical Substation and substation or continue to the southwest where they cross the State Line Hills and enter California.

Four transmission lines pass into California to the north of the Stateline facility. These lines lie within the Boulder Corridor. Two other transmission lines run across Ivanpah Dry Lake into California immediately south of the proposed Stateline site and the Ivanpah Solar Electric Generating System. Another transmission line, which crosses Interstate 15 approximately 2.5 miles south of Jean, borders the community of Jean in the northern portion of the action area. Networks of smaller, interconnecting distribution lines also traverse the action area.

Southern California Edison completed the Eldorado–Ivanpah Transmission Project in June 2013 (Bureau 2013a). The Service's (2011f) biological opinion for this project concluded that it was not likely to jeopardize the continued existence of the desert tortoise. The 36-mile-long transmission line extends from the existing Eldorado Substation to the existing Ivanpah Substation.

The construction of the numerous tower sites for the transmission lines disturbed or destroyed habitat. Unpaved roads generally run parallel to the power lines and provide access to utility company workers and the public; spur roads extend from these roads to each tower. The main and spur roads have likely caused more habitat loss than the tower sites. The use of these access roads for the utility transmission lines (both electric and gas) by workers and the public results in the ongoing injury and death of desert tortoises. On April 13, 2013, a desert tortoise that had been struck by a utility vehicle was found along the El Dorado to Ivanpah transmission line route in Nevada. In one case in the western Mojave Desert near Daggett, a desert tortoise bearing a radio transmitter was buried alive by a utility company maintaining the access road. In the spring of 2011, at least two desert tortoises were crushed by vehicles using utility line access roads; based on the use patterns of the utility company at the time, these desert tortoises seem to have been killed by casual users of the access roads. Most of deaths that result from use of the access roads for utility lines are likely not detected; however, these instances demonstrate that access roads within utility corridors pose an ongoing threat to desert tortoises.

A substantial ongoing effect of electrical transmission lines is their use by common ravens for perching and nesting. The presence of this additional nesting substrate, which allows common ravens to nest far above the reach of ground-dwelling predators, likely contributes substantially to the increase in the number of common ravens in the desert. As previously discussed, common ravens prey on desert tortoises and are likely detrimental to the recovery of the desert tortoise.

The Boulder Corridor also supports two gas lines, constructed and maintained by the Kern River Gas Transmission Company, and a fiber optic line. The installation of the first Kern River gas line resulted in the disturbance of hundreds of acres of habitat. Construction of the first gas pipeline in 1991 resulted in the deaths of approximately 23 desert tortoises. (We do not have information regarding how many of these deaths occurred in the action area for this consultation. Additionally, a portion of the mortalities occurred on another pipeline that was addressed in the same consultation.) The Service (2002) issued a non-jeopardy biological opinion to the Federal Energy Regulatory Commission for the construction and operation of the second gas pipeline. In June 2011, the Bureau and the Service agreed that the requirement for re-initiation of consultation had been triggered for operation and maintenance activities due to a desert tortoise mortality that occurred, and additional effects to the desert tortoise due to a large-scale translocation project in the action area (Service 2011g).

The Kern River Gas Transmission Company also built a distribution pipeline that emanates from the Boulder Corridor, travels west of the Ivanpah Solar Electric Generating System, and terminates at the Molycorp Mountain Pass Mine, which lies outside of the action area of this consultation, just north of Interstate 15. The Service concluded that this proposed pipeline was not likely to jeopardize the continued existence of the desert tortoise (Service 2012g); one desert tortoise died during construction activities after being struck by a worker's truck.

The Molycorp wastewater pipeline, which traverses the area to the east of Interstate 15 from the Mountain Pass Mine, terminates on the Ivanpah Dry lake bed. This pipeline has been the subject of several consultations (Service 1997a, 1997b, 2006b). Maintenance of the pipeline and clean-up of spills of hazardous materials from the line cause minor amounts of habitat disturbance along its route.

The disturbance caused by the pipelines remains evident and, on occasion, repair and inspection work result in new disturbances in the right-of-way. Access roads along most of these lines allow for recreational vehicle use. We are aware of desert tortoises that have been killed by utility company and recreational vehicles.

Rail Lines

A rail line traverses the alluvial fan to the northwest of the New York Mountains, turns north across the valley and passes through the town of Nipton, then turns northwest and north to pass along the west side of the Silver State South Project. From this point, it travels parallel to Interstate 15. This rail line forms a semi-permeable barrier to desert tortoises because they can

use culverts under the tracks. Desert tortoises have been known to attempt to cross rail lines and to become entrapped between the rails, where they die of exposure to temperature extremes. The rail line is protected from flood flows by a series of dikes that have been constructed on its uphill side; these dikes have, at least in some cases, created differences in the washes and perennial vegetation above and below the rail line. We cannot, at this time, determine the specific manner in which the rail line and dikes have affected desert tortoises. Because the dikes seem to be concentrating the sheet flow of water that would normally flow across the alluvial fan into defined washes, the potential exists that the decrease in water availability to upland areas has compromised the plant community in upland areas; conversely, the increased flow in the washes may have enhanced habitat suitability for desert tortoises in the washes. The potential also exists that an increased flow of water and debris in washes may increase the number of desert tortoises that are killed or injured during storm events.

The Service and Federal Railroad Administration have completed formal consultation for a high-speed rail line, the DesertXpress, which would enter Ivanpah Valley near the southeastern slope of the Clark Mountains, turn north along the upper alluvial fan, turn east along the northern side of the Stateline Project in California, and then enter Nevada just to the north of Primm. In Nevada, the line would be located either adjacent to or within the median of Interstate 15. The components of the rail alignment would include a 75-foot-wide permanent right-of-way, concrete barriers, overhead electrical distribution and transmission lines, fencing, and access and maintenance areas. This rail line would cross some washes in the action area with bridges; the design plan also includes numerous culverts to allow other washes to pass under the rail line. We anticipate that the proposed rail line would fragment desert tortoise habitat in the valley, but not result in an impermeable barrier.

Miscellaneous Facilities

To the south of the Primm Valley Golf Course, the California Department of Transportation and Service have completed consultation on the development of a joint port of entry (Service 2006a). We concluded that the proposed action was not likely to jeopardize the continued existence of the desert tortoise. This new facility will be located on the northwest side of southbound Interstate 15 between the Yates Well Road Interchange and the Nipton Road Interchange, and occupy approximately 80 acres along approximately 4 miles of the freeway. Construction of this facility has not yet begun. BrightSource fenced the port-of-entry project site and removed three desert tortoises from the area as a courtesy to the California Department of Transportation during the course of implementing mitigation measures for the Ivanpah Solar Electric Generating System (Davis 2013b).

Status of the Desert Tortoise in the Action Area

The Service's (2010c) protocol is effective at detecting desert tortoises larger than 160 millimeters in length. We have determined, through work conducted during range-wide sampling, that field workers detect desert tortoises that are 160 millimeters in length or longer

more readily than they do small individuals. For the purposes of the analysis in this biological opinion, we will refer to desert tortoises 160 millimeters and greater in length to be large animals and desert tortoises less than 160 millimeters in length to be small animals.

Desert tortoises reach reproductive age (i.e., become adults) at different sizes in different parts of their range. The likelihood of being detected during surveys is a function of size and not reproductive capacity; therefore, we will not use the terms "adult" and "subadult" in this biological opinion unless we are discussing reproduction.

Population Estimates for the Action Area

To estimate the number of large desert tortoises in the action area, we used different methods for California and Nevada because of differences in the best available information. First, we assumed that the density derived from range-wide sampling within the Ivanpah Critical Habitat Unit was applicable for the California portion of the action area; we then multiplied this density by the acreage of modeled desert tortoise habitat in this portion of the action area. Within the Mojave Desert, previous assessments from the Service have used a threshold of 0.5 or greater as the predicted value that corresponds with potential desert tortoise habitat (Bureau and Ironwood 2013a, Service 2010d). For the purpose of maintaining consistency in this assessment, a model value of 0.5 or greater has been used to represent desert tortoise habitat. Second, we estimated the number of individuals in the Nevada portion of the action area by multiplying the estimated density extrapolated from past surveys conducted in the northern part (Ironwood 2012b) of the valley by the acreage of modeled desert tortoise habitat in that portion of the action area. We then added the estimated number of large desert tortoises in California to that in Nevada to obtain an overall estimate for the action area. Appendix 2 contains these calculations. Based on these calculations, we estimate that approximately 4,572 large desert tortoises occur within the action area. Due to the large number of assumptions needed to calculate the number of small desert tortoises or eggs and thus leading to a high level of uncertainty, we did not attempt to estimate the total number of small desert tortoises or eggs in the action area.

Estimates for Stateline and Silver State South Project Sites - Desert Tortoises Larger than 160 Millimeters

We summarized the following information from the Stateline and Silver State South biological assessments (Bureau 2013a, Bureau and Ironwood 2013c) and supplemental information provided by Blandford (2013a, 2013b). Ironwood Consulting conducted desert tortoise surveys in 2012 on the Stateline site and in 2011 and 2012 for the Silver State South site based on the Service's (2010c) field survey protocol.

The Bureau (2013a) and Blandford (2013a) used the equation contained in the Service's protocol (2010c) to derive estimates of the number of large desert tortoises within the project site and the lower and upper 95 percent confidence intervals for the Stateline and Silver State South facilities, respectively. Blandford (2013b) noted that the survey area covered only 2,265 acres of

the 2,427-acre Silver State South facility. We did not extrapolate the number of large desert tortoises to cover the entire 2,427 acres of the project footprint for several reasons. First, the difference in the acreages (162 acres) is relatively minor. Second, desert tortoises are not uniformly distributed across the landscape; therefore, a straight-forward extrapolation would not necessarily be appropriate. Last, our use of the upper 95 percent confidence interval for the number of desert tortoises within the project area provides for a conservative estimate of the number of large individuals predicted within the actual project area. The Bureau (2013a) and Blandford (2013a, 2013c) did not take into account the incidental sightings of large desert tortoises within the action area; we agree with this methodology because at least some of these animals may have been repeated sightings of the large desert tortoises observed during the surveys and the equation in our protocol accounts for individuals that are missed during surveys. We will use the upper 95 percent confidence intervals from the following table as a basis upon which to conduct the analysis of effects in this biological opinion because it is the maximum number of desert tortoises likely to be present; units are numbers of large desert tortoises.

Project	Detected During Surveys	Point Estimates	95 Percent Confidence Intervals
Stateline	14	35	13 to 94
Silver State South	20*	44	17 to 115

*This number includes observations of large desert tortoises from the 2011 and 2012 protocol surveys.

At the Stateline site, most observations of desert tortoises and their sign occurred at higher elevations within the study areas within areas of rocky and gravelly substrates of the stabilized alluvial fan. No live desert tortoises or active burrows were found within 1,300 meters of the western edge of Ivanpah Dry Lake.

Based on the information in figure 5 in the biological resources technical report for Silver State South (Ironwood 2012b), desert tortoises do not seem to be distributed differently in relation to their location on the alluvial fan; that is, they seem to occupy all elevation across the alluvial fan. Figure 5 seems to indicate, though, that desert tortoises are not distributed evenly across the project site; some portions of the site are devoid of observations.

Estimates for Stateline and Silver State South Project Sites - Eggs and Desert Tortoises Smaller than 160 Millimeters

Desert tortoises less than 160 millimeters in length (including hatchlings) are difficult to detect because of their small size and their cryptic nature. Hatchlings may also have emerged from a nest on the site since the time of the survey; this scenario could also increase the overall number of individuals on the site.

The Bureau and the Applicants used the Service's general methodology for estimating the number of small desert tortoises and eggs in the project areas. The table below summarizes the upper 95 percent confidence intervals for the estimates of the number of desert tortoises in the Stateline and Silver State South Project areas. We will use these numbers as a basis upon which to conduct the analysis of effects in this biological opinion; all units are numbers of individuals.

Project	Hatchling and Eggs	49.7 to 120 millimeters	120 to 160 millimeters	>160 millimeters
Stateline	286	523	44	94
Silver State South	353	646	54	115

The methodology is based on several assumptions. The assumptions are that female desert tortoises greater than 160 millimeters in length are reproductive, the ratio of males to females is one to one, the life table developed by Turner et al. (1987) is applicable, and that desert tortoises produce an average number of eggs every year. (Turner et al. developed a life table based on work they conducted near Goffs, California, which is located approximately 60 miles south of the action area.) We emphasize that, although the estimate of the number of desert tortoises and eggs on the project site is based on the best available information, the overall number of animals and eggs may be different. The demographic structure of the desert tortoise population on the Goffs study site may have been different in the early 1980s than that currently on either project site, because of the declines that have occurred since that time; consequently, use of the Goffs data may overestimate the actual number of smaller desert tortoises within the project area. Furthermore, we recognize that the survey data used for these estimates represent a single point in time and the number of individuals in these areas may change by the onset of project actives, environmental conditions and other anthropogenic and natural processes.

Disease Prevalence within and adjacent to the Stateline and Silver State South Project Sites

The Applicants have collected blood and performed health assessments on all of the animals located, to date, within and adjacent to the Stateline and Silver State South Project sites. These health evaluations provided a baseline status of the *Mycoplasma agassizii* and *M. testudenium* prevalence in this region. The translocation plans included tables that depicted the results of disease testing on desert tortoises in the project area (Bureau 2013f, Bureau and Ironwood 2013b).

The University of Florida, which analyzes the blood samples using an enzyme-linked immunosorbent assay (ELISA) to determine whether antibodies are present, recently suggested that the positive and suspect findings for *Mycoplasma testudinium* correspond to enzyme titers of 128 and 64 (Field 2013). We used the data from the biological assessments and the new information from the University of Florida to construct the following table.

Project	Number of Desert Tortoises Sampled	*Mycoplasma agassizii* ELISA titer				*Mycoplasma testudinium* ELISA titer			
		<32	32	64	128	<32	32	64	128
Stateline	34	33	1	0	0	15	12	5	2
Silver State South	71	68	3	0	0	45	18	7	1

Currently, researchers understand the presence of antibodies to be an indication of past exposure to the pathogens; it does not necessarily confer immunity or relate to the current health of an individual (Field 2013). The results indicate that prevalence of these two diseases in the area is likely to be low.

Connectivity within and outside of the Ivanpah Valley

Lowe and Allendorf (2010) define demographic connectivity as the degree to which population growth and vital rates are affected by dispersal and genetic connectivity as the degree to which gene flow affects evolutionary processes within populations. To further explain demographic connectivity, we have included this excerpt from Lowe and Allendorf (2010, although we did not include their citations or references to figures):

> Demographically connected populations are those in which population growth rates (λ, r) or specific vital rates (survival and birth rates) are affected by immigration or emigration. Demographic connectivity is generally thought to promote population stability (e.g. $\lambda \geq 1.0$) and this stabilizing effect can occur at two different scales. In individual populations, demographic connectivity can promote stability by providing an immigrant subsidy that compensates for low survival or birth rates of residents [i.e. low local recruitment]. Demographic connectivity can also promote the stability of metapopulations by increasing colonization of unoccupied patches (i.e. discrete subpopulations), even when the extinction rate of occupied patches is high.

They also note that "The importance of demographic connectivity is clear when the elimination of immigration results in a shift from stable or positive population growth to negative population growth." Demographic connectivity is equally important if negative population growth results from anthropogenic factors.

Genetic connectivity is the flow of genetic material between two populations. Genetic connectivity can occur if a few individuals occasionally make long-distance movements between populations; the amount of genetic connectivity is a function of the numbers of individuals in the two populations and of how many individuals move between those populations. For example, if two populations have a high degree of demographic connectivity, they would also exhibit a high degree of genetic connectivity.

In the following paragraphs, we explain the factors affecting connectivity within and outside of Ivanpah Valley. We will also describe how this connectivity relates to the Eastern Mojave Recovery Unit and desert tortoise as a listed taxon.

Three main areas contain the highest quality habitat and most of the desert tortoises within the Eastern Mojave Recovery Unit. In the western portion of the recovery unit, the first area extends roughly from Interstate 15 between Kelbaker and Cima roads to the south, along the southern edge of Cima Dome. This area supports high quality habitat and numerous desert tortoises; it lies mostly within the Mojave National Preserve. As we discussed previously in this biological opinion, this area is largely isolated from the southern end of Ivanpah Valley by a relatively high elevation pass from the southeastern edge of Cima Dome. Data collected during range-wide sampling from 2007 through 2010 seem to show lower relative abundance of desert tortoises in this area, thereby indicating that this connection may be tenuous (Service 2009b, 2012a, 2012b). Morningstar Mine Road (a heavily used, high-speed road along which several desert tortoises are killed by vehicles every year) and a rail line likely contribute, at least in part, to the low density of desert tortoises in this area.

Moving from west to east, Ivanpah Valley is the second important area of the Eastern Mojave Recovery Unit because it continues to support a relatively large number of desert tortoises across a range of habitat types (Hagerty et al. 2010). In an undisturbed state, desert tortoises would likely maintain long-term population stability and connectivity throughout Ivanpah Valley. Existing disturbance and development that was present when the desert tortoise was listed, has already undergone consultation, or has been approved legislatively (current: Interstate 15, an existing rail line, existing solar and fossil fuel plants, Primm, golf course; future: high-speed rail, joint port of entry) fragment habitat in the Ivanpah Valley. Existing disturbance has probably contributed to a decline in the overall number of desert tortoises in Ivanpah Valley and certainly caused the loss and degradation of habitat in the valley; off-highway vehicle recreation within the valley has contributed to these effects. With regard to connectivity within Ivanpah Valley, a large portion of this disturbance and development occurs (or will occur) within or near the naturally narrow band of desert tortoise habitat between Roach and Ivanpah dry lakes, near the state line and has likely affected the connectivity of desert tortoises between the northern and southern portions of the valley.

The Ivanpah Valley is bounded by geographic features that greatly restrict potential for demographic connectivity outside the valley. These natural barriers include the Clark and Spring Mountains to the west; Bird Spring Range to the northwest; Northern McCullough Range to the northeast; McCullough, Lucy Gray and New York Mountains to the east; and Cima Dome to the south. These mountain ranges (and Cima Dome) represent major geographic barriers that largely separate desert tortoises and gene flow within the Ivanpah Valley from individuals outside of the valley.

Ivanpah Valley connects to Eldorado Valley, the third important habitat area for desert tortoises within the Eastern Mojave Recovery Unit, near the northernmost points of both valleys. The

transition from Ivanpah Valley to Eldorado Valley is likely the primary genetic and demographic pathway between these two areas of important desert tortoise habitat. The genetic similarity in desert tortoises that reside in the Ivanpah and Eldorado valleys, as delineated by Hagerty and Tracy (2010), infers at least historical high levels of population connectivity. Historically, genetic connectivity was likely possible through southern Las Vegas Valley, north of the McCullough Range, and into Eldorado Valley (Bureau and Ironwood 2013a). These linkages have likely been compromised by development associated with Las Vegas. If the primary historical connection between these valleys was through the southern Las Vegas Valley, the genetic separation between the desert tortoise populations in Ivanpah and Eldorado valleys would likely become more pronounced over time. The linkage through McCullough Pass and other less-obvious linkages through the McCullough Range likely support lower levels of genetic connectivity. We can only indirectly infer the exact measurements of gene flow through these linkages at this time.

We acknowledge that desert tortoises may also occasionally move through Stateline Pass, which lies directly north of the proposed Stateline Solar Project. These animals, however, would pass through a narrow canyon that is unlikely to support a population of desert tortoises in the long term; therefore, we do not expect that this canyon provides a demographic connection between Ivanpah Valley and desert tortoises that reside outside the valley. Genetic separation caused by the Clark and Spring mountains, which divide Ivanpah Valley from Mesquite and Pahrump valleys to the north as delineated by Hagerty and Tracy (2010), infers that demographic connectivity is naturally limited across these geographic features (Bureau and Ironwood 2013a). Additionally, the northern end of this pass does not connect directly to another area that we consider important for the recovery of the desert tortoise because of generally lower densities and more diffuse patches of suitable habitat.

Maintaining the genetic variability of the desert tortoise and sufficient ecological heterogeneity within and among populations are factors that are integral to recovery of the species (Murphy et al. 2007 and Hagerty and Tracy 2010 in Service 2011b). This variation is necessary to allow desert tortoises to adapt to changes in the environment over time (Service 1994). Additionally, because desert tortoises occupy large home ranges, the long-term persistence of extensive, unfragmented habitat is essential for the survival of the species (Service 1994). Extensive, unfragmented habitat is necessary to support sufficient numbers of desert tortoises to allow for periodic and local declines in densities that can result from various natural factors (e.g., drought, excessive predation, etc.) and for subsequent recolonization from adjacent areas that were not affected by such declines. The loss or degradation of suitable habitat because of urbanization, large-scale wildfire, or other landscape-modifying activities places desert tortoises at increased risk of extirpation in local areas; repetition of these activities over its range places the desert tortoise at risk of extinction. In short, absent the conservation of large areas of suitable habitat within each recovery unit, we cannot conserve all of the genetic and morphological variations and differences in behavior and ecology that comprise the desert tortoise as a species.

Maintaining "self-sustaining populations of desert tortoises within each recovery unit into the future" is a primary objective for recovery of the species (Service 1994, 2011b). The Service (2011b) uses recovery units as tools to identify geographic units that are individually necessary to conserve the diversity necessary for long-term sustainability of the entire listed taxon. Maintaining a robust population of desert tortoises within the Eastern Mojave Recovery Unit is important to ensure the long-term persistence of the species and the ability to recover the species throughout its range.

Individual desert tortoises can make long-distance movements, which can contribute to gene flow (Berry 1986, Edwards et al. 2004), but we do not know the extent to which individuals will traverse long narrow corridors of relatively intact habitat. Given this uncertainty, reliable genetic connectivity of populations depends upon the existence of enough suitable and occupied habitat to maintain sustainable populations. Consequently, the long-term viability of linkages depends on the ability of the habitat in these linkages to sustain populations into the future and the absence of substantial barriers to dispersal.

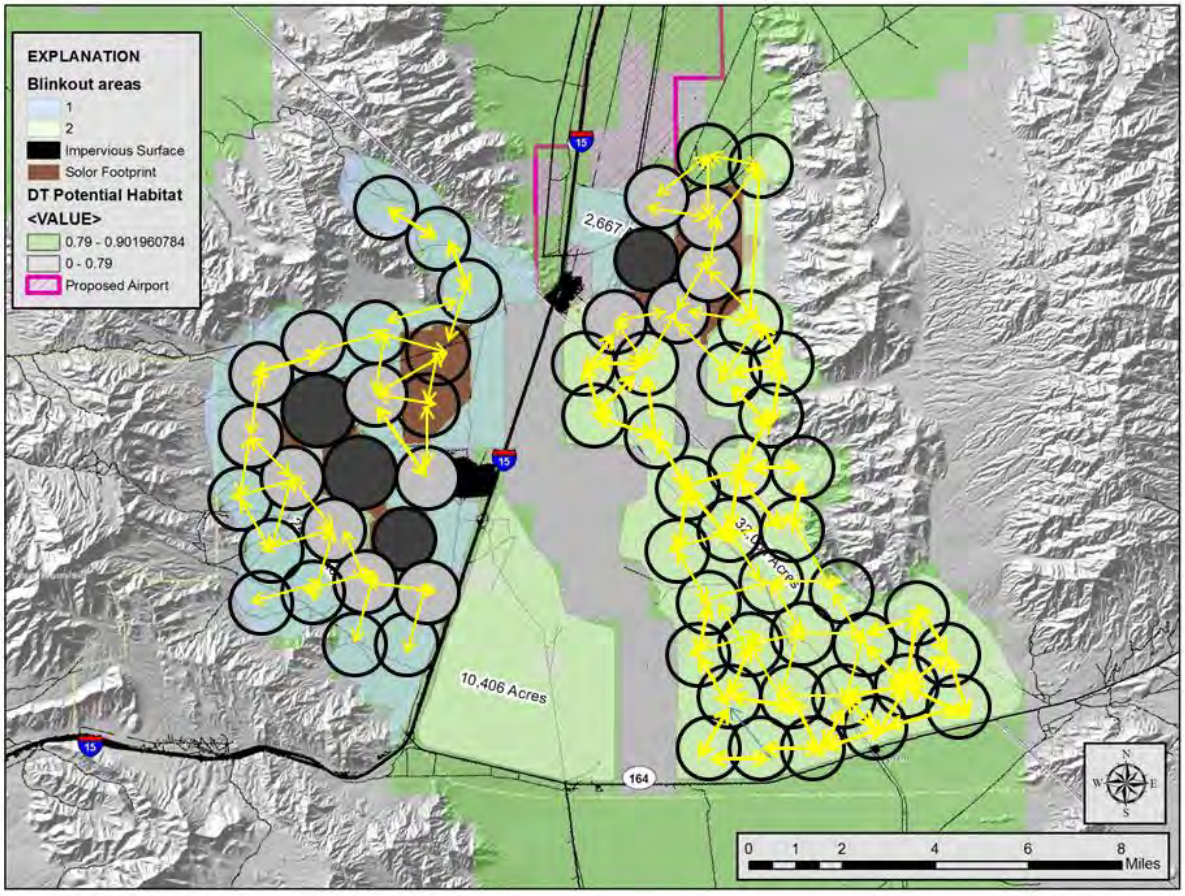
To define the area required to maintain populations within the linkages, we considered desert tortoise home range size, resource availability, and the magnitude of edge effects. Turner et al. (1981 in Berry 1986) documented home ranges of desert tortoises in the Ivanpah Valley to be as large as 220 acres. However, a desert tortoise's home range can expand and contract over the course of its life as it responds to year-to-year variability in resource availability. Over their lifetime, individual desert tortoises may use 1.5 square miles of habitat in adjusting their home ranges to address this variability (Service 1994). Therefore, we assess the viability of the linkages based on the ability of those linkages to maintain the lifetime desert tortoise utilization area of 1.5 square miles or the ability of utilization areas of this size to connect to one another through a relatively short linkage (e.g. a pinch point versus a long narrow corridor of desert tortoise habitat). Because the lifetime utilization area considers the expansion and contraction of an individual's home range size over time, it allows us to consider whether the linkage could remain viable in a year where decreased resource availability results in a smaller population of individuals requiring larger home ranges.

In assessing the lifetime utilization area, the Service (1994) assumed a circular configuration of this area when using it in the population viability assessment. We based this assumption on the fidelity that desert tortoises exhibit towards an overwintering burrow year after year. Consequently, the overwintering burrow serves as an anchor point from which the lifetime utilization area radiates (Service 1994). Using a circular lifetime utilization area of 1.5 square miles for a desert tortoise, we estimate that a linkage would need to be at least 1.4 miles wide to accommodate the width of a single desert tortoise's lifetime utilization area.

The existing conditions of demographic connectivity in the valley have been restricted from their historic condition by anthropogenic features in the region that act as barriers. Although we cannot quantify the overall effect on the viability of the population of desert tortoises in the Ivanpah Valley, these developments and their associated activities function as semi-permeable

and non-permeable barriers, affecting genetic and demographic connectivity through the valley. Interstate 15 is the most significant anthropogenic feature that has resulted in a demographic separation of subpopulations within the valley. Other features that have restricted demographic connectivity in the valley include, but are not limited to, the Ivanpah Solar Electric Generating System, Silver State North Project, the railroad, and larger developments such as the communities and commercial developments associated with the towns of Primm, Jean, and Goodsprings.

Interstate 15 bisects the Ivanpah Valley by forming a slightly permeable barrier; culverts and underpasses, north of Primm and between Yates Well Road and Nipton Road, offer some minor potential for population connectivity through this area. We anticipate that dispersal of desert tortoises through these underpasses does not likely contribute substantially to population connectivity. Based on the figure below showing circular 1.5-square-mile areas around the proposed projects sites in relation to Interstate 15 (Averill-Murray 2013), 3 potential linkages, in their existing state, are of sufficient width to accommodate the diameter of a single desert tortoise lifetime utilization area. Although this figure provides a means for characterizing the potential minimum width of a linkage, the actual linkage-width needed will be highly dependent on the actual site-specific configuration and size of desert tortoise home ranges in that area, the terrain within the linkage, and the degree to which threats, other constrictions, and edge effect will disrupt the linkage.



The first linkage exists to the north of the Stateline Project and serves as the only existing linkage along the west side of Interstate 15. This linkage has already experienced habitat loss and fragmentation due to the Kern River Gas Transmission Lines, several large transmission lines, urban development along both sides of Interstate 15, and access roads along these utilities. This linkage is also the proposed location of the DesertXpress rail line; that project would introduce a substantial amount of habitat loss and disturbance and fragment habitat. The Large-Scale Translocation Site virtually severs the linkage north of Primm because of the intersection of its southern boundary fence and Interstate 15. We anticipate that connectivity through this linkage is likely almost severed at the current time; removal of the fences at the Large-Scale Translocation Site and restoration of habitat quality in and around the Stateline Hills may improve the functionality of this linkage.

The other two linkages in the area occur east of Interstate 15. The linkage between Primm and the Silver State North Project is narrow (approximately 0.75 mile), heavily disturbed by human activity, and fairly close to Roach Dry Lake, where we expect the substrate would be less suitable for desert tortoises. Additionally, a rail line forms the eastern edge of this area for some distance. This linkage likely no longer supports a reliable level of connectivity.

The other linkage to the east of Interstate 15 lies east of the Silver State North Project, between the existing solar plant and the Lucy Gray Mountains. This linkage has the lowest level of existing habitat degradation and is wider (approximately 2 miles in the vicinity of the existing solar project). This linkage likely provides the most reliable potential for continued population connectivity throughout the Ivanpah Valley.

EFFECTS OF THE ACTION

We conducted the analysis in the following sections based on the current conditions in the action area as we described in the Environmental Baseline section of this biological opinion. Several aspects of the proposed actions may affect desert tortoises within the action area. These aspects are the capture and relocation of any desert tortoises, the installation of the fences to exclude desert tortoises from roads and construction areas, killing or injuring of individuals and crushing of their burrows and eggs during construction, loss of habitat, population fragmentation resulting from loss of connectivity, and other miscellaneous effects.

In this section of the biological opinion, we will analyze how these various aspects of the proposed actions affect desert tortoises and their habitat in a qualitative manner. In the Conclusions section of this biological opinion, we will integrate this general analysis with the best available information with regard to the numbers of desert tortoises and amount of habitat in the project areas, action area, and recovery unit to determine whether the proposed actions are likely to jeopardize the continued existence of the desert tortoise.

Effects Associated with Capture and Translocation of Desert Tortoises

The first step in the translocation of desert tortoises involves their capture. In some cases, the authorized biologists may find the animals above ground or near the mouths of their burrows. In such cases, the authorized biologist can easily pick up the desert tortoise and transfer it to a container for transport. If desert tortoises are deeper in their burrows, the authorized biologists would excavate the burrows; we expect that excavating desert tortoises from deep in their burrows is likely more stressful for them than being captured on the surface of the ground.

The capture and holding of desert tortoises can subject them to stress; stressed desert tortoises occasionally void their bladders. Desert tortoises store water in their bladders; this water is important to desert tortoises, particularly during times of low rainfall, in maintaining their life functions. Consequently, desert tortoises that void their bladders are at an increased risk of dying after their release. To mitigate this impact, the Bureau and the Applicants have proposed to hydrate desert tortoises prior to their release according to the Service's protocol. Because the Bureau and the Applicants would employ qualified biologists, we expect that the capture and transport of desert tortoises is unlikely to kill or wound any individuals.

We acknowledge that, in every phase of implementation of the proposed actions, desert tortoises are at risk of being killed or wounded when workers (including authorized biologists and

biological monitors) drive outside of areas that have been fenced and desert tortoises removed. As in many cases, small desert tortoises are at greater risk than larger animals. We are aware of desert tortoises that have been crushed by the vehicles of biologists working on translocations; both resident and translocated animals are vulnerable.

Boarman (2002), in a review of literature on threats to the desert tortoise, stated that the adverse effects of translocation include increased risk of mortality, spread of disease, and reduced reproductive success. The tendency for translocated desert tortoises to spend more time above ground, moving through their environment, than animals within their home ranges exacerbates at least some of these threats. Recent research, using comparisons among resident desert tortoises (animals within their home ranges with translocated individuals nearby) and control desert tortoises (animals within their home ranges with no translocated individuals nearby), has provided substantial information on this issue. We will evaluate the potential effects of translocation on desert tortoises in the following paragraphs.

Field et al. (2007), Nussear (2004), and Nussear et al. (2012) have found that translocated animals seem to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations. As time increases from the date of translocation, most desert tortoises change their movement patterns from dispersed, random patterns to more constrained patterns, which indicate an adoption of a new home range (Nussear 2004). Walde et al. (2011) found that movement patterns of desert tortoises translocated from Fort Irwin differed from those of animals studied elsewhere but describe their results as "apparent trends" because they have not completed analyses to determine if these trends were statistically significant. Translocated animals moved greater distances than residents and controls through the 4 years of their study. Desert tortoises that were translocated short distances moved much shorter distances than those that were translocated long distances. The movements of resident desert tortoises were similar to those of controls.

The Applicants will implement short distance translocations as much as possible; therefore, we expect that translocated desert tortoises are likely to exhibit more limited movement patterns; desert tortoises that spend less time above ground are less vulnerable to predation and environmental extremes. Regardless of the distance desert tortoises would be moved, we expect that translocated animals would spend more time moving, at least during the first year, which means they would be more vulnerable to predators, adverse interactions with other desert tortoises, and weather conditions than resident or control animals. For example, in spring 2013, biologists translocated 108 large and 49 small desert tortoises from approximately 2,000 acres of the KRoad Moapa Solar Project on the Moapa River Indian Reservation northeast of Las Vegas; they also monitored 18 large desert tortoises as controls or residents. Extremely high temperatures during the summer may have killed two or more large translocated desert tortoises. Predators likely killed eight small translocated desert tortoises. No resident or control desert tortoises have died during monitoring (Burroughs 2013b). During this first year of increased movement, desert tortoises would also be more likely to engage in fence pacing behavior, which can lead to hyperthermia and death.

As with other translocations (Nussear 2004, Field et al. 2007), we anticipate that predation is likely to be the primary source of post-translocation mortality. The level of winter rainfall may dictate the amount of predation observed in desert tortoises (Drake et al. 2010, Esque et al. 2010). Drake et al. (2010) documented a statistically significant relationship between decreased precipitation and increased predation of translocated desert tortoises at Fort Irwin. Additionally, the numbers of translocated, resident, and control desert tortoises that have died since the onset of work at the Ivanpah Solar Electric Generating System are roughly equal (see table in the Environmental Baseline – Existing Conditions in the Action Area – Land Management section of this biological opinion), which seems to indicate that translocation is not a factor in these mortalities.

Drought conditions seem to affect translocated and resident desert tortoises similarly. Field et al. (2007) monitored translocated and resident desert tortoises during drought conditions and found no significant difference between resident and translocated animals. Field et al. (2007) noted that most of the translocated desert tortoises "quickly became adept at life in the wild," despite the harsh conditions. Consequently, we have concluded that the amount of rainfall preceding translocation is not likely to decrease the survival rate of desert tortoises that would be moved from within the area of the proposed solar facilities. Additionally, the Bureau's proposal to assess the condition of desert tortoises prior to translocation and to hydrate individuals prior to release would decrease the likelihood that conditions at the time of release could depress survival rates.

Nussear et al. (2012) investigated the effects of translocation on reproduction in 120 desert tortoises. They found that, in the first year since translocation, the mean reproductive effort for translocated desert tortoises was slightly less than that of residents. Nussear et al. (2012) noted that the translocated animals may have benefited from being fed while in the pre-translocation holding facility; the food provided in the facility may have increased their production of eggs in the first year after translocation. In the second and third years after translocation, the mean number of eggs was not different between resident and translocated desert tortoises.

Translocating desert tortoises may also adversely affect resident desert tortoises within the action area due to local increases in density. Increased densities may result in increased incidence of aggressive interactions between individuals, increased competition for available resources, increased incidence of predation that may not have occurred in the absence of translocation, and increased spread of upper respiratory tract disease or other diseases.

We anticipate that density-dependent effects on resident populations are likely to be minor for the following reasons. First, current densities in the recipient sites are low enough to support additional desert tortoises (Bureau 2013f, Bureau and Ironwood 2013b). Second, the Applicants will restrict the number of large desert tortoises released in translocation areas to 15 individuals per square mile, which is one standard deviation of the mean density of desert tortoises in the Eastern Mojave Recovery Unit (Service 2011a). Third, the recipient sites are not a confined space, so released individuals would be able to disperse into other areas. Fourth, during the

translocation work at Fort Irwin, researchers tested over 200 desert tortoises for differences in the levels of corticosterone, which is a hormone commonly associated with stress responses in reptiles; Drake et al. (2012) "did not observe a measurable physiological stress response (as measured by [corticosterone]) within the first two years after translocation." The researchers found no difference in stress hormone levels among resident, control, and translocated desert tortoises. Finally Saethre et al. (2003) evaluated the effects of density on desert tortoises in nine semi-natural enclosures at the Desert Tortoise Conservation Center in Nevada. The enclosures housed from approximately 289 to 2,890 desert tortoises per square mile. Saethre et al. (2003) observed a greater incidence of fighting during the first year of the experiment but did not detect any trends in body condition index, reproduction, or presence of the symptoms of upper respiratory tract disease among the enclosures. Body condition index and reproduction are important indicators of how translocation may affect resident desert tortoises; generally, stress suppresses body condition index and reproduction in desert tortoises. For these reasons, we conclude that the addition of translocated desert tortoises to the recipient areas at densities that are slightly higher than the mean density of large individuals in the Eastern Mojave Recovery Unit would not result in detrimental effects to translocated or resident animals.

The upper limit for translocating desert tortoises is based on the density of large animals. We do not recommend limiting the density of small desert tortoises during translocation for several reasons. Natural mortality rates of smaller desert tortoises are greater than those of larger tortoises. In general, we expect that healthy populations have a large number of desert tortoises smaller than 160 millimeters (Turner et al. 1987), but have limited information on how many that might be. Additionally, small desert tortoises use resources differently than do large ones (Wilson et al. 1999) and we expect that juveniles (small animals) and adults (large animals) interact much less frequently than do adults. Due to differences in habitat use, caused by both physical and physiological differences in large and small desert tortoises, we expect overlapping of ranges while the small desert tortoises are growing and dispersing. Consequently, we do not expect translocating small desert tortoises at higher densities than large animals would result in any density-dependent adverse effects.

Upper respiratory tract disease and other pathogens are spread by direct contact between desert tortoises. Consequently, increasing the density of desert tortoises in the translocation areas has the potential to exacerbate the spread of diseases because, presumably, animals that occur in higher densities would have more opportunity to contact one another. Based on the results of the testing that the Applicants have conducted at the projects sites, disease prevalence in the area seems to be low; see the Environmental Baseline - Status of the Desert Tortoise in the Action Area - Disease Prevalence within and adjacent to the Stateline and Silver State South Project Sites section of this biological opinion. We cannot predict, at this time, whether animals that tested as suspect or positive for *Mycoplasma* would be placed in proximity of other desert tortoises. Overall, however, because the overall prevalence of disease in the area is low, the slightly greater densities of desert tortoises that would result from translocation would not cause an appreciable alteration.

Recently, we have become aware of new information with regard to disease in desert tortoises in the Mojave Desert (Jones 2013). Biologists have detected an undescribed *Mycoplasma* and a new beta herpes virus in desert tortoises; additionally, a Russian tortoise (*Testudo horsfieldi*) found at Fort Irwin had a strain of herpes that has not been found in desert tortoises. We have no other information on these diseases at this time.

Several circumstances are likely to reduce the magnitude of the threat of disease prevalence being exacerbated by translocation. First, the Applicants will use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals; animals are less likely to succumb to disease when they are not stressed. Second, desert tortoises on the project site are currently part of a continuous population with the resident populations of the recipient sites and are likely to share similar pathogens and immunities. Third, the Applicants will move many of the translocated desert tortoises a relatively short distance into the within-home-range recipient site, which is likely to reduce post-translocation stress associated with long-distance movements. Fourth, density-dependent stress is unlikely to occur for the reasons discussed previously in this section. Finally, Service-trained biologists will perform health assessments using Service-approved protocols and will not translocate any desert tortoise showing severe clinical signs of disease, but rather will transport the animal to an agency-approved quarantine, which is described in the projects' translocation plans.

We recognize that, if the DesertXpress rail line is constructed, some desert tortoises that were translocated from the Stateline Solar Project would need to be moved again. We are unaware of any research regarding the effects of sequential translocations. We expect that desert tortoises would react as they have as a result of other translocations but that the potential adverse effects of the increased movement in the first year after translocation would be exacerbated if the two translocations occurred over a short period of time. We cannot, at this time, predict how many desert tortoises the rail line would affect.

Based on this information, we anticipate that post-translocation survival rates will not significantly differ from that of animals that have not been translocated. We expect that translocated desert tortoises would be at greatest risk during the time they are spending more time above ground than resident or control animals. We cannot precisely predict the level of post-translocation mortality because regional factors that we cannot control or predict (e.g., drought, predation related to a decreased prey base during drought, etc.) would likely exert the strongest influence on the rate of mortality.

Effects Associated with Construction of the Stateline and Silver State South Projects

The Applicants will install desert tortoise exclusion fencing and security fencing around the projects and remove all desert tortoises that it can locate on the proposed project sites prior to ground disturbance. During construction of the perimeter fencing and during other ground-disturbing activities that are outside of the fenced facilities (i.e., fiber optic line, access roads,

gen-tie line, and water wells), the Applicants will perform pre-activity clearance surveys and employ monitors to move desert tortoises out of harm's way if they re-enter work areas. For these reasons, we anticipate that construction is likely to kill few, if any, individuals larger than 160 millimeters. Some potential always exists that surveyors may miss desert tortoises during clearance surveys and construction monitoring. We cannot predict how many of these large desert tortoises that clearance surveys and construction monitoring would miss. However, because the Applicants will use qualified biologists, authorized by the Service for clearance surveys, we anticipate that the number is likely to be small. Weather conditions can also affect the number of animals detected during surveys; warm weather after average or above-average rainfall would lead to more activity in desert tortoises, which would facilitate their detection.

In some cases, desert tortoises that have been fenced out of their home territories make repeated efforts to return and follow fence lines for long periods. Desert tortoises would die when exposed to harsh conditions (i.e., cold or hot temperatures) while pacing fences. We expect that desert tortoises whose home territories have been reduced by the projects would be the animals most likely to pace fences.

The installation of fencing may also reduce the home range size of some individuals that inhabit areas immediately adjacent to the fence alignments. This reduction could result in future injury or mortality of these individuals as they expand their home range into adjacent areas where unknown threats may occur or where adverse social or competitive interactions may occur with neighboring desert tortoises. Based on the desert tortoise translocation plan for Silver State South (Bureau and Ironwood 2013b), approximately 43 desert tortoises have home ranges that fence alignments may affect. We do not have the same information for the Stateline Project and therefore cannot predict the number of desert tortoise home ranges that fence alignments may affect.

The Applicants have proposed to check newly installed fences on a daily basis to "identify any tortoises that may be fence-walking." The biological assessments do not provide any information on the actions the Applicants would undertake if they finds desert tortoises engaging in this behavior. Additionally, desert tortoises can overheat quickly when pacing fences; periodically checking the fence would likely be inadequate to prevent mortalities.

Desert tortoises are known to construct their nests at the entrance to their burrows (Ennen et al. 2012). Because the Applicants will excavate all desert tortoise burrows that are found within the construction footprint prior to the onset of ground disturbance (Bureau 2013f, Bureau and Ironwood 2013b), the biologists may detect at least some of the nests and eggs. Overall, we anticipate that detection of eggs is unlikely because the buried nests are difficult to find. Because hatchlings can take shelter in burrows of all sizes and are difficult to see due to their cryptic nature and their small size, surveyors are less likely to detect them than they are larger desert tortoises. Consequently, we expect that most of the hatching and eggs are likely to remain in the work areas during construction. The Applicants are likely to kill these desert tortoises during construction. Because construction activities for both projects would occur year round,

we cannot predict whether these activities would affect the hatchling or egg stage. Consequently, we have combined these stages in our estimation of effects.

We cannot predict precisely how many desert tortoises may be injured or killed because of the numerous variables involved. For example, we do not know the precise number of desert tortoises onsite, the size of those individuals, whether eggs will be present at the time of construction, the time of year that construction occurs, and the weather before or during construction. Regardless of these factors, we expect that relatively few large desert tortoises are likely to be killed or injured during construction because the Applicants have proposed to implement measures that have proven effective in the past in reducing mortality and injury.

Effects Associated with Construction of Linear Facilities

Linear facilities have different effects on desert tortoises relative to construction on large blocks of habitat. Construction of linear facilities (e.g., access road, gen-tie line, water lines, and installation of the fence along the main access road) would take place outside of the permanent perimeter fencing. We have analyzed these effects here rather than grouping them with our analysis of the overall effects of construction of the solar fields. The following table presents the overall habitat disturbance associated with the construction of linear activities proposed in the projects' biological assessments.

Project Components (outside permanent perimeter fence)	**Acreage of Disturbance**	
	Permanent	**Temporary**
Stateline		
Roads and re-routed pipelines	14	-
Access roads and gen-tie line	26	4
Western wells and access right-of-way	2	1
Total		**47**
Silver State South		
Drainage features	374	-
Access roads and gen-tie line	86	7
Southern California Edison components	2	4
Total		**473**

During construction of linear components, the Applicants would move desert tortoises out of harm's way into adjacent habitat. An approved recipient site will not be required for desert tortoises encountered within linear components. Based on the amount of surface disturbance that we expect from the construction of linear facilities (i.e., 520 acres), we anticipate that the Applicants would move few desert tortoises. Because of the relatively limited amount of activity associated with the construction of linear facilities and numerous protective measures that the Applicants have proposed, we expect the number of desert tortoises that would be wounded or killed to be small.

Installation of the temporary fence along the main access road for the Stateline Solar Project would affect prevent most desert tortoises from being killed on the road during construction. It would also affect desert tortoises with regard to fence pacing behavior and fragmenting of home territories during construction of the solar facility. As we discussed previously in this biological opinion, desert tortoises that pace fences may become overheated and die. We cannot assess how many animals are likely to engage in this behavior because that number is a function of how many desert tortoises are active and encounter the fence and their behavioral response to it.

If desert tortoises breached the temporary fencing, the 15-mile-per-hour speed limit for project-related travel would reduce the likelihood that large individuals would be killed along the main access road during construction. Smaller desert tortoises may be more likely to move through the temporary fence and less likely to be detected by drivers, even at 15 mile per hour. Consequently, these individuals are at greater risk.

The temporary fence would be in place for the duration of construction, which the Bureau expects to last between 2 to 4 years. During this time, the temporary fence would fragment habitat in this area because desert tortoises would be unable to cross the road. Figure 4 of the biological assessment (Bureau 2013a) indicates that desert tortoises seem to be absent from the area to the east of the main access road; no desert tortoises were found in that area during surveys. The lack of desert tortoises in this area is consistent with the results found on the Stateline solar facility; desert tortoises are generally absent from the area around Ivanpah Dry Lake. Because desert tortoises seem to be scarce in this section of the valley, we expect that fencing pacing behavior would be infrequent; however, any desert tortoises that pace the fence would be at risk of hyperthermia. Because of the low density of animals and the fact that the fence would be in place temporarily, we do not expect that it would affect connectivity to a measurable degree.

Construction of the Stateline Project would include the installation of two groundwater production wells and associated waterlines. The primary well will be located inside the perimeter fence; consequently, Stateline would implement the protective measures applicable for construction of the solar field during installation of this well and associated water lines.

The secondary well and its two associated monitoring wells would be located outside the perimeter fence and an aboveground pipeline would convey water to the solar field. Desert tortoises could be crushed by the equipment being used to install the water lines and wells; workers could also trample desert tortoises. Small desert tortoises would be at greatest risk because they are more difficult to see. If trenches or holes are left uncovered, desert tortoises could become entrapped and die of exposure or be killed by predators. Stateline has proposed several measures to protect desert tortoises during activities that would occur outside the fenced solar facility. These measures include installing temporary fencing around work areas, checking excavations, and assigning monitors to project sites. With these measures, we expect that few desert tortoises are likely to be wounded or killed. We cannot quantify the number of desert tortoises the pipeline and wells may affect because we do not know how many animals would be

wounded or killed because we do not know how many animals will cross this primarily linear work area during construction; also, we expect that monitors would be able to detect and protect most desert tortoises. The monitoring wells would result in a long-term loss of a small amount of habitat; the trench for the water line would result in the temporary loss of slightly more habitat. Neither the wells nor the pipeline would fragment habitat to a measurable degree.

Effects Associated with Geotechnical Investigations

Stateline would need to conduct geotechnical investigations at 23 sites, each of which would require the disturbance of an area of approximately 300 square feet; some of these facilities are likely to occur outside of areas that have been fenced and cleared of desert tortoises. As with the linear facilities, desert tortoises, particularly small individuals, would be at risk of being killed or wounded during this work by vehicles and workers. Stateline would implement standard measures to avoid killing or wounding desert tortoises during this work. Additionally, monitors at each site will have the authority to site test sites to avoid desert tortoises, if necessary. Given the small area involved with each site, the small area of cumulative disturbance (approximately 0.2 acre), and the proposed implementation of standardized avoidance measures, we expect that few, if any, desert tortoises are likely to be killed or wounded during these activities. Most risk to desert tortoises as a result of the geotechnical testing would likely stem from workers traveling to the sites along unpaved roads; Stateline would abide by its standard protective measures when driving to and from these sites outside of areas that have been fenced and cleared of desert tortoises.

The disturbance caused by the geotechnical testing would not result in the long-term loss of habitat to the extent that it has a measurable effect on desert tortoises in the area of the Stateline Solar Project. The temporary disturbance of approximately 300 square feet would not lead to additional fragmentation of habitat.

Effects Associated with Operations and Maintenance

We are aware of occasions where desert tortoises have been able to enter fenced facilities, such as a pump station for a gas pipeline and an operating solar plant; they entered through gaps under the fencing or open gates. Floods can damage fences to the point where desert tortoises may be able to enter the facilities. Once inside the fencing, desert tortoises would be at risk of being killed or injured by operations or maintenance. In general, we expect that operation and maintenance within permanently fenced areas are likely to injure or kill few desert tortoises; however, if fences are poorly maintained, the degree of risk to desert tortoises would likely increase.

Over the 30-year life of the projects, the Applicants may conduct some ground-disturbing maintenance activities outside of fenced areas. These activities have the potential to injure or kill desert tortoises primarily by vehicle strikes, as workers travel to and from work sites outside of the fenced areas; a limited possibility exists that desert tortoises could be injured or killed by

equipment or workers moving around a work site. Because typical maintenance activities would not result in surface disturbance or loss of habitat and the Applicants propose to implement protective measures to reduce the potential effects, maintenance activities would kill few, if any, desert tortoises.

Maintenance activities associated with repair of desert tortoise exclusion fencing would likely kill or injure few, if any, desert tortoises for the following reasons. First, fence repairs are likely to result in minimal ground disturbance in localized areas. Second, at least a portion of the work area would be on disturbed areas within the fenced project site. Third, perimeter roads would exist that would allow access to most repair locations with minimal off-road travel. Finally, the Applicants would implement numerous protective measures to reduce the potential for injury or mortality of desert tortoises.

Operation and maintenance of the transmission corridors may affect desert tortoises. The transmission corridor would not be fenced; therefore, desert tortoises may use the habitat in this corridor and be present during maintenance activities. Vehicles and workers conducting this work could kill or injure desert tortoises in the same manner as during construction. The Applicants would implement numerous protective measures to reduce the potential for injury or mortality of desert tortoises during this work.

Use of the unfenced main access road for the Stateline Solar Project poses some risk of vehicle strikes to desert tortoises. This risk would remain low if desert tortoises do not reoccupy the area to the east of the road; given habitat conditions in that area, we do not expect large numbers of desert tortoises to use that area. Stateline's proposal to maintain a 15-mile-per-hour speed limit when desert tortoises are active should be protective of larger animals; small animals would be at greater risk because they are more difficult to see. We expect few desert tortoises to be killed or wounded along the main access road because of the low density of desert tortoises in this area.

Effects of Decommissioning

Work associated with decommissioning of the sites within the fenced project areas is unlikely to result in injury to or mortality of desert tortoises because desert tortoises would not be present. The effects of use of the main access road for the Stateline project would be similar to those associated with construction and described previously in this biological opinion. If the sites are restored to pre-project conditions, they would likely be available for use by desert tortoises at some point after removal of the facilities. We cannot predict how soon desert tortoises would reoccupy the sites after decommissioning because of the many variables involved. These variables would include the amount of degree to which substrates and shrubs have been disturbed on the sites, weather conditions, and the restoration methodologies; additionally, different portions of the sites may return to functional habitat at different rates. We anticipate that the Bureau will informally consult with the Service as the time for decommissioning approaches, if some aspect of decommissioning and restoration may affect desert tortoises differently than we

have anticipated in this biological opinion, the Bureau would need to re-initiate formal consultation, pursuant to section 7(a)(2) of the Endangered Species Act.

Both biological assessments note that some potential exists for continued use of the project areas for industrial or commercial purposes (Bureau 2013a, Bureau and Ironwood 2013c). In such a case, re-initiation of consultation, pursuant to section 7(a)(2) of the Endangered Species Act may be necessary if long-term monitoring detected changes that present concern for tortoises in regards to demographic or genetic connectivity within Ivanpah Valley.

Effects of Loss of Habitat

The following analysis provides a detailed assessment of the effects that the habitat loss associated with the proposed projects would have on desert tortoises in the Ivanpah Valley and within the recovery unit. The following table summarizes the final acreages of the rights-of-way for each project as presented in the biological assessments (Bureau 2013a, Bureau and Ironwood 2013c).

Project	Acreage of Disturbance		
	Permanent	Temporary	Total
Stateline	1,651	5	1,685*
Silver State South/Southern California Edison	2,388	39	2,427

* The final right-of-way requirement is larger than the area of permanent disturbance because the transmission and access road corridors have a minimum width within which the facilities would be constructed.

Construction of the proposed Stateline and Silver State South projects would result in the direct, long-term loss of 4,039 acres of habitat that will not be available to desert tortoises for foraging, breeding, or sheltering for the life of the projects. Following extensive disturbance and compaction, Mojave Desert substrates can take between 92 and 124 years to recover in the absence of active restoration (Webb 2002). In addition, recovery of plant cover and biomass in the Mojave Desert can require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Although active restoration, including decompaction, seeding, and planting, can reduce the time required to restore desert ecosystems, success is varied and dependent on numerous variables. Based on this information, the 4,039 acres currently characterized as permanent disturbance are likely to remain unsuitable as habitat for several decades following decommissioning of the facilities and commencement of restoration work. The potential exists that they may be permanently lost if restoration efforts are not successful.

For the Stateline Project, the Bureau and Stateline have proposed to mow vegetation in the portion of the site that is closest to Ivanpah Dry Lake, disk and roll the middle portion of the site, and grade the upper third (Bureau 2013a). The area to be mowed is likely to return to pre-

disturbance conditions in the shortest time because the roots of most shrubs would be retained for the life of the project and the surface of the ground would be less disturbed. If cryptogamic crusts are present, mowing may cause less disturbance. (Cryptogamic crusts are a mixture of algae and soil fungi that occur in the upper millimeters of the substrate. They assist in retaining soil moisture and some can incorporate atmospheric nitrogen into substrates; these attributes are beneficial for the establishment and growth of native annual plant species.) Retaining cryptogamic crusts may inhibit the invasion of non-native plant species to some degree and allow for the persistence of native annual plants. Currently, desert tortoises do not occupy this area, likely because of its proximity to Ivanpah Dry Lake and the unsuitability of the substrate; we do not expect mowing to alter its suitability for desert tortoises.

The area to be graded may require the longest time to recover. Some potential exists that the root crowns of shrubs may persist after grading, if the grading removes only a small amount of substrate. Grading of the entire surface area would also remove most of the cryptogamic crusts, which is likely to delay the re-establishment of native annual plants and increase the potential for the establishment of weeds.

Disking and rolling are likely to disturb the roots of many shrubs and severely disturb the ground's surface; we expect that it would destroy at least some portion of the shrubs and potentially alter the substrate and destroy cryptogamic crusts in a manner that may exacerbate the spread of weeds. We do not expect that disking and rolling are likely to reduce the amount of time required to return disturbed areas to habitat suitable for desert tortoises as compared to grading the entire surface area.

Effects of Population Fragmentation

All recent genetic studies of the desert tortoise characterize its population structure as isolation-by-distance (Britten et al. 1997, Edwards et al. 2004, Murphy et al. 2007, Hagerty and Tracy 2010). In addition, the historic distribution of desert tortoises was relatively continuous across the species' range, broken only by major topographic barriers (Germano et al. 1994, Nussear et al. 2009). Genetic analysis also suggests that, historically, levels of gene flow among subpopulations of desert tortoises were likely high, corresponding to high levels of habitat connectivity (Murphy et al. 2007). All of this information suggests that gene flow in desert tortoises generally occurs according to a continuous-distribution model (Allendorf et al. 2007), as opposed to a metapopulation or stepping-stone model where individuals move from one patch of suitable habitat to another, across less suitable habitat.

Hagerty et al. (2010) concluded that geographic distance and the presence of geographic barriers provide the most reliable predictors for population structure in the desert tortoise; they used these predictors to model how these variables historically affected population connectivity on a landscape scale. This modeling indicates that historic population connectivity in the Eastern Mojave Recovery Unit and Ivanpah Valley was constrained through geographic and topographic bottlenecks. Because of these constrictions, the following analysis focuses on how the Stateline

and Silver State South solar facilities, in combination with other barriers in the action area, will affect dispersal, gene flow, demographic connectivity, and population viability in the Ivanpah Valley. In addition, we address the relative contribution of the Stateline and Silver State South solar facilities to these effects in context with the other existing and approved developments within the valley.

Long-term Viability of the Ivanpah Valley Population of Desert Tortoises

The loss of connectivity between the northern and southern ends of Ivanpah Valley would have far-reaching implications because of the confined nature of the desert tortoise population in the valley. Most of the Ivanpah Valley in California is isolated from adjacent desert tortoise habitat by mountain ranges; only the southern part of the valley is broadly connected to adjacent non-mountainous areas. Hagerty et al. (2010) showed that historic connectivity through the southern end of Ivanpah Valley near Cima is constrained by topographic barriers (i.e., the mountains on either side of the pass between Ivanpah Valley and Cima Dome). This constriction is sufficient to contain the width of multiple desert tortoise lifetime utilization areas. However, Nussear et al. (2009) identified the area of the Cima-Ivanpah junction as having a lower probability to support desert tortoises based on habitat attributes; it is higher in elevation than most desert tortoise habitat. Considering the low habitat potential and existing habitat impacts and degradation within the linkage (i.e., the Union Pacific Rail Road line, Morningstar Mine Road, unpaved roads, past cattle grazing, etc.), existing population connectivity through the southern end of Ivanpah Valley is likely severely constrained. Consequently, the southern portion of Ivanpah Valley is primarily connected to other desert tortoise habitat in the vicinity of Primm. To the north of Primm, Ivanpah Valley is largely isolated from adjacent desert tortoise habitat by mountains and the cities of Las Vegas and Boulder City.

Because desert tortoise habitat in the northern and southern portions of Ivanpah Valley is largely isolated from the remainder of the eastern Mojave Recovery Unit, the maintenance of connectivity within the valley is important. Based on a population viability analysis, the Service (1994) concluded that the minimum viable density for a population of desert tortoises was 10 adults per square mile; below this density, demographic stochasticity and genetic deterioration likely diminish the potential for population growth. This analysis concluded that recovery areas required a minimum reserve area of 1,000 square miles to maintain evolutionary potential at a minimum viable density of 10 adults per square mile due to the patchy distribution of desert tortoises across the landscape. The Service (1994) also concluded that the time to extinction for small populations was strongly related to population size (i.e., smaller populations would go extinct faster) and that lambda (i.e., population growth rate) needed to remain above one to avoid becoming extremely vulnerable to extinction.

Loss of population connectivity between the northern and southern portions of Ivanpah Valley would create a nearly closed population of desert tortoises within a 258-square-mile area in its southern portion. (Darst [2013] calculated the area of habitat with a potential [Nussear et al. 2009] of 0.5 or greater and then subtracted the amount of impervious surfaces.) The most recent

6-year average density of desert tortoises in the Ivanpah Critical Habitat Unit, which contains the southern portion of the Ivanpah Valley, is approximately 9.7 adult desert tortoises per square mile (Service 2009b, 2012a, 2012b, 2012e, 2012f). This density is based on the sampled areas of the entire Ivanpah Critical Habitat Unit and may not reflect conditions in this smaller area. Although the estimated density of desert tortoises for the southern portion of the valley is close to the recommended 10 adults per square mile, the amount of habitat is less than a third of the recommended reserve size of 1,000 square miles. Given the small size of the southern portion of the valley, the relatively small population that currently occupies it (2,503 large desert tortoises: 9.7 large desert tortoises per square mile multiplied by 258 square miles), the ongoing sources of mortality in this area that we discussed in the Environmental Baseline section of this biological opinion, and the existing conditions in the Ivanpah Valley, this population, if isolated, would likely experience the demographic and genetic effects discussed in the population viability assessment.

The loss of connectivity between the northern and southern portions of Ivanpah Valley would also create a nearly closed population within the 255-square-mile area of the northern portion of the valley. The cities of Las Vegas and Boulder City disrupt connectivity to adjacent habitat in the Eldorado Valley. The best available information regarding the density of desert tortoises in this area is from the surveys Silver State conducted in the area around the site of the proposed Silver State South Project; which estimated a density of 8.1 desert tortoises per square mile (Darst 2013). Again, the density of 8.1 desert tortoises per square mile and the size of the area do not meet the recommendations of the population viability analysis needed to maintain a viable population over time (2,066 large desert tortoises: 8.1 large desert tortoises per square mile multiplied by 255 square miles). As we discussed for the southern portion of the valley, this population, if isolated, would likely experience the deleterious demographic and genetic effects discussed in the population viability assessment.

Failure to maintain a viable population of desert tortoises in the Ivanpah Valley would have negative implications for the population in the Eldorado Valley of Nevada. The desert tortoise population in Eldorado Valley lies within the "South Las Vegas" genetic cluster with the Ivanpah Valley population (Hagerty and Tracy 2010). Even though agencies often consider the Eldorado and Piute valleys together for management purposes, the Piute Valley population is aligned with desert tortoise populations in the "Northern Colorado" genetic cluster to the south (Hagerty and Tracy 2010). (The Piute Valley lies to the south of the Eldorado Valley.) The cities of Las Vegas and Boulder City have already compromised the linkage between the Eldorado Valley and desert tortoise populations to the north; the Eldorado Valley has likely experienced population declines. If development in the Ivanpah Valley near Primm severs connectivity, it would essentially isolate the Eldorado Valley population from the rest of the recovery unit.

Effects of the Silver State South Project on Population Connectivity

As previously discussed, the linkage between Primm and the Silver State North Project will not likely provide any reliable level of population connectivity because of its narrowness and the

current levels of human impacts within and adjacent to it. The Primm Substation would be located at the northern end of this linkage; available desert tortoise habitat at this point in the linkage is approximately a mile wide, between the edge of Roach Dry Lake and the Silver State North Project. We estimate that the Primm Substation would occupy approximately 0.2 mile of this width; the access road from the substation to the Silver State North Project, which would run perpendicular to the linkage, would introduce another source of mortality to desert tortoises in the area.

Figure 9 of the biological assessment for the Silver State South Project (Bureau and Ironwood 2013c) indicates that desert tortoises currently occupy the area between the existing solar field and the lake bed in the area proposed for the substation. The presence of the Primm Substation (and temporary disturbance for construction of the Southern California Edison transmission line and laydown area) is likely to disrupt the use of the general area by these animals; given the numerous transmission lines and access roads in this area, the loss of 16 acres of habitat for the substation and additional vehicle travel on another road may render this less likely to support desert tortoises. The loss of habitat and increase in mortality source as a result of the construction and operation of the Primm Substation is unlikely to affect the linkage between Primm and the Silver State North Project because of its distance from the central portion of the linkage and its already degraded condition. Its primary effect is likely to be a minor degradation of the stability of the desert tortoise population that occurs at the northern end of the linkage to the east of the Silver State South Project.

The linkage east of the proposed Silver State South Project has the lowest level of existing habitat degradation and likely provides the most reliable potential for continued population connectivity. After construction, the linkage between habitat to the north and south would be approximately 3.65 miles long and between 1.39 and 2 miles wide. (See figure 10 in Bureau 2013c.) This width would likely accommodate a single lifetime desert tortoise utilization area throughout the length of the corridor. Beier et al. (2008) recommend that corridors between habitat patches for corridor-dwelling species like the desert tortoise accommodate multiple home ranges. To the east of the site of the Silver State South Project, the corridor that would remain after construction of the proposed project would vary from approximately the width of a single desert tortoise lifetime utilization area (i.e., 1.4 miles) to slightly more than that area. Horskins et al. (2006 in Beier et al. 2008) note that strongly territorial species require a minimum corridor width that is substantially larger than the width of a home range; in a narrow corridor, an occupied home range that spans the corridor could impede movement by other individuals through the corridor. Although desert tortoises are territorial and will fight among themselves, their territories also frequently overlap. Consequently, although the width of the remaining corridor would be narrower than optimal, territorial desert tortoises are unlikely to block the movement of other desert tortoises through the corridor.

Beier et al. (2008) note that wide linkages are beneficial because, among other attributes that are less relevant to desert tortoises, they reduce edge effects due to invasive species, provide an opportunity to conserve ecological processes, and help the biota respond to climate change. The

Environmental Law Institute (2003 in Beier et al. 2008) found that "Negative edge effects are biologically significant at distances of up to 300 (meters) in terrestrial systems…." Consequently, the effective width of the corridor to the east of the project site is likely less than the measured distance; we acknowledge that the edge effects of a solar plant likely extend less into adjacent habitat than those of a residential development and that edge effects likely do not emanate from the Lucy Gray Mountains.

The width of the corridor affects the functionality of linkages in that narrower linkages provide less certainty of desert tortoises persisting during years of low resource availability or surviving stochastic events; they may die or move to other areas. The converse is also true. Desert tortoises are more likely to persist in wider linkages because these areas support more habitat of different types, at varying elevations, and with varying weather patterns over time; desert tortoises can more easily recolonize areas where extirpations have occurred if the linkage is larger and source populations are closer (the larger areas to the north and south of the project site support the source populations for this linkage). In short, longer, narrower linkages are less likely to allow for recolonization of areas where extirpations have occurred. The rise in temperatures that we expect because of climate change is likely to exacerbate the potential effect of narrower linkages; the effects of climate change on rainfall are less predictable at this time.

An overall rise in temperature would increase the environmental variability that desert tortoises face and increase the likelihood that a small number of desert tortoises within the narrow linkages would perish in any given year from catastrophic events or other sources of mortality associated with edge effect. Desert tortoises occupying these linkages would also be vulnerable to periodic loss from stochastic events (i.e., the few desert tortoises occupying the linkages are more likely to die out due to random chance) that effectively sever connectivity. An increase in environmental variability would likely lower the overall survival rate of desert tortoises because they may be less likely to survive the wide variation between good and poor years in terms of resource availability. Preserving connectivity may allow species to adapt to or allow for natural range shifts in response to changing environmental conditions (Averill-Murray et al. 2013).

Under such conditions, desert tortoises occupying this narrow linkage area, which would also continue to be affected by the anthropogenic effects occurring in these areas that we described in the Environmental Baseline - Existing Conditions in the Action Area section of this biological opinion, may be more susceptible to local extirpation than individuals that reside in a larger area of habitat. With the overall number of desert tortoises in the area reduced because of the stochastic event, individuals may be less likely to find mates, reproduce, and recolonize the linkage areas, particularly if desert tortoises in these areas are subject to ongoing causes of mortality.

Effects of the Stateline Project on Population Connectivity

The Clark Mountains separate the portion of the Ivanpah Valley west of Interstate 15 and south of Primm (i.e., the location of the proposed Stateline Project) from adjacent desert tortoise

habitat to the north and west. To the north of the valley, the easternmost portion of the Stateline Hills allows for some level of connectivity for desert tortoises to the north of Primm; we are aware of desert tortoise burrows in these hills. Ivanpah Dry Lake is essentially an impermeable barrier directly south of Primm; although desert tortoises can and do occasionally cross dry lakebeds, dry lakes would never serve as an area that could support a source population of desert tortoises. South of the dry lake, Interstate 15 functions as a semi-permeable barrier between desert tortoises on either side of the freeway. The two underpasses on Interstate 15, between Yates Well Road and Nipton Road, offer some small potential for population connectivity to this area; however, we have concluded that dispersal of desert tortoises through these underpasses does not likely contribute substantially to population connectivity. This lack of connectivity has nearly isolated desert tortoises west of Interstate 15 from the remainder of the population in Ivanpah Valley.

Within this area west of Interstate 15, the joint port of entry, Ivanpah Solar Electric Generating System, Primm Valley Golf Course, and DesertXpress have caused or will cause the loss of thousands of acres of habitat. Other actions, such as those occurring in the Boulder Corridor and the Mountain Pass lateral pipeline have degraded additional habitat. This loss and degradation of habitat renders this area less able to support a stable population of desert tortoises and more vulnerable to stochastic events. The isolated population west of Interstate 15 is substantially smaller than the minimum viable population size identified in the original recovery plan for the desert tortoise (Service 1994), indicating that it is highly vulnerable to demographic stochasticity and genetic deterioration.

Development of the Stateline facility in the area occupied by this isolated population is likely to promote or exacerbate these effects by reducing the area available to this population and introducing additional mortality sources that may reduce population recruitment or create demographic imbalances. The potential mortality of juvenile desert tortoises on the Stateline project site will also likely affect, to some degree, recruitment (i.e., individuals reaching reproductive age). In addition to exacerbating demographic and genetic effects within this small population, the Stateline facility would further fragment the small population west of Interstate 15 by constraining, to a limited degree, connectivity between populations east and west of the facility.

The northern edge of the Stateline Project would be located approximately 0.9 mile from the southernmost point of the eastern arm of the Clark Mountains. The resulting linkage between the Stateline facility and the Clark Mountains would connect desert tortoises to the northeast of the project with animals to the west, in the remaining habitat west of Interstate 15. Although this width is less than a single desert tortoise lifetime utilization area (i.e., 1.4 miles), the linkage will likely remain functional because its length is very short; the southernmost extension of the Clark Mountains is shaped like a peninsula and the linkage becomes wider immediately to the east and west of the narrowest point. Additionally, even without the proposed project, the width of the area where Stateline detected desert tortoises south of the “peninsula” is less than 1.4 miles

because the substrate becomes silt-like as the alluvial fan levels out and approaches Ivanpah Dry Lake.

To summarize, the population west of Interstate 15 is nearly isolated from the remainder of desert tortoises in Ivanpah Valley and therefore is more vulnerable to extirpation and genetic deterioration because of existing barriers that greatly reduce the potential for movement. The construction of the Stateline Solar Project would further inhibit, to a limited degree, connectivity in this portion of the valley. Given the existing extensive loss of habitat in this portion of the valley, the overall decrease in the amount of suitable habitat that would result from the proposed action is likely more detrimental to desert tortoises in this area than the reduced connectivity.

Effects Associated with Climate Change

Increases in atmospheric carbon are responsible for changes in climate. As we discussed in the Status of the Desert Tortoise section of this biological opinion, climate change is likely to cause frequent and/or prolonged droughts with an increase of the annual mean temperature. Increased temperatures would likely adversely affect desert tortoises by decreasing the range of temperatures at which desert tortoises would be active; decreased rainfall would likely result in fewer annual plants on which desert tortoises feed.

Plant communities in arid lands sequester carbon by incorporating it into their tissues. Plants also respire carbon into the substrate, where it combines with calcium to form calcium carbonate; calcium carbonate also sequesters carbon (Allen and McHughen 2011). The removal of plant life from approximately 4,039 acres within the action area is likely to reduce the amount of carbon that natural processes can sequester. We acknowledge that a portion of the area of the Stateline Project would be mowed and that regrowth of shrubs in that area may lessen, to some degree, the loss of carbon-sequestering plants; we do not have the ability to quantify the difference the mowing would cause.

The proposed action is unlikely to affect desert tortoises in a measurable manner with regard to carbon sequestration for several reasons. First, the amount of carbon sequestration that would be lost would be minor because the proposed action would affect a small portion of the desert. Second, some researchers have questioned the amount of carbon sequestration that occurs in arid areas; Schlesinger et al. (2009) contend that previous high estimates of carbon sequestration in the Mojave Desert bear re-examination. Finally, the reduction in the use of fossil fuels because of the solar facilities would prevent more carbon from entering the atmosphere than would occur by the vegetation that is currently present within the areas to be disturbed by construction. For example, Fernandes et al. (2010) report that thin film photovoltaic technology reduces overall atmospheric carbon by 4 million grams of carbon per acre per year and that, by contrast, the amount of annual carbon uptake by desert land is approximately 429,000 grams of carbon per acre per year. Additionally, any changes in the level of carbon production or sequestration would be dispersed far beyond the boundaries of the action area of this biological opinion;

consequently, we could not link any such changes to any specific impacts to desert tortoises within or outside the action area of this consultation.

The proposed actions are also unlikely to alter the surface albedo of the action area to the degree that it affects local climatic conditions. (Albedo is the amount of light reflected by an object. An object that reflects more light is heated less. The opposite is also true; an object that reflects less light is heated more.) Millstein and Menon (2011) found that large-scale photovoltaic plants in the desert could lead to significant local temperature increases (0.4^{o} Celcius) and regional changes in wind patterns because the solar plants are less reflective than many substrates in the desert. As we discussed above, increases in temperatures would likely impair the activity patterns of desert tortoises.

The proposed action is unlikely to affect desert tortoises in a measurable manner with regard to changes in the albedo of the action area because Millstein and Menon's (2011) prediction was based on a model that analyzed the effects of a 1-terawatt solar facility. (A terawatt is 1,000,000,000,000 watts; by comparison, the proposed solar fields would produce a maximum of 550 megawatts.) Consequently, the proposed actions, even when combined with the albedo produced by the Silver State North and Ivanpah Solar Electric Generating System (a combined 430 megawatts; Bureau 2010a, b) are unlikely to change local temperatures or regional wind patterns.

Miscellaneous Effects

Indirect effects associated with construction, operation, maintenance, and decommissioning of the Stateline and Silver State South solar projects may injure or kill desert tortoises. These effects include increased predation by common ravens that are attracted to the area because of increased human activity and modification of the habitat and diet of desert tortoises due to the spread of non-native plant species.

Ivanpah Valley currently supports numerous facilities that attract common ravens (e.g., water sources, trash, road-killed animals, nest and roost sites, etc.). These facilities are associated with established communities (i.e., Primm and Nipton), golf courses, an interstate highway, solar facilities, and utility lines that are likely to elevate the level of predation of desert tortoises by common ravens within the action area. Construction and operation of the Stateline and Silver State South facilities have the potential to attract additional common ravens and increase predation in the action area.

The Applicants have proposed numerous measures in the management plans for the projects (Ironwood 2012a, Bureau et al. 2013) to address predation by common ravens associated with the project sites. These measures include control of attractants, monitoring and reporting programs, and implementing adaptive management techniques such as devices to discourage roosting or nesting on project-related structures. To address the indirect and net effects of the Stateline Project with regard to common ravens, Stateline will participate in the regional

management and monitoring program for common ravens. The Service developed this program, in coordination with the Desert Managers Group, which is a consortium of land management agencies and other stakeholders in California, and the Renewable Energy Action Team, which is composed of the Service, Bureau, California Energy Commission, and California Department of Fish and Wildlife. The management and monitoring program for common ravens does not apply to Nevada.

We cannot reasonably predict the amount of predation by common ravens that construction and operation of the projects are likely to add to baseline levels within the action area, but we anticipate that measures proposed by the Applicants are likely to be effective in eliminating some, but not all, common raven use of the project sites. Depending on the location of specific control actions, funding of regional management of common ravens may also aid in reducing the amount of common raven predation on desert tortoises within the California portion of the action area.

Non-native species can occur in densities that can increase the risk of fires, which may result in future habitat loss. Non-native plant species currently occur on the proposed project site and are likely to occur in other portions of the action area at varying densities. Within the Ivanpah Valley, numerous features serve as vectors for infestation of the action area by non-native plant species (e.g., highways, unpaved roads, cattle allotments). Construction and operation of the Stateline and Silver State South facilities have the potential to increase the distribution and abundance of non-native species within the action area due to ground-disturbing activities that favor the establishment of non-native species. In addition, access to the project sites and other project features by construction and operations personnel could increase the volume and distribution of non-native seed carried into the action area. The Applicants have proposed numerous measures to address control of non-native plant species within the project sites. We cannot predict the degree to which non-native species would proliferate within or spread beyond the boundaries of the solar facilities for several reasons. For example, above-average rainfall immediately after construction may encourage the spread of weeds whereas drought may have the opposite effect. We cannot predict whether project equipment would introduce new species or whether such new species would be able to germinate, grow, and reproduce onsite. Because the objective of the Applicants' weed management plans is to ensure that the presence of weed populations on and adjacent to the projects does not increase due to the Projects and because available technology, consistently and persistently applied, can achieve this objective, we predict that the proposed projects would not lead to an increase in the number or amount of non-native species within or outside the boundaries of the solar facilities. If the Applicants' objective is not met, we would consider this new information regarding the effects of the action that may affect desert tortoise and its habitat in a manner or to an extent not considered in this biological opinion. Consequently, the Bureau would be required to re-initiate formal consultation, pursuant to 50 Code of Federal Regulations 402.16.

Field work associated with the monitoring of demographic and genetic stability, proposed by the Bureau and U.S. Geological Survey, has to potential to kill or wound desert tortoises simply

because the researchers would be using roads in the desert to access study sites and could strike desert tortoises with their vehicles. Because experienced researchers would be conducting this work, we expect that they are likely to strike a limited number of desert tortoises. The information provided by the study would likely improve our ability to manage desert tortoises in the future.

Effects of the Proposed Compensatory Mitigation

The Bureau and the Applicants have proposed a set of measures, discussed below, to offset at least a portion of the adverse effects of the proposed solar power facilities. For the Silver State South Project, the Bureau, with funding from Silver State, proposes to determine whether the fence around the Large-Scale Translocation Site can be removed or realigned to improve connectivity or, alternatively, to fence Highway 93 (if the fence around the Large-Scale Translocation Site cannot be removed or realigned), restore habitat near the site of the Silver State South Project, and fund law enforcement personnel to enhance protection of desert tortoise habitat.

The Bureau, with funding from Silver State, proposes to assess disease and the genetic status of desert tortoises within the Large-Scale Translocation Site and remove or realign the fence unless prohibited by disease or genetic issues. The Large-Scale Translocation Site encompasses approximately 28,000 acres of desert tortoise habitat. This measure, if implemented, would allow for some degree of increased connectivity; because it would allow more desert tortoises to approach the Stateline Hills to the south of the Large-Scale Translocation Site, it would enhance connectivity more along the west side of the freeway where the Stateline Solar Project would be located than to the Silver State South side of the freeway.

The increased connectivity west of Interstate 15 may alleviate, to a small degree, the reduction in the width of the linkage to the east of the freeway that the Silver State South Project would cause. Because of existing development in Primm and the Stateline Hills, increasing connectivity on the west side of the freeway could not completely offset the reduction east of the Silver State South Project.

If removal or realignment of the Large-Scale Translocation Site fence is not possible, Silver State would fund fencing of Highway 93. This project would not directly improve connectivity but would remove a mortality source for desert tortoises. This project would not directly improve connectivity but would remove a mortality source for desert tortoises. A reduction in mortality would likely lead to higher densities in desert tortoises over time; higher densities of desert tortoises would improve the overall capacity of the area to support demographic connectivity.

Silver State will also fund work to restore habitat near the site of the Silver State South Project. Habitat that has been restored after being damaged by recreational and other uses is likely to

support more desert tortoises; increasing the density of desert tortoises adjacent to and within a linkage area would be important to maintain connection through the linkage.

Silver State would also fund law enforcement personnel to ensure that recreational users follow the proposed management actions within the new area of critical environmental concern. The presence of law enforcement personnel is likely to add to the overall conservation of desert tortoises within the area because it would reduce habitat damage and deaths of desert tortoises from unauthorized use.

For the Stateline Solar Project, the Bureau proposes to remove cattle grazing from part of the action area, restore habitat along the Kern River Pipeline right-of-way and adjacent to Whiskey Pete's, and restore 30 closed and unauthorized routes located within the Eastern Mojave Recovery Unit. Lastly, Stateline will fund fencing of Morningstar Mine Road, which is located within the Mojave National Preserve.

The removal of cattle from 40,000 acres of the Clark Mountain Grazing Allotment would benefit desert tortoises adjacent to the Stateline Project because it would reduce competition for forage, habitat disturbance, and direct mortality of individuals and allow for the restoration of native plant species and soil crust. Studies in the eastern Mojave Desert on foraging behavior and food preferences of range cattle and desert tortoises show that a dietary overlap (spatial and temporal) exists and that this overlap is greatest in the spring when annual plants are at their peak biomass and densities (Service 2010d). A reduction in competition for forage would improve nutrition and may lower the susceptibility of desert tortoises to upper respiratory tract and shell diseases (Bureau 2002). Grazing also facilitates the proliferation of invasive species, increases soil compaction, and decreases infiltration rate (Boarman 2002). Eliminating such impacts to vegetation would increase the abundance and distribution of plant species that are preferred by the desert tortoise (Oftedal et al. 2002). Removal of grazing would also reduce the potential for desert tortoises or their burrows to be trampled by cattle.

Second, Stateline will fund restoration work along 20 acres of the Kern River Pipeline right-of-way located north of the project site and within an 6.4-acre area along the west side of Whiskey Pete's, located approximately 1.5 miles northeast of the proposed project site. Restoration of these sites should increase in the quality of desert tortoise habitat; if this increased habitat quality allows more desert tortoises to inhabit the area, overall connectivity near the Stateline Project would improve to a small degree. If the restoration results in less use of the area by off-road vehicles and, consequently, a reduction in mortality levels along unpaved roads in the area, this aspect may provide an even greater benefit to desert tortoises than the improved habitat quality.

The restoration of 30 unauthorized routes within the Eastern Mojave Recovery Unit would involve the active restoration of enough of the route to make it difficult for recreationists to see; this restoration could involve moving rocks onto the route, planting container plants, reseeding the route, and "vertical mulching," which is inserting branches from nearby shrubs into the ground or otherwise placing pieces of plants or rocks into disturbed areas so they do not look like

routes of travel. The Bureau would then allow plants to recolonize the remaining portion of the route. This action would not immediately restore habitat value to the route, in terms of native annual plants for forage or appropriate substrates for burrowing; those values would require a long time. It would, however, remove use of the route by vehicles as a threat to desert tortoises and thereby contribute to increased survivorship of animals in areas were the routes are closed.

Finally, Stateline will fund fencing of Morningstar Mine Road, located within the Mojave National Preserve. Fencing of Morningstar Mine Road will reduce the number of desert tortoises that are killed or injured along this road. As we stated in the Environmental Baseline - Existing Conditions in the Action Area section of this biological opinion, motorists use the paved Morningstar Mine Road at high speeds, which is responsible for the death of several desert tortoises a year (National Park Service 2011). The installation of fencing along Morningstar Mine Road could also increase habitat fragmentation by preventing the movement of desert tortoises across the road. To at least some extent, Morningstar Mine Road already serves as a semi-permeable barrier to the movement of desert tortoises. As Hoff and Marlow (2002) have described, the density of desert tortoises is lower adjacent to roads; this lowered density is itself a barrier to interaction among desert tortoises from opposite sides of the road; additionally, desert tortoises that attempt to cross the road are at risk of death or injury. In sum, reducing injury and mortality associated with Morningstar Mine Road would promote increased survivorship in the Eastern Mojave Recovery Unit and recovery of the desert tortoise, even though it may slightly reduce connectivity in this particular region.

Generally, the proposed actions are consistent with recommendations for recovery of the desert tortoise. Some of the actions would affect immediate benefits to desert tortoises. For example, fencing of Morningstar Mine Road (and Highway 93, if the Bureau pursues that option) would immediately reduce the mortality rate of desert tortoises in a large area of critical habitat; however, because of the desert tortoise's low reproductive rate, another benefit of the fencing, as measured by an increased density of desert tortoises in the area, is unlikely to be evident for many years. The removal of cattle, closing of roads, and restoration of habitat would likewise have some immediate benefit (e.g., reduction in competition, reduction in the number of desert tortoises crushed by off-highway vehicles and cattle) but increases in habitat quality and the number of desert tortoises will take much more time. The effects of efforts to improve connectivity, such as removal or realignment of the fence around the Large-Scale Translocation Site, will be more difficult to measure.

Effects of Changes in Land Use Plans

The Bureau (2013g) has proposed to create a new 50-square-mile area of critical environmental concern in Nevada. The Bureau would manage lands within the proposed area of critical environmental concern in Nevada in a manner consistent with its multiple-use mandate. However, the designation alters the Bureau's goals and objectives to ensure that conservation of habitat for desert tortoises is a primary purpose of land use in the area. For example, the Bureau would retain all lands within the area of critical environmental concern in Federal ownership;

allow (on a case-by-case basis) Bureau facilities that provide resource protection, enhancement of relevance and importance values and/or address human health and safety; restore areas that are temporarily disturbed to meet its standard restoration standards; consider land use authorizations and site-type right-of-ways of 5 acres or less on a case-by-case basis; close the area to solid leasable mineral resources; allow, on a case-by-case basis, salable mineral disposals that provide resource protection, enhancement of relevance and importance values and/or address human health and safety; close the area to livestock grazing; limit recreation facility development to those necessary for resource protection; limit off-highway vehicle use to existing routes; require permitted non-speed recreation activities have a desert tortoise monitor during the active season; and prohibit military maneuvers.

The Bureau would also designate the area of critical environmental concern as a linear right-of-way avoidance area. Rights-of-way for construction and operation of the Southern Nevada Supplemental Airport and associated facilities are allowed in the area of critical environmental concern, subject to an approved final environmental impact statement and record of decision for the airport and to compliance with the Endangered Species Act. The Bureau would also exclude large site-type rights-of-way (greater than 5 acres). Rights-of-way for construction and operation of the Southern Nevada Supplemental Airport and associated facilities are allowed in the area of critical environmental concern, subject to an approved final environmental impact statement and record of decision for the airport and to compliance with the Endangered Species Act (Cota 2013b).

The Bureau would expand the Ivanpah Desert Wildlife Management Area by approximately 37 square miles and manage these lands according to the multiple-use guidance contained in its final environmental impact statement for the Northern and Eastern Mojave amendment to the California Desert Conservation Area Plan (Bureau 2002). Under the plan, the Bureau would include specific design features to minimize potential impacts to desert tortoises and their habitat if projects would lead to new surface disturbance; require reclamation, to as close to pre-disturbance condition as practicable, for activities that result in loss or degradation of desert tortoise habitat within the area; limit cumulative new surface disturbance on public lands administered by the Bureau to no more than one percent of public lands; and require compensation for disturbances of public lands at the rate of 5 acres for each acre disturbed.

The area of critical environmental concern in Nevada and expansion of the desert wildlife management area in California would contribute to the protection of desert tortoises within this portion of the Ivanpah Valley. These designations are likely to reduce the amount of human disturbance in these areas; the reduced disturbance is likely to benefit desert tortoises by reducing the number of animals that are killed and the amount of habitat that is lost or degraded. In particular, the Bureau's prohibition of site-type rights-of-way larger than 5 acres in Nevada and the high compensation requirement and limit on cumulative disturbance in California would serve to prevent (in Nevada) or strongly discourage (in California) the loss of large areas of habitat.

As with most measures that are intended to protect desert tortoises and their habitat, we cannot precisely quantify how these measures would benefit individuals, populations, or habitat. To some degree, the benefit is a function of the activities that the management measures would prevent or discourage. For example, the mere presence of the increased level of management may discourage some development proposals from being brought forward or cause recreational users to go elsewhere; in such cases, we would not know that the direction had provided a benefit. In all cases of restoration, the degree to which desert tortoises and their habitat respond to the removal of sources of mortality and the restoration of disturbed areas is a function of rainfall. Adequate amounts of rainfall would improve the likelihood of survival of desert tortoises of all size classes and hasten the degree to which habitat restoration would occur.

Effects on Recovery

Given the relatively small number of large desert tortoises that we expect the Stateline Solar and Silver State South projects to kill, the proposed actions are unlikely to appreciably diminish the ability of the desert tortoise to reach stable or increasing population trends in the future. Several of the Bureau and the Applicants' proposals to offset the adverse effects of the proposed solar facilities (e.g., fencing of Morningstar Mine Road, removal of cattle grazing, reduction in the number of unauthorized vehicle routes) would remove sources of mortality of desert tortoises in the action area. These measures would promote the recovery of the desert tortoise and, over time, are likely to prevent more individuals from being killed than the Applicants is likely to kill during construction, operation, and maintenance of the solar facilities.

Connectivity among populations is essential to the conservation of the desert tortoise. Ivanpah Valley is almost completely isolated from adjacent important habitat for desert tortoises in the Kelbaker/Cima area and Eldorado Valley. Consequently, stochastic events (e.g., drought, wild fires) pose a greater degree of threat to desert tortoises in Ivanpah Valley than if the valley were more widely connected to adjacent habitat from which individuals could recolonize over time.

Connectivity within Ivanpah Valley is currently constrained in the area of the state line by existing development. The loss of habitat as a result of the Stateline Solar Project is likely to reduce connectivity in this portion of Ivanpah Valley to some degree. A portion of the area proposed for the project would occur in unoccupied habitat (i.e., the area close to Ivanpah Dry Lake), the corridor between the project and the adjacent mountains is short, and existing (and previously consulted upon) development has largely isolated the habitat west of Interstate 15 from the remainder of Ivanpah Valley. For these reasons, the Stateline Solar Project is not likely to measurably affect connectivity within Ivanpah Valley.

The habitat to the east of the Silver State South Project currently provides the greatest degree of connectivity between the northern and southern portions of Ivanpah Valley. The loss of habitat to east of the Silver State South Project is likely to reduce this connectivity; edge effects may reduce the effective connectivity to less than the measured distance between the project site and the Lucy Gray Mountains.

If the Bureau is able to remove or realign the fence around the Large-Scale Translocation Site, the improved connectivity on the west side of Interstate 15 would not completely compensate for decreased connectivity to the east of the Silver State South Project, primarily because Primm and the Stateline Hills comprise impermeable and semi-permeable barriers, respectively, to movement of desert tortoises through this area. The Bureau's proposal to restore routes and increase the degree of conservation management adjacent to the Silver State South Project would, over time, likely improve habitat quality and thereby increase the number of desert tortoises in this area; an increased number of desert tortoises adjacent to the corridor would likely provide a source population in the event of decreased densities within it.

For the reasons discussed in the preceding paragraphs, the Silver State South Project is likely to reduce connectivity within Ivanpah Valley. Consequently, the proposed project is likely to impede recovery of the desert tortoise, at least temporarily. The loss of habitat and reduction in connectivity would occur over a short period of time. The measures proposed to offset the loss of connectivity would require years to result in an increased number of desert tortoises and improved habitat quality; they also cannot replace the lost habitat and reduced width of the corridor.

Although the loss of habitat would occur in a relatively short time and be clearly visible, loss or degradation of connectivity would likely not occur for several years and be more difficult to detect. However, the monitoring of demographic and genetic stability by the U.S. Geological Survey should be able to detect such changes over time. The initial work by the U.S. Geological Survey would establish baseline conditions; that is, the first sampling would provide information on genotype, differentiation of populations, genetic diversity (allelic richness, heterozygosity), effective population size, relatedness among individuals, and genetic connectivity among collection location. Subsequent sampling would allow the U.S. Geological Survey to determine changes in these measurements of demographic and genetic stability over time and to provide information, based on the location of the monitoring plots, on whether changes in demographic and genetic stability were related to the proposed solar projects. Changes in any of the sampled metrics over time and among sites that rise to the level of significance (alpha = 0.05) would likely indicate changes in demographic and genetic stability. Comparisons between sites would suggest that connectivity between those sites has been altered. If this comprises new information with regard to the effects of the Silver State South or Stateline Solar Projects on connectivity, the Bureau would be required to re-initiate formal consultation, pursuant to section 7(a)(2) of the Endangered Species Act. At that time, the Service and Bureau would assess the available information to determine an appropriate course of action.

We conclude that construction of the Silver State South Project is not likely to appreciably diminish the likelihood of recovery of the desert tortoises for several reasons. First, at least one desert tortoise's lifetime utilization area would remain in the corridor after construction of the project. This corridor, combined with the increased level of management proposed by the Bureau within the new proposed area of critical environmental concern, has the potential to increase the density of desert tortoises in the region to a degree that may mitigate the loss of

habitat. Second, the monitoring to be conducted by the U.S. Geological Survey should detect changes in demographic and genetic stability. Third, the long generation time of desert tortoises provides the Bureau an opportunity to implement additional management measures, if needed. Finally, the re-initiation requirements of section 7(a)(2) of the Endangered Species Act will provide for additional review of the proposed action, both during and after the 30-year life of the right-of-way grant.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions, including future actions on federal land by non-federal entities, that are unrelated to the proposed actions in this section because they require separate consultation pursuant to section 7(a)(2) of the Act.

The Bureau and the National Park Service manage the majority of the land in the action area. Future non-federal actions in the action area within Nevada are subject to the requirements of the Clark County Multi-species Habitat Conservation Plan. We are not aware of any proposed, non-federal actions within the action area in California.

CONCLUSIONS

As we stated previously in the biological opinion, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 Code of Federal Regulations 402.02). This regulatory definition focuses on how the proposed action would affect the reproduction, numbers, or distribution of the species under consideration in the biological opinion. For that reason, we have used those aspects of the desert tortoise's status as the basis to assess the overall effect of the proposed actions on the species.

Additionally, we determine whether a proposed action is likely "to jeopardize the continued existence of the species" through an analysis of how a proposed action affects the listed taxon within the action area in relation to the range of the entire listed taxon. For the desert tortoise, this process involves considering the effects at the level of the action area, then at the level of the recovery unit (in this case, the Eastern Mojave Recovery Unit), and then finally for the range of the listed taxon. Logically, if a proposed action is unlikely to cause a measurable effect on the listed taxon within the action area, it is unlikely to affect the species throughout the recovery unit or the remainder of its range. Conversely, an action with measurable effects on the listed entity in the action area may degrade the status of the species to the extent that it is affected at the level of the recovery unit or range-wide.

In the following sections, we will synthesize the analyses contained in the Effects of the Action section of this biological opinion to determine how each of the proposed actions affects the reproduction, number, and distribution of the desert tortoise. We will then assess the effects of the proposed actions on the recovery of the species and whether they are likely to appreciably reduce the likelihood of both the survival and recovery of the desert tortoise.

Reproduction

Construction of the solar facilities would not have a measurable long-term effect on reproduction of individual desert tortoises that live adjacent to the solar facilities because this intense activity would occur over a relatively brief time relative to the reproductive life of female desert tortoises. Furthermore, desert tortoises are well adapted to highly variable and harsh environments and their longevity helps compensate for their variable annual reproductive success (Service 1994).

We expect that translocated desert tortoises may exhibit decreased reproduction in the first year following translocation. Based on research conducted by Nussear et al. (2012), however, the reproductive rates of translocated desert tortoises are likely to be the same as those of resident animals in subsequent years. Based on work conducted by Saethre et al. (2003), we do not expect the increased density of desert tortoises that would result from translocation to affect the reproduction of resident animals.

For these reasons, we expect that the proposed Stateline and Silver State South facilities are not likely to appreciably diminish reproduction of the desert tortoise in the action area.

Numbers

We expect that the proposed actions are likely to result in the injury or mortality of few large desert tortoises because most construction activities (the aspect of the proposed actions that would be most likely to kill or injure desert tortoises) would occur within areas that have been fenced and cleared of desert tortoises. For activities outside of fenced areas, the Applicants would implement measures to reduce the level of mortality during all work activities. We anticipate that the proposed actions are likely to result in injury or mortality of numerous small desert tortoises because of their small size and cryptic nature. Consequently, densities of large desert tortoises serve as the basis for our following analysis.

In the Environmental Baseline – Status of the Desert Tortoise in the Action Area section of this biological opinion, we estimated that approximately 4,572 large desert tortoises occurred within approximately 328,640 acres within the Ivanpah Valley. For the California portion of the action area, we extrapolated the number of large desert tortoises from the density of large individuals in an area that is considered to provide the best habitat and support the highest densities (i.e., the Ivanpah Critical Habitat Unit). Densities within the action area may be different and are likely lower. For the Nevada portion of the action area, we used the density calculated for the larger

area surrounding the Silver State South facility site and extrapolated it to the northern portion of the action area.

Survey results for the proposed Stateline facility indicate that up to 94 large desert tortoises will require capture and movement from harm's way as a result of construction of the solar facility. Based on the estimated desert tortoise densities within the action area, construction of the Stateline solar facility would affect approximately 2 percent (e.g., 94 of 4,572 individuals) of the large desert tortoises within the action area. Based on density estimates for the Silver State South facility, we anticipate that up to 115 large individuals will be translocated. This encompasses approximately 2.5 percent (e.g., 115 of 4,572 individuals) of the estimated large desert tortoises within the action area. The combined construction and operation of the Stateline and Silver State South solar facilities would affect approximately 4.6 percent (e.g., 208 of 4,572 individuals) of the large desert tortoises in the action area based on the high end of the density estimates.

Range-wide monitoring in the Eastern Mojave Recovery Unit indicates that the lower and upper confidence intervals (at 95 percent) of the densities of large desert tortoises to be approximately 4.7 to 18.9 per square mile (point estimate of 9.4) (Allison 2013a). Assuming the worst-case scenario (i.e., the number of large desert tortoises in the region is close to the lower confidence interval [29,101] and in the footprint of the Silver State South Project is close to the upper limit [115]), the Silver State South Project would require translocation of approximately 0.4 percent of the large desert tortoises in the Eastern Mojave Recovery Unit. Using this same scenario for the Stateline Project, Stateline would translocate approximately 0.32 percent of the large desert tortoises in the recovery unit (93 of 29,101). We expect that Silver State will capture most of the large desert tortoises within the solar fields and the Silver State South Project's substation and move them to translocation areas. Based on the results of studies conducted at Fort Irwin and the Ivanpah Solar Electric Generating System, we expect the majority of these animals will survive the translocation.

We acknowledge that the Applicants will likely kill some large desert tortoises during construction of the facilities; however, as we have discussed previously in this biological opinion, the proposed measures to protect desert tortoises during these activities will ensure that few large animals die or are injured. Additionally, few large desert tortoises are likely to die during work along linear facilities and in the course of operations and maintenance over the life of the projects. We have reached this conclusion because construction work along linear facilities would involve much smaller areas, most work associated with operations and maintenance would occur within fenced areas, and the Applicants would implement protective measures while conducting these activities. Overall, the number of large desert tortoises likely to be killed or injured as a result of construction, operation, and maintenance of the proposed projects would comprise a minor portion of the population within the action area.

The potential exists that factors unrelated to the Stateline and Silver State South projects may affect desert tortoises in the action area. If the overall number of desert tortoises in the recovery

unit decreases, we expect that the number of desert tortoises that inhabit the action area would also decrease. Some potential exists that the number of desert tortoises within the action area may increase relative to adjacent areas if the overall human disturbance decreases and the mortality rate of desert tortoises decreases concurrently. In spite of the uncertainties related to the overall future trend in the number of desert tortoises, the proposed actions are not likely to appreciably diminish the number of large desert tortoises in the action area during the life of the projects.

We expect that many of the small desert tortoises and eggs within the boundaries of the solar facilities are likely to be killed or injured during construction, although the Applicants would likely find some small animals and translocate them. We estimated that the sites might support up to 1,906 small desert tortoises and eggs. We did not attempt to compare this estimate with one of the same size classes for the Eastern Mojave Recovery Unit for two reasons. First, the large number of assumptions involved, particularly in the context of the entire recovery unit, decreases the value of this exercise. Second, the natural high rate of mortality among eggs and juveniles would reduce the value of the estimate. Additionally, small desert tortoises are likely to die during work along linear facilities and in the course of operations and maintenance; however, protective measures are likely to be more effective in preventing mortality or injury during these activities because of the smaller areas involved. Although we are not comparing the overall estimate of the numbers of small desert tortoises and eggs likely to be killed or injured to the overall numbers within the recovery unit, we can reasonably conclude that the estimate is a small percentage of the overall numbers of small desert tortoises and eggs because the number of large desert tortoises affected by the proposed actions is a small percentage of the population in the Eastern Mojave Recovery Unit. Consequently, although construction is likely to kill many small desert tortoises and eggs and some additional animals and eggs would be killed during operations and maintenance, the proposed actions are not likely to appreciably diminish the number of small desert tortoises or eggs in the action area.

Distribution

The long-term loss of 4,039 acres of desert tortoise habitat that would result from implementation of the 2 solar projects (1,651 acres for Stateline; 2,388 acres for Silver State South) is not likely to appreciably reduce the distribution of the desert tortoise. The Eastern Mojave Recovery Unit may support as much as 7,443 square miles of desert tortoise habitat (Allison 2013a). Consequently, the proposed actions would result in the loss of approximately 0.08 percent of the habitat in the Eastern Mojave Recovery Unit (0.03 percent for Stateline; 0.05 percent for Silver State South).

We anticipate that the long-term habitat loss associated with the Silver State South Project will reduce connectivity between the southern and northern ends of Ivanpah Valley. The Bureau's proposal to restore disturbed habitat and increase the level of law enforcement around the Silver State South Project should offset, to some degree, the decrease in the width of the linkage. We are uncertain as to whether the reduced width of the corridor between the Silver State South

Project and the Lucy Gray Mountains would cause demographic or genetic instability. As we discussed in the Effects of the Action – Effects on Recovery section of this biological opinion, if the Silver State South Project degrades connectivity between the northern and southern portions of Ivanpah Valley, monitoring by the U.S. Geological Survey should be able to detect any such change, and the long generation time and re-initiation requirements of section 7(a)(2) would enable the Bureau to undertake corrective actions on the ground to bolster connectivity and for the Bureau and Service to re-evaluate the effects of the proposed action during re-initiation of formal consultation, either during the life of the project or at the end of the 30-year right-of-way grant.

To summarize, we concluded that the proposed actions are not likely to appreciably diminish reproduction, numbers, or distribution of the desert tortoise in the action area, or to appreciably impede long-term recovery of the desert tortoise. Integral to that conclusion is our expectation that the reduction in the width of habitat east of the Silver State South Project is either unlikely to degrade demographic or genetic stability in Ivanpah Valley or that we will be able to detect degradation of those values and implement remedial actions, if necessary.

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the Service's biological opinion that the Bureau's proposed issuance of right-of-way grants for the Silver State South and Stateline projects and Southern California Edison's substation are not likely to jeopardize the continued existence of the desert tortoise. We reached these conclusions for these projects because:

Silver State South Project

1. We do not expect that the issuance of a right-of-way grant for the Silver State South Project would affect the reproductive capacity of desert tortoises in the action area.

2. The Bureau and Silver State have proposed numerous measures, including translocation of desert tortoises from the project site, to minimize injury and mortality of desert tortoises. Information from previous large-scale translocations has demonstrated that it can be an effective tool for reducing mortality at project sites. Consequently, the proposed action is not likely to appreciably reduce the number of desert tortoises in the Eastern Mojave Recovery Unit.

3. The proposed action will not appreciably reduce the distribution of the desert tortoise in the action area because it would result in the loss of approximately 0.05 percent of suitable habitat in the Eastern Mojave Recovery Unit. Construction of the project would result in a net loss of desert tortoise habitat and may impair connectivity to some degree in the linkage between the project site and the Lucy Gray Mountains, which is the most critical linkage remaining in the Ivanpah Valley. However, the average width of the remaining corridor can accommodate one lifetime desert tortoise utilization area

throughout the length of the linkage, the Bureau and Silver State will fund and implement numerous measures to enhance connectivity and secure desert tortoises populations in the surrounding area, the U.S. Geological Survey will monitor demographic and genetic stability, and the Bureau will be required to re-initiate formal consultation if monitoring detects loss of stability. The long generation time of desert tortoises will allow the Bureau to take remedial actions if the U.S. Geological Survey detects degradation of demographic or genetic instability.

Stateline Project

1. We do not expect that the issuance of a right-of-way grant for the Stateline Project would affect the reproductive capacity of desert tortoises in the action area.

2. The Bureau and Stateline have proposed numerous measures, including translocation of desert tortoises from the project site, to minimize injury and mortality of desert tortoises. Information from previous large-scale translocations has demonstrated that it can be an effective tool for reducing mortality at project sites. Consequently, the proposed action is not likely to appreciably reduce the number of desert tortoises in the Eastern Mojave Recovery Unit.

3. The proposed action will not appreciably reduce the distribution of the desert tortoise in the action area because it would result in the loss of approximately 0.3 percent of suitable habitat in the Eastern Mojave Recovery Unit. Construction of the project would result in a net loss of desert tortoise habitat and is likely to impair connectivity to some degree in the linkage between the project site and the Clark Mountains. This linkage has already been compromised to a large degree by the Ivanpah Solar Electric Generating System, DesertXpress, Primm, and the Large-Scale Translocation Site. Additionally, the point of constriction that the proposed action would cause would be short in length and natural features in that area also pose constraints to connectivity. The Bureau and Stateline will fund and implement numerous measures to improve management of the remaining habitat for desert tortoises in the surrounding area. These measures include expanding the Ivanpah Desert Wildlife Management Area by approximately 42 square miles; this change in management direction would increase the emphasis on protection of desert tortoises in the remaining habitat.

Southern California Edison Substation

1. We do not expect that the issuance of a right-of-way grant for the Southern California Edison substation would affect the reproductive capacity of desert tortoises in the action area.

2. The Bureau and Southern California Edison have proposed numerous measures, including translocation of desert tortoises from the project site, to minimize injury and

mortality of desert tortoises. Information from previous large-scale translocations has demonstrated that it can be an effective tool for reducing mortality at project sites. Consequently, the proposed action is not likely to appreciably reduce the number of desert tortoises in the Eastern Mojave Recovery Unit.

3. The proposed action will not appreciably reduce the distribution of the desert tortoise in the action area. Construction of the substation would result in a net loss of a small amount of desert tortoise habitat (28 acres, which we included in the total for the Silver State South Project) and is likely to impair further the connectivity in the linkage between the project site and Roach Dry Lake. This linkage has already been compromised to a large degree by the Silver State North Project, the Walter M. Higgins Generating Station, an existing railroad, the portion of Primm that lies east of the freeway, and general human disturbance, which is likely an edge effect of Primm. The Bureau intends for the measures described for the Silver State South Project to also apply to this project.

Under normal circumstances, we would analyze the three proposed actions separately; as we completed the analysis for the first action, its impacts would then alter the status of the species for the next consultation. To ensure that we are not compromising the section 7(a)(2) process by ignoring their aggregative effects on desert tortoises in the Ivanpah Valley, we will now consider all three actions in combination.

1. Effects to the reproductive capacity of desert tortoises are not additive across the three proposed projects. Most of the large desert tortoises that occur in project area would be translocated to suitable habitat; we expect that these individuals would continue to reproduce at the same rate as prior to translocation.

2. The Bureau and the Applicants will use techniques that have proven to be effective in protecting large desert tortoises during clearance surveys of the project areas. Although we acknowledge that some large individuals will likely be killed or injured because of the proposed actions, mostly during construction, the overall number of animals we expect will die (including small animals and eggs) would be a minor fraction of the number of desert tortoises within the Eastern Mojave Recovery Unit. Several measures proposed by the Bureau and the Applicants to offset these losses (e.g., fencing of Morningstar Mine Road, removal of cattle from the Clark Mountain Allotment, management of off-highway vehicle use near the Silver State South Project) are likely to reduce the number of individuals that are killed by anthropogenic activity within the Eastern Mojave Recovery Unit upon their implementation.

3. Construction of the projects would result in a net long-term loss of approximately 4,039 acres of desert tortoise habitat of varying quality and decrease the width of 3 linkages between the northern and southern portions of Ivanpah Valley. The measures that the Bureau and the Applicants will implement to offset the reduction in width are likely to enhance the ecological value of the remaining habitat within and adjacent to the linkages.

> These measures include altering management strategies to be more protective of desert tortoises, increased presence of law enforcement personnel to reduce damage to habitat and injury and death of desert tortoises, and habitat restoration to reduce illegal use of unauthorized routes within desert tortoise habitat. These measures, taken together, are likely to improve the viability of desert tortoise populations within and surrounding the linkages. Furthermore, we expect the monitoring to be conducted by the U.S. Geological Survey would allow detection of demographic or genetic instability and the long generation time and requirements for re-initiation of formal consultation would allow for remediation of such effects.

As we noted previously in this biological opinion, the analysis we conduct under section 7(a)(2) of the Endangered Species Act must be conducted in relation to the status of the entire listed taxon. We considered the action area for this biological opinion to be Ivanpah Valley because the effects of the loss of connectivity would affect the entire valley. Because we have reached the determination that the proposed actions are not likely to appreciably diminish reproduction, numbers, or distribution of the desert tortoise in Ivanpah Valley, these actions are also not likely to affect desert tortoises within the remainder of the Eastern Mojave Recovery Unit or to the remainder of the range of the Mojave population of the desert tortoise.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not the purpose of, the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement and the avoidance and minimization measures proposed by the Bureau.

The measures described below are non-discretionary; the Bureau must include these measures as binding conditions of its right-of-way grants to Stateline, Silver State and Southern California Edison for the exemption in section 7(o)(2) to apply. The Bureau has a continuing duty to regulate the activity covered by this incidental take statement. If the Bureau fails to require Stateline, Silver State and Southern California Edison to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the right-of-way grants, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take,

the Bureau must report the progress of the actions and its impact on the species to the Service as specified in the incidental take statement (50 Code of Federal Regulations 402.14(i)(3)).

Although we have combined the analyses of the effects of the projects, we have provided separate conclusions with regard to our section 7(a)(2) determinations because the Bureau is proposing the issuance of three separate right-of-way grants. For this reason, we are also providing separate incidental take statements for the projects.

Stateline Solar Project

Construction of the Stateline Solar Field

We anticipate that all desert tortoises within the Stateline Solar project site are likely to be taken. We anticipate that most of the large individuals (i.e., those greater than 160 millimeters in length) within this area will be captured and moved from harm's way to adjacent habitat. Desert tortoises that are not detected during clearance surveys prior to construction may be killed or wounded; because of the difficulty in finding small desert tortoises, we expect that most of these individuals are likely to be killed or wounded during construction.

We estimate that, at most, approximately 94 larger tortoises and 853 small desert tortoises and eggs may be present within the boundaries of the solar facility. We are unable to state precisely how many desert tortoises are present within the area where the proposed solar facility would be built for several reasons. Desert tortoises are cryptic (i.e., individuals spend much of their lives underground or concealed under shrubs), they are inactive in years of low rainfall, and their numbers and distribution within the action area may have changed since the surveys were completed because of hatchings, deaths, immigration, and emigration. The numbers of hatchlings and eggs are even more difficult to quantify because of their small size, the location of eggs underground, and the fact that their numbers vary depending on the season; that is, at one time of the year, eggs are present but they become hatchlings later in the year.

Determining the amount or extent of the forms in which the take is likely to occur (killed, injured, or captured) is also difficult. As we noted previously, most of the large individuals within this area will likely be captured and moved from harm's way to adjacent habitat. Few larger desert tortoises are likely to be killed or wounded because our prior experience is that the proposed avoidance and minimization measures will be effective. However, occasionally even larger animals remain undetected during clearance surveys and are likely to be killed or wounded during construction. Stateline is also likely to find and translocate some of the small desert tortoises; eggs are unlikely to be detected.

Using the total number of individuals within the site of the solar facility as the anticipated level of take in the form of desert tortoises that are killed or wounded as a result of the proposed action would be inappropriate because we fully expect that Stateline will capture and move numerous individuals into adjacent habitat. Therefore, we anticipate that the number of individuals killed

or wounded resulting from the proposed action will be a subset of the number of desert tortoises estimated to be within the action area. Because Stateline is not likely to find every dead or wounded desert tortoise within the area of the solar facility, the number of dead or wounded individuals that are found likely will be a subset of the number that are killed or wounded.

To summarize, we do not know the precise number of desert tortoises within the area of the solar facility and cannot predict the numbers of animals that Stateline will capture and move from harm's way prior to and during construction, the number of individuals that are likely to be killed or wounded, or the number of dead or injured individuals that will be found. Therefore, we cannot precisely quantify the number of individuals that are likely to be killed or wounded during construction of the proposed solar field. Because Stateline is unlikely to find every individual that is killed or wounded but we know that this number will be a fraction of the total number of desert tortoises present, we will consider the amount or extent of take to be exceeded if three killed or wounded large desert tortoises are found within the solar field. We used large desert tortoises to establish this amount or extent of take because small desert tortoises are difficult to find and the method by which we calculate their abundance contains more assumptions and therefore more potential for variation than does our method for predicting the number of large desert tortoises.

In the previous paragraphs, we described the difficulties involved with quantifying the numbers of desert tortoises that are likely present in the solar field and of desert tortoises that are likely to be moved from harm's way. However, we based our overall section 7(a)(2) analysis in this biological opinion on the premise that at most approximately 94 large and 853 small desert tortoises and eggs are likely to occur within the boundaries of the proposed solar field. If Stateline's surveys were inaccurate and more desert tortoises actually reside on site, Stateline would exceed the amount or extent of incidental take that we have anticipated; additionally, this increased number of individuals would constitute new information revealing effects of the agency action that may affect the desert tortoise to an extent that the Service did not consider in this biological opinion. Consequently, we will consider the amount or extent of take to be exceeded if Stateline captures and translocates more than 89 large desert tortoises from within the solar field. We used this number because it is less than the 94 large desert tortoises upon which we based our analysis, it accounts for the number of killed or wounded desert tortoises at which the Bureau would need to re-initiate formal consultation (3), and it provides for a reasonable number of large individuals that may die but not be detected (2).

More uncertainty exists in the numbers of small desert tortoises and eggs that are likely to be present because of the assumptions that we make to derive an estimate; additionally, circumstances could lead to the authorized biologists and monitors finding more small desert tortoises than we predicted (e.g., an unusually high survival rate in the previous year, long periods of good weather leading to greater activity levels, biologists with better search images for small animals, etc.). Because our estimate of the number of large desert tortoises within the project area forms the basis for the estimate of the number of small desert tortoises, finding more large animals than we predicted would likely mean that our estimate of the number of small

animals is too low. Therefore, we are not establishing an independent re-initiation criterion for the number of small desert tortoises or eggs that would be moved out of harm's way during construction of the proposed project.

We expect that most of the eggs present within boundaries of the solar field will be destroyed. We cannot predict how many eggs desert tortoises will produce prior to the onset of construction and the number of eggs present would vary depending upon the time of the year Stateline conducts the clearance surveys. Biologists are unlikely to find many eggs because they are difficult to detect. For these reasons, predicting the number of eggs that may be taken is not possible and we are not establishing a re-initiation criterion for eggs for the loss of eggs. As we noted in the previous paragraph regarding small desert tortoises, the amount or extent of take of large desert tortoises we established previously in this section serve as a surrogate for the number of eggs; if the amount or extent of take for large desert tortoises is exceeded, the re-initiation of formal consultation would also require re-evaluation of the effects of the action on eggs.

Translocation

Because Stateline will employ experienced biologists, approved by the Service and the Bureau, and sanctioned handling techniques, we do not expect that the take, in the form of capture or collection, required to move desert tortoises out of harm's way during construction of the proposed project will result in mortality or injury of any individuals. Consequently, we do not anticipate that the activities involved with capturing and transporting desert tortoises from the solar field to the recipient site is likely to kill or injure any desert tortoises.

The work required to translocate desert tortoises and to monitor translocated and resident animals would necessitate increased use of vehicles in suitable habitat when desert tortoises are active. We acknowledged this fact in the Effects of the Action - Effects Associated with Capture and Translocation of Desert Tortoises. We cannot predict how many desert tortoises are likely to be killed or wounded in this manner because of the numerous variables involved (the density of desert tortoises in the area, how many animals are active when biologists are working in the area, the condition of the roads, etc.). Additionally some desert tortoises (particularly small individuals) may be killed or wounded but never detected. Because Stateline will employ experienced biologists, approved by the Service and the Bureau, we expect that few desert tortoises are likely to be killed or wounded by vehicle strikes during translocation. For these reasons, we will consider the amount or extent of take to be exceeded if Stateline kills or wounds more than 2 large desert tortoises as a result of vehicle strikes during translocation activities.

We do not anticipate any differences in mortality rates among translocated, resident, and control desert tortoises. To ensure that the effects of translocation are consistent with our analysis, we will consider the amount or extent of take of translocated or resident desert tortoises to be exceeded if the mortality rates of either translocated or resident animals is significantly different (alpha = 0.05) from that of control individuals.

Operation and Maintenance of the Stateline Solar Facility

Operations and maintenance activities would occur primarily within the fenced facility; however, desert tortoises may occasionally breach the fence and would then likely be taken, either by being captured and moved outside the fence into suitable habitat or by being killed or injured. We cannot reasonably anticipate the number of desert tortoises that may breach the fence during the life of the project or predict the numbers of those individuals that would be killed, injured, or captured because of the numerous variables involved. For example, we cannot predict the future numbers of desert tortoises that may reside near the project site or when an animal would then find a hole in the fence and enter the facility. We also cannot predict whether the animal would be killed, injured, or captured.

Because we cannot precisely quantify the number of individuals that are likely to be killed, injured, or captured during operations and maintenance of the proposed solar field, we will consider the amount or extent of take to be exceeded if more than two large desert tortoises are killed or wounded within the solar facility in any calendar year.

Geotechnical Investigations and Construction, Operation, and Maintenance of Linear Facilities

Determining the number of desert tortoises that are likely to be taken along linear facilities is extremely difficult. In addition to the reasons we have already discussed regarding why the take of desert tortoises is difficult to quantify, narrow linear facilities pose additional difficulty in that they most likely cross only a small portion of a desert tortoise's home territory. Consequently, desert tortoises that are detected during a survey may be absent during construction or vice versa. Additionally, the likelihood of encountering a desert tortoise varies with the time of day, season, and long- and short-term weather conditions. These same factors influence estimating the amount of take that is likely to result from geotechnical investigations because of the small amount of disturbance associated with this activity.

Consequently, we have not tried to quantify the number of desert tortoises that Stateline is likely to encounter during geotechnical investigations or the construction, operations, and maintenance of its linear facilities. Rather, because the proposed protective measures have been effective in minimizing the injury and mortality of desert tortoises in similar linear and small projects and Stateline is unlikely to find every desert tortoise it kills during construction, we will consider the amount or extent of take to be exceeded if more than two large desert tortoises are killed or wounded during geotechnical investigations and construction of the linear facilities. We will consider the amount or extent of take to be exceeded if more than two desert tortoises are killed or wounded during operations and maintenance of the linear facilities in any calendar year. We are not establishing a limit for moving desert tortoises from harm's way if they are encountered during geotechnical investigations and construction, operations, or maintenance of linear facilities. As we discussed previously, we cannot reasonably assess how many individuals are likely to be encountered during work activities and moving these desert tortoises a short distance from harm's way will not adversely affect them in a measurable manner.

Silver State South Project

The same factors that render quantifying the amount or extent of take that we described for the Stateline Project apply for the Silver State South Project. Consequently, we will not repeat the discussion but will provide our quantification in the following sections.

Construction of the Silver State South Solar Facility

We estimate that approximately 115 large tortoises and 1,053 small desert tortoises and eggs may be present within the boundaries of the solar facility. We will consider the amount or extent of take to be exceeded if 5 killed or wounded desert tortoises are found within the solar field.

We will consider the amount or extent of take to be exceeded if Silver State captures and translocates more than 107 large desert tortoises from within the solar field. We used this number because it is less than the 115 large desert tortoises upon which we based our analysis, it accounts for the number of killed or wounded desert tortoises at which the Bureau would need to re-initiate formal consultation (5), and it provides for a reasonable number of large individuals that may die but not be detected (3).

We are not establishing a re-initiation criterion for the number of small desert tortoises or eggs that would be moved out of harm's way during construction of the proposed project. We are not establishing a re-initiation criterion for the loss of eggs.

We expect that most of the eggs present within boundaries of the solar field will be destroyed. We cannot predict how many eggs desert tortoises will produce prior to the onset of construction and the number of eggs present would vary depending upon the time of the year Silver State conducts the clearance surveys. Biologists are unlikely to find many eggs because they are difficult to detect. For these reasons, predicting the number of eggs that may be taken is not possible.

The amount or extent of take of large desert tortoises established previously in this section serves as a surrogate for the number of small desert tortoises and eggs; if the amount or extent of take for large desert tortoises is exceeded, the re-initiation of formal consultation would also require re-evaluation of the effects of the action on small desert tortoises and eggs.

Translocation

We do not anticipate that the activities involved with capturing and transporting desert tortoises from the solar facility to the recipient site is likely to kill or injure any desert tortoises.

We will consider the amount or extent of take to be exceeded if Silver State kills or wounds more than 2 large desert tortoises as a result of vehicle strikes during translocation activities.

We will consider the amount or extent of take of translocated or resident desert tortoises to be exceeded if the mortality rates of either translocated or resident animals is significantly different (alpha = 0.05) from that of control individuals.

Operation and Maintenance of the Silver State South Solar Facility

We will consider the amount or extent of take to be exceeded if more than three large desert tortoises are killed or wounded within the solar field in any calendar year.

Construction, Operation, and Maintenance of Linear Facilities

We will consider the amount or extent of take to be exceeded if more than two large desert tortoises are killed or wounded during construction of the linear facilities. We will consider the amount or extent of take to be exceeded if more than two large desert tortoises are killed or wounded during operations and maintenance of the linear facilities in any calendar year. We are not establishing an upper limit for moving desert tortoises from harm's way if they are encountered during construction, operations, or maintenance of linear facilities.

Primm Substation and Ancillary Facilities

The same general factors that render quantifying the amount or extent that we described for the solar project apply for the Primm Substation and ancillary facilities; the only difference is the smaller size of the facility. Consequently, we will not repeat the discussion but will provide our quantification in the following sections.

Construction of the Primm Substation

We estimate that approximately 7 large tortoises and 60 small desert tortoises and eggs may be present within the boundaries of the substation. (We used the observations of desert tortoises noted in figure 8 of the biological assessment [Bureau and Ironwood 2013c] to establish the number of large individuals and extrapolated the number of small desert tortoises and eggs from that. We note that none of these observations were within the boundaries of the substation; however, the information in figure 9 indicates that at least some of these animals may have spent some time in the area.) We will consider the amount or extent of take to be exceeded if one large desert tortoise is found killed or wounded within the substation.

We will consider the amount or extent of take to be exceeded if Southern California Edison captures and translocates from within the substation more than seven large desert tortoises. We used this number because the small size of this area should allow for authorized biologists to find all of the large desert tortoises present.

We are not establishing a re-initiation criterion for the number of small desert tortoises or eggs that would be moved out of harm's way during construction of the proposed project. We are not establishing a re-initiation criterion for the loss of eggs.

We expect that most of the eggs present within boundaries of the Primm Substation and associated Southern California Edison facilities will be destroyed. We cannot predict how many eggs desert tortoises will produce prior to the onset of construction and the number of eggs present would vary depending upon the time of the year Southern California Edison (or its contractor) conducts the clearance surveys. Biologists are unlikely to find many eggs because they are difficult to detect. For these reasons, predicting the number of eggs that may be taken is not possible.

The amount or extent of take of large desert tortoises established previously in this section serves as a surrogate for the number of small desert tortoises and eggs; if the amount or extent of take for large desert tortoises is exceeded, the re-initiation of formal consultation would also require re-evaluation of the effects of the action on small desert tortoise and eggs.

Translocation

We do not anticipate that the activities involved with capturing and transporting desert tortoises from the substation to the recipient site is likely to kill or injure any desert tortoises.

Any desert tortoises within the Primm Substation and other Southern California Edison facilities would be translocated with animals from the Silver State South solar facility and would be placed among the same residents. Consequently, assigning animals that are wounded or killed as a result of vehicle strikes during translocation activities to either Silver State or Southern California Edison would not be practical. The same holds true for attributing different mortality rates among translocated, resident, and control desert tortoises to Southern California Edison or Silver State. Additionally, the number of desert tortoises within the Southern California Edison facilities is likely to be a small fraction of those within the Silver State South solar facility. For these reasons, we will not assign an amount of extent of take solely to the Southern California Edison facilities but will instead rely on those established for the Silver State South solar facility.

Operation and Maintenance of the Primm Substation and Ancillary Facilities

We will consider the amount or extent of take to be exceeded if more than one desert tortoise is killed or wounded within the substation in any calendar year.

Construction, Operation, and Maintenance of Linear Facilities

We will consider the amount or extent of take to be exceeded if more than one desert tortoise is killed or wounded during construction of the linear facilities. We will consider the amount or extent of take to be exceeded if more than one desert tortoises is killed or wounded during

operations and maintenance of the linear facilities in any calendar year. We are not establishing an upper limit for moving desert tortoises from harm's way if they are encountered during construction, operations, or maintenance of linear facilities.

General Considerations

The exemption provided by this incidental take statement to the take prohibitions contained in section 9 of the Endangered Species Act extends only to the action area as described in the Environmental Baseline section of this biological opinion.

These incidental take statements are separable by right-of-way grants. That is, if the project proponent for a specific right-of-way grant exceeds the anticipated amount or extent of take for that grant, the requirement to re-initiate would apply only to that grant. The Bureau must determine how work would proceed during the re-initiation process, pursuant to section 7(d) of the Endangered Species Act.

We did not include exemptions for activities associated with decommissioning of the projects because most activities would occur within fenced facilities where desert tortoises are absent. When more information becomes available at the end of the right-of-way grants, the Bureau will determine how it wants to proceed in light of the information that is available at that time. Re-authorization of industrial use of the sites may require re-initiation of formal consultation.

We have not exempted take for activities associated with the monitoring for demographic and genetic stability because the U.S. Geological Survey is not a party to this formal consultation. Additionally, the work that the U.S. Geological Survey would conduct would be more appropriately evaluated under the auspices of section 10(a)(1)(A) of the Endangered Species Act. We will coordinate with the Service's Desert Tortoise Recovery Office on this issue.

We did not have enough information to analyze the potential effects of the measures to offset the adverse effects of the proposed projects on the desert tortoise. Consequently, this biological opinion does not exempt the incidental take that may occur as a result of those future actions. The Bureau is required to follow the consultation procedures of section 7(a)(2) of the Endangered Species Act with regard to those future actions.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of desert tortoises during the construction, operation, and maintenance of the proposed facilities:

Stateline Project

1. The Bureau must condition Stateline right-of-way grant to ensure that the perimeter fence of the solar facility is sufficiently maintained to preclude desert tortoises from entering the facility.

2. The Bureau must condition Stateline right-of-way grant to reduce mortality associated with fences.

Silver State South Project

1. The Bureau must condition Silver States right-of-way grant to ensure that the perimeter fence of the solar facility is sufficiently maintained to preclude desert tortoises from entering the facility.

2. The Bureau must condition Silver State right-of-way grant to reduce mortality associated with fences.

Primm Substation and Ancillary Facilities

We do not have any reasonable and prudent measures or terms and conditions for the Primm Substation or Southern California Edison's ancillary facilities.

Our evaluation of the proposed action includes consideration of the protective measures proposed by the Bureau in the biological assessments and re-iterated in the Description of the Proposed Action section of this biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 Code of Federal Regulations 402.16).

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Bureau must ensure that Stateline, Silver State or Southern California Edison complies with the following terms and conditions, which implement the reasonable and prudent measures, and the following reporting and monitoring requirements. These terms and conditions are non-discretionary.

Stateline Project

1. The following terms and conditions implement reasonable and prudent measure 1:

a. The Bureau must require Stateline to inspect the fence around the solar facility on a quarterly basis and immediately after any rain or wind storm that has the potential to compromise the effectiveness of the perimeter fence.

b. The Bureau must require Stateline to effect repairs to the perimeter fence within 2 days of an inspection during the spring, summer, and fall. Stateline may repair the fence within a week in the winter.

2. The following term and condition implements reasonable and prudent measure 2:

The Bureau must require Stateline to install shade structures periodically along the outside of the fences around the solar facility that face habitat occupied by desert tortoises. If Stateline installs interior fences that would be in place during the active season and prior to the removal of desert tortoises from within the area of the solar facility, the Bureau must also require Stateline to include shade structures along these fences. The structures must be sufficiently large and long enough to allow the largest desert tortoises to be completely covered. Prior to the onset of construction, the Bureau must submit a plan for this activity to the Service for its review and approval; the plan must include information on the design of the structures, their spacing along fences, and a schedule for monitoring their effectiveness. The plan must also include a proposal to establish a duration for the monitoring and may include a proposal that would assist the Service in determining when daily inspections are no longer needed; these proposals should be based on observations of activity levels of desert tortoises at the project site and the degree to which translocated desert tortoises have reduced their wandering.

Silver State South Project

1. The following terms and conditions implement reasonable and prudent measure 1:

a. The Bureau must require Silver State to inspect the fence around the solar facility on a quarterly basis and immediately after any rain or wind storm that has the potential to compromise the effectiveness of the perimeter fence.

b. The Bureau must require Silver State to effect repairs to the perimeter fence within 2 days of an inspection during the spring, summer, and fall. Silver State may repair the fence within a week in the winter.

2. The following term and condition implements reasonable and prudent measure 2:

The Bureau must require Silver State to install shade structures periodically along the outside of the fences along the main access road and around the solar facility that face habitat occupied by desert tortoises. If Silver State installs interior fences that

would be in place during the active season and prior to the removal of desert tortoises from within the area of the solar facility, the Bureau must also require Silver State to include shade structures along these fences. The structures must be sufficiently large and long enough to allow the largest desert tortoises to be completely covered. Prior to the onset of construction, the Bureau must submit a plan for this activity to the Service for its review and approval; the plan must include information on the design of the structures, their spacing along fences, and a schedule for monitoring their effectiveness. The plan must also include a proposal to establish a duration for the monitoring and may include a proposal that would assist the Service in determining when daily inspections are no longer needed; these proposals should be based on observations of activity levels of desert tortoises at the project site and the degree to which translocated desert tortoises have reduced their wandering.

REPORTING REQUIREMENTS

Within 60 days of the completion of each proposed action (i.e., activities under each right-of-way grant), the Bureau must provide a report to the Service that provides details on the effects of the action on the desert tortoise. Specifically, the reports must include information on any instances when desert tortoises were killed, injured, or handled, the circumstances of such incidents, and any actions undertaken to prevent similar mortalities or injuries from re-occurring. The reports must also include a description of the monitoring efforts that the Applicants implements. In addition, the Bureau must provide an annual report by January 31 for each facility with this information; if animals are moved from harm's way during this period, the Bureau must include that information in these reports.

We also request that the Bureau provide us with the names of any monitors who assisted the authorized biologists and an evaluation of the experience they gained on the projects; the qualifications form on our website (http://www.fws.gov/ventura/sppinfo/protocols/deserttortoise_monitor-qualifications-statement.pdf), filled out for each project, along with any appropriate narrative would provide an appropriate level of information. This information would provide us with additional reference material in the event these individuals are submitted as potential authorized biologists for future projects.

DISPOSITION OF DEAD OR INJURED DESERT TORTOISES

Within 3 days of locating any dead or injured desert tortoises, you must notify the Service by telephone and by facsimile or electronic mail. The report must include the date, time, and location of the carcass, a photograph, cause of death, if known, and any other pertinent information. For the Silver State South Project and Southern California Edison's substation, please contact the Southern Nevada Fish and Wildlife Office by telephone at (702) 515-5230 or electronic mail. For the Stateline Project, please contact the Ventura Fish and Wildlife Office by

telephone (805 644-1766) and or electronic mail.

Injured desert tortoises must be taken to a qualified veterinarian for treatment. If any injured desert tortoises survive, the Bureau must contact the Service regarding their final disposition.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis, if such analysis is needed. The Service will make this determination when the Bureau provides notice that a desert tortoise has been killed by project activities.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Bureau require Stateline to mark small desert tortoises from within the Stateline project site prior to their translocation. This marking would provide some information on their status post-translocation if they are encountered during future surveys or monitoring efforts. If the Bureau determines that it will include this requirement, we suggest that the authorized biologist contact the Desert Tortoise Recovery Office to ascertain the most appropriate means of marking the animals.

2. During site visits in the vicinity of the Stateline Hills, Service staff observed copious amounts of burro scat. Because burros can trample small desert tortoises; spread weeds; disrupt the surface of the substrate and cryptogamic crusts, which facilitates the spread of weeds; and disturb or destroy shrubs that desert tortoises use for cover, we recommend that the Bureau conduct additional burro gathers in this area.

3. We recommend that the Bureau and Applicants develop a disposition plan for any nests that relocated from the project sites. We recommend that the nests be monitored periodically to ascertain whether the eggs hatched. This information may prove useful in determining whether our current guidance (Service 2009) needs revision.

4. We recommend that the Bureau require Stateline, Silver State and Southern California Edison to conduct specific searches for small desert tortoises in portions of the project areas where densities of these individuals may be greater. Biologists at the Ivanpah Solar Electric Generating System removed numerous small individuals by using search techniques specific to small desert tortoises.

5. In the Effects of the Action - Effects on Recovery section of this biological opinion, we noted that changes in any of the sampled metrics over time and among sites that rise to the level of significance (alpha = 0.05) would likely indicate changes in demographic and genetic stability and that the Bureau would be required to re-initiate formal consultation, pursuant to section 7(a)(2) of the Endangered Species Act, if this new information was related to the effects of the Silver State South or Stateline Solar Projects on connectivity. To attempt to avoid the need for re-initiation of formal consultation, we recommend that the Bureau contact the Service if changes in any of the sampled metrics differ at the alpha = 0.2 level of significance. This early warning may enable the agencies and Applicants to implement adaptive measures to avoid greater differences in the mortality rates.

6. In the Incidental Take Statement of this biological opinion, we noted that we would consider the amount or extent of take of translocated or resident desert tortoises to be exceeded if the mortality rates among these groups of desert tortoises is significantly different (alpha = 0.05). To attempt to avoid the need for re-initiation of formal consultation, we recommend that the Bureau contact the Service if the mortality rates of translocated and resident desert tortoises in comparison to control animals differs at the alpha = 0.2 level of significance. This early warning may enable the agencies and Applicants to implement adaptive measures to avoid greater differences in the mortality rates.

REINITIATION NOTICE

This concludes formal consultation on the Bureau's proposal to issue right-of-way grants to the Stateline and Silver State South projects, respectively, and to Southern California Edison for the substation and ancillary facilities. As provided in 50 Code of Federal Regulations 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

As we discussed in the Effects of the Action - Effects on Recovery section of this biological opinion, we noted that changes in any of the sampled metrics over time and among sites that rise to the level of significance (alpha = 0.05) would likely indicate changes in demographic and genetic stability; we also noted that these changes may be related to the Silver State South and Stateline Solar projects. If the changes in demographic and genetic stability are related to the Silver State South and Stateline Solar projects, this new information would reveal effects of the agency actions that may affect the desert tortoise in a manner or to an extent that we did not consider in this biological opinion.

In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending re-initiation.

If you have any questions, please contact Ray Bransfield of my staff at (805) 644-1766, extension 317, or Michael Burroughs of the Southern Nevada Fish and Wildlife Office at (702) 515-5242.

Appendices

1 - Mojave population of the desert tortoise (*Gopherus agassizii*). 5-year review: summary and evaluation. Available on disk or hard copy by request or at http://ecos.fws.gov/docs/five_year_review/doc3572.DT%205Year%20Review_FINAL.pdf.

2 - Methodology used to estimate the number of desert tortoises and eggs present in the action area.

Appendix 2. Estimating the Number of Large Desert Tortoises in the Ivanpah Valley

California portion

Average density of large desert tortoises in the Ivanpah Critical Habitat Unit (Service 2009b, 2012a, 2012b, 2012e, 2012f) = 9.7/square mile

Modeled desert tortoise (does not include the Primm Valley Golf Course, Ivanpah Solar Electric Generating System, joint port of entry, etc.) (Darst 2013) = 258.18* square miles

9.7/square mile x 258.18* square miles = 2,504.35 large desert tortoises

Nevada portion

Estimated density of large desert tortoises from past surveys in the northern part of the valley (Ironwood 2012b) = 8.1/square mile

Modeled desert tortoise (does not include Primm, the Silver State North Project, Walter M. Higgins Generating Station, etc.) (Darst 2013)= 255.32* square miles

8.1/square mile x 255.32* square miles = 2,068.09 large desert tortoises

Total
2,504.35 + 2,068.09 = 4,572.44 large desert tortoises

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United States Department of the Interior

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IN REPLY REFER TO
08EVEN00-2014-B-0004-FWS-2014-00016

December 6, 2013

Memorandum

To: Field Manager, Needles Field Office, Bureau of Land Management, Needles, California

Assistant Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada

From: Acting Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

Subject: Errata for the Biological Opinion for First Solar's Stateline and Silver State Solar South Projects, San Bernardino County, California and Clark County, Nevada (Stateline: 2800(P), CACA-048669, CAD090.01; Silver State South: 6840 (NV-052))(Stateline: 8-8-13-F-43; Silver State South: 84320-2010-F-0208-R003)

After we issued the referenced biological opinion on September 30, 2013, we became aware of several errors in the final document. Through this memorandum, we acknowledge these errors and provide corrected information.

Page 26. The final biological opinion omitted a portion of a paragraph that appeared in the draft biological opinion we provided to the Bureau of Land Management and First Solar for their review. The wording of the portion of the paragraph that we inadvertently omitted from the final biological opinion is the same as that in the draft document, with the exception that we corrected the estimate of the number of affected desert tortoises. This paragraph follows in its entirety.

> Since the completion of the 5-year review, the Service has issued several biological opinions that affect large areas of desert tortoise habitat because of numerous proposals to develop renewable energy within its range. These biological opinions concluded that proposed solar plants were not likely to jeopardize the continued existence of the desert tortoise primarily because they were located outside of critical habitat and desert wildlife management areas that contain most of the land base required for the recovery of the species. The proposed actions also included numerous measures intended to protect desert tortoises during the construction of the projects, such as translocation of affected individuals. In aggregate, these projects resulted in an overall loss of approximately 35,100 acres of habitat of the desert tortoise. We also predicted that these projects would translocate, injure, or kill up to 1,528 desert tortoises (see table below); we concluded that most of the individuals in these totals would be juveniles. The mitigation required by

> the Bureau and California Energy Commission, the agencies permitting these facilities, will result in the acquisition of private land within critical habitat and desert wildlife management areas and funding for the implementation of various actions that are intended to promote the recovery of the desert tortoise. Although most of these mitigation measures are consistent with recommendations in the recovery plans for the desert tortoise and the Service continues to support their implementation, we cannot assess how desert tortoise populations will respond because of the long generation time of the species.

Page 27. The final biological opinion depicted the Estimated Number of Desert Tortoises Onsite to be 1,529; the correct number is 1,528. This number also appears in the previously omitted paragraph that we included above.

Page 37. The first sentence of the third paragraph on this page states: "The Service has issued two biological opinions for the construction and operation of two photovoltaic solar facilities located within the action area." Although the Silver State North Project generates electricity via photovoltaic panels, the Ivanpah Solar Electric Generating System uses thermal technology. Consequently, we correct this sentence to read: "The Service has issued two biological opinions for the construction and operation of two solar facilities located within the action area."

Pages 37 and 38. On page 37 of the final biological opinion, we noted that BrightSource had reported 25 deaths among desert tortoises that it was monitoring; however, the table on page 38 provided information on only 24 deaths. In rechecking reports from BrightSource, we determined that the actual number of monitored desert tortoises that had been found dead was 26.

The following text and table correct these errors.

> To date, 26 desert tortoises have died but no significant difference exists among control, resident, and translocated animals (Service 2013e; see following table); most of the deaths resulted from predation. Two deaths can be attributed to project activities. We expect that at least a few additional animals died during construction and were not detected.

	Treatment of Desert Tortoises				
Cause of Death	**Control**	**Resident**	**Translocated**	**Holding Pen**	**Total**
Canid Predation	2	5	4	-	11
Hyperthermia[1]	3	2	1	-	6
Vehicle Strike	1	1	-	-	2
Livestock Trampling	-	-	1	-	1
Unknown	2	1	1	1	5
Golden Eagle Predation	-	-	1	-	1
Total	8	9	8	1	26

Page 86. The summary of our findings for the Stateline Solar Project in the Conclusion section of the biological opinion contained the misstatement that 0.3 percent of suitable habitat in the Eastern Mojave Recovery Unit would likely be lost as a result of the proposed action. The correct percentage is 0.03, as stated on page 84 of the final biological opinion. The revision of this paragraph for the Stateline Solar Project follows.

3. The proposed action will not appreciably reduce the distribution of the desert tortoise in the action area because it would result in the loss of approximately 0.03 percent of suitable habitat in the Eastern Mojave Recovery Unit. Construction of the project would result in a net loss of desert tortoise habitat and is likely to impair connectivity to some degree in the linkage between the project site and the Clark Mountains. This linkage has already been compromised to a large degree by the Ivanpah Solar Electric Generating System, DesertXpress, Primm, and the Large-Scale Translocation Site. Additionally, the point of constriction that the proposed action would cause would be short in length and natural features in that area also pose constraints to connectivity. The Bureau and Stateline will fund and implement numerous measures to improve management of the remaining habitat for desert tortoises in the surrounding area. These measures include expanding the Ivanpah Desert Wildlife Management Area by approximately 42 square miles; this change in management direction would increase the emphasis on protection of desert tortoises in the remaining habitat.

The changes described in this document involve the correction of typographical or minor mathematical errors. None of the changes involve the factors that would necessitate the re-initiation of consultation, as described in the implementing regulations for section 7(a)(2) of the Endangered Species Act of 1973, as amended (50 Code of Federal Regulations 402.16). Consequently, these changes do not require the re-initiation of formal consultation.

We appreciate the readers who made us aware of these errors and regret any inconvenience that they may have caused. If you have any questions, please contact Ray Bransfield or Rachel Henry of my staff at (805) 644-1766, extension 317 and 333, respectively.

APPENDIX 3

MINOR CLARIFICATIONS OF PA/EIS/EIR

The BLM prepared the PA/EIS/EIR for the SSFP in consultation with other agencies, taking into account public comments received during the FLPMA and NEPA process undertaken for the Project. The PA/EIS/EIR described the Proposed Action and alternatives (including the agency preferred alternative), analyzed the proposed CDCA Plan Amendment and Project decisions, and responded to written comments received during the public review period for the Draft PA/EIS/EIR (see Final PA/EIS/EIR Chapter 5, *Consultation, Coordination and Public Involvement*, and Appendix G, *Responses to Comments*). Review of the PA/EIS/EIR by the BLM and others has resulted in the minor corrections and clarifying statements listed below. Revisions to language as it appears in the PA/EIS/EIR are indicated as follows: Quoted language is *italicized*, new language is shown in *underscore*, and deleted language is shown in *strikethrough*. None of these minor corrections and clarifying statements affects the adequacy of the underlying NEPA analysis in the PA/EIS/EIR.

- The location of the proposed Southern Nevada Supplemental Airport, indicated by the number "21" shown on Figure 4.1-1, in the Final PA/EIS/EIR is incorrect. The actual location of the airport is further south, about halfway between the number "4" and the number "20".

- The means of traffic access to the Southern Nevada Supplemental Airport in Section 4.16 has been clarified. The revised text is:

  Operation of the Southern Nevada Supplemental Airport may incrementally increase traffic on I-15 at certain times; however, it is anticipated that the majority of traffic would occur on the I-15 between ~~Primm~~ Sloan and Las Vegas Nevada. Conversely, the Southern Nevada Supplemental Airport may incrementally decrease traffic south of Sloan if people choose to travel by airplane instead of automobile.

- The discussion of potential impacts to air navigation in Section 4.18 has been clarified. The revised text is:

  The closest major commercial service ~~public~~ airport that serves the valley is McCarran Airport in Las Vegas, nearly 24 miles northeast of the project. Two general aviation public airports (Henderson Executive Airport and Jean Sports Aviation Center) are closer, with the Jean Airport located approximately 15 miles northeast of the proposed project. The planned Southern Nevada Supplemental Airport (analysis of the airport is currently suspended) may be constructed north of Primm, approximately 3 miles northeast of the proposed project (FAA 2012). Although FAA has not made an examination of the glint and glare impacts of the proposed project, existing PV solar array projects installed near airports or on air force bases that have undergone FAA or U.S. Air Force review in the past have been determined to be "no hazard to air navigation." The FAA is currently in the process of developing formal standards for glint and glare associated with PV solar arrays on and near airports, and conducts specific reviews at its discretion. ~~The SunPower Solar Module Glare and Reflectance Technical Note T09014 (SunPower 2009) notes that existing PV solar array projects installed near airports or on air force bases have passed Federal Aviation Administration (FAA) or Air Force standards, and been determined as "no hazard to air navigation". The possible glint and glare from PV panels are at safe levels, and usually considerably lower than other common reflective surfaces. There would be no hazard to existing or planned airport operations from glint and glare effects of the proposed facility.~~

- The discussion of the planned removal of fencing at the Large-Scale Translocation Site (LSTS) on pages 4.22-13 and 4.22-48 has been clarified. The revised text in both locations is:

Removal of the fencing around the LSTS in Nevada west of I-15, which is contemplated ~~planned~~ for the future, would ~~will~~ improve connectivity between and among desert tortoise populations.

- The statement of the CEQA significance criterion for noise impacts on Page 4.9-2 was incorrectly modified in the Final PA/EIS/EIR. The correct criterion is:

  NZ-3: Result in a substantial permanent ~~long-term~~ increase in ambient noise levels above levels existing without the project.

- The statement of the CEQA significance conclusion for noise impact NZ-4 was incorrectly modified in the Final PA/EIS/EIR. The revised text is:

  Temporary noise during construction, as measured in dBa L_{max}, would exceed the EPA standards of 45 dBA L_{eq} for indoors and 55 dBA L_{eq} for outdoors at the residence during individual pass-by events, as well as the County standard of 45 dBA L_{eq} at night. Although these ~~However, these~~ exceedances would be intermittent and temporary, they would still be significant and unavoidable, even with mitigation measures. ~~and would not be considered a significant impact, as the L_{max} values are not directly comparable to the L_{eq} standards. Therefore, the temporary noise would be a less than significant impact.~~

- The numbers of tortoise discussed in Section 4.22 of the FEIS/FEIR addressed only adult tortoises, and did not include all tortoises regardless of size. To respond to this comment, Table 4.22-1 is revised as follows:

Table 4.22-1. Desert Tortoise Survey Results

	Alternative 1 (Proposed Action)	**Alternative 2**	***Revised* Alternative 3**	**Alternative 4**
Adult Tortoises[1]				
Live Adult Tortoises Observed	16	*25*	*14*	*18*
Estimated Number of Adult Tortoises	40	*62*	*35*	*45*
Lower 95% Confidence Interval	15	*24*	*13*	*17*
Upper 95% Confidence Interval	107	*160*	*93*	*118*
Juvenile Tortoises[2, 3]				
Estimated Number of Juvenile Tortoises	365	566	317	411
Lower 95% Confidence Interval	137	219	118	155
Upper 95% Confidence Interval	977	1461	853	1077

[1] Adult tortoises are assumed to be greater than 160mm MCL.
[2] Juvenile tortoises are assumed to be less than 160mm MCL.
[3] Juvenile estimates are based on size class ratios (Turner et al. 1987; Service 2011) applied to adult estimates.
[4] Adult (estimate of 18) and juvenile (estimate of 162) tortoises potentially encountered within linear project components are not included in the table above. These estimates are expected to be similar between each alternative.
[5] Adult (estimate of 2 during each calendar year) and juvenile (estimate of 18 during each calendar year) tortoises potentially encountered during the O&M phase for both the solar farm and linear components are not included in the table above. These estimates are expected to be similar between each alternative.

- Additional comments were received which were on documents other than the EIS, or which did not require modifications to the EIS. Specifically, the CDFW provided technical comments on the sufficiency of the Tortoise Translocation Plan. Those comments are being addressed through revisions to that plan by the Applicant, in consultation with CDFW.

APPENDIX 4

ADOPTED MITIGATION MEASURES

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
Air Resources			
MM-Air-1: Air Quality Construction Management Plan. The Applicant shall implement their Air Quality Construction Management Plan (First Solar 2012c) that describes the fugitive dust control measures that would be implemented and monitored at all locations of proposed facility construction. This plan shall comply with the mitigation measures described in the Fugitive Dust Control Rules enforced by MDAQMD (Rule 403.2), as well as the existing SIP available for PM_{10} and $PM_{2.5}$, and the BLM Fugitive Dust/PM_{10} Emissions Control Strategy for the Mojave Desert Planning Area. The plan shall be submitted to MDAQMD no less than 60 days prior to the start of construction. The plan shall be incorporated into all contracts and contract specifications for construction work. The plan shall outline the steps to be taken to minimize fugitive dust generated by construction activities by: • Describing each active operation that may result in the generation of fugitive dust; • Identifying all sources of fugitive dust, e.g., earth moving, storage piles, vehicular traffic; • Describing the control measures to be applied to each of the sources identified. The descriptions shall be sufficiently detailed to demonstrate that the best available control measures required by the air quality districts for linear projects are used; and • Providing the following control measures, in addition to or as listed in the applicable rules but not limited to: - Frequent watering or stabilization of excavation, spoils, access roads, storage piles, and other sources of fugitive dust (parking areas, staging areas, other) if construction activity cause persistent visible emissions of fugitive dust beyond the work area; - Use of street sweeping and trackout devices at the construction site. Sweep streets daily (with water sweepers) if visible soil material is carried into adjacent public streets or wash trucks and equipment before entering public streets; - Apply chemical soil stabilizers or apply water to form and maintain a crust on inactive construction areas (disturbed lands that are unused for four consecutive days); - Cover stockpiles and suspend construction work when winds exceed 30 miles per hour; - Pre-watering of soils prior to clearing and trenching; - Pre-moisten, prior to transport, import and export dirt, sand, or loose materials; - Installing temporary coverings on storage piles when not in use. Cover loads in haul trucks or maintain at least six inches of free-board when traveling on public roads; - Dedicating water truck or high/capacity hose to any soil screening operations; - Minimizing drop height of material through screening equipment; - Reducing the amount of disturbed area where possible; and		During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
- Planting vegetative ground cover in disturbed areas as soon as possible following construction activities. The Applicant or its designated representative shall obtain prior approval from the MDAQMD prior to any deviations from fugitive dust control measures specified in the Air Quality Construction Management Plan. A justification statement used to explain the technical and safety reason(s) that preclude the use of required fugitive dust control measures shall be submitted to the appropriate agency for review. The provisions of the Air Quality Construction Management Plan shall also apply to project decommissioning activities.			
MM-Air-2: Construction Emissions Reduction. The Applicant shall implement the following measures to reduce emissions during construction: • All off-road diesel-powered construction equipment with a rating greater than 50 horsepower shall utilize engines compliant with U.S. Environmental Protection Agency (EPA) Tier 3 or higher non-road engine standards, where available. In addition, all retrofitted construction equipment shall be outfitted with Best Available Control Technology devices certified by the California Air Resources Board (CARB). Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 2 or Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations; • As feasible, reduce emissions of particulate matter and other pollutants by using alternative clean fuel technology such as electric, hydrogen fuel cells, and propane-powered equipment or compressed natural gas-powered equipment with oxidation catalysts instead of gasoline- or diesel-powered engines; • Ensure that all construction equipment is properly tuned and maintained and shut off when not in direct use; • Prohibit engine tampering to increase horsepower; • Locate engines, motors, and equipment as far as possible from residential areas and at least 300 feet from sensitive receptors, such as schools, daycare centers, and hospitals; • Provide carpool shuttles and vans to transport construction workers to and from construction sites, thus eliminating some private vehicle trips; • Arrange for food catering trucks to visit the Proposed Action twice a day, if commercially available; • Reduce construction-related trips of workers and equipment, including trucks; • Require that on-road vehicles be less than 10 years old. The Applicant shall also consult with the MDAQMD to identify other potential control measures not identified above. The Applicant or its designated representative shall submit a plan specifying these additional measures and related construction contract specifications to the agencies involved in the environmental		During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
review and permitting process for the proposed facility, to the extent applicable under rules and regulations (BLM, EPA, MDAQMD), prior to construction activities. The Applicant shall prepare and maintain documentation that demonstrates implementation of the proposed emission reduction measures and required mitigation measures. The following documents and/or files shall be submitted to the agencies involved in the environmental review and permitting process for the proposed facility: • Inventory of all equipment used during each construction activity. At a minimum, this inventory shall include an equipment description, equipment identification, identification of type of engine(s), and engine emission data; and • The CARB Diesel Off-Road On-line Reporting System (DOORS) for registration shall be used to certify conformance with the tiered engine certification.			
MM-Air-3: Operations Emissions Reduction. The Applicant shall implement the following measures to reduce emissions during operations and maintenance activities: • The Applicant shall control fugitive dust from the unpaved roads on the site during operation using the following methods; • The main access road for employees and deliveries to the maintenance complex shall be paved as early during construction as practical; • The other unpaved roads at the site shall be stabilized using water or soil stabilizers so that vehicle travel on these roads does not cause visible dust plumes; • ~~Traffic speeds on unpaved roads shall be limited to no more than 15 miles per hour~~. *Traffic speeds on unpaved roads shall be limited to no more than 25 miles per hour within the desert tortoise fenced areas and 15 miles per hour outside the fenced areas.* Traffic speed signs shall be displayed prominently at all site entrances and at egress point(s) from the central maintenance complex; • All on-site off-road equipment and on-road vehicles for operation/maintenance shall be new equipment that meets the recent California Air Resources Board engine emission standards or alternatively fueled construction equipment, such as compressed natural gas, liquefied natural gas, or electric, as appropriate; • All equipment shall be turned off when not in use. Engine idling of all equipment shall be minimized; and • All equipment engines shall be maintained in good operating condition and in proposed tune per manufacturers' specification.	Traffic speed limits will act both to protect wildlife and to reduce air emissions. The lower speed limit of 15 mph was developed specifically for wildlife protection, and is not necessary for air emissions. Therefore, a higher speed limit inside the fenced areas is appropriate.	During operations and maintenance	BLM
Archaeological and Built Environment			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
~~**MM-CULT-1: SHPO Consultation.**~~ ~~The BLM made its determinations of eligibility and findings of effect for the project in consultation with the SHPO and other consulting parties, including Indian tribes. The BLM found that there would be no adverse effect to historic properties. A Memorandum of Agreement (MOA) is not necessary because there are no adverse effects.~~ ~~In the consultation letter dated November 1, 2012, BLM developed and the SHPO concurred on seven measures that will be required of the Applicant. These measures are:~~ ~~1. Archaeological sites that can be protected from direct impacts, but are within 50 feet, including buffer areas, of proposed construction activities will be identified and labeled as Environmentally Sensitive Areas (ESAs). This includes archaeological sites determined eligible for inclusion in the NRHP and sites that have not been formally evaluated, but are being treated as eligible and avoided for project management purposes.~~ ~~2. The ESAs will be designated by marking the boundaries of sites with appropriate buffer zones (generally a buffer of 20 feet beyond the outer limits of the site extent, as demonstrated by surface and/or subsurface indications) using temporary fencing or other easily recognizable boundary defining materials. These areas will be shown on the engineering plans for the project as off limits to construction activities.~~ ~~3. Once established, an ESA will define areas where construction can occur while preventing construction activities and damage to archaeological resources within the designated ESA.~~ ~~4. ESAs will be identified and established by a qualified archaeologist prior to initiation of ground disturbing activities and will be maintained for the duration of the work effort in the ESA vicinity.~~ ~~5. Qualified archaeologist(s) will be on site during construction to observe grading, trenching or other excavation for any facilities, roads or other project components related to the undertaking near ESAs and in other areas determined appropriate for full-time monitoring.~~ ~~6. The Applicant will develop procedures for archaeological monitoring, post-review discovery and unanticipated effects and submit to BLM for review and consultation with consulting parties.~~ ~~7. The BLM will require the Applicant to develop and implement a Long Term Management Plan (LTMP) for the post-construction monitoring and condition assessment of sites in the APE which could be subject to project operations and maintenance activities.~~	Removed to reduce repetition of measures, see MM-CULT 2, 3 and 4.	Prior to construction	BLM
MM-CULT-2: Monitoring. The Applicant will retain a qualified archaeologist(s) to conduct full-time monitoring of all areas of the Project during ground disturbing activity. The archaeological monitor shall have a working knowledge of the Project area and will be competent to identify the range of cultural resources known to exist in the vicinity of the Project. The monitor will have the responsibility to temporarily stop construction activities to inspect areas where ground disturbance has potentially revealed cultural resources. The monitor shall have the responsibility to stop all construction activities in the event an unanticipated cultural resource is located. The Applicant shall suspend construction activities until the archaeologist has inspected the discovery and determined any required or recommended treatment for the resource(s).	Added specific language from the SHPO consultation.	During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
The monitoring plan must include the following measures: 1. Archaeological sites that can be protected from direct impacts, but are within 50 feet, including buffer areas, of proposed construction activities will be identified and labeled as Environmentally Sensitive Areas (ESAs). This includes archaeological sites determined eligible for inclusion in the NRHP and sites that have not been formally evaluated, but are being treated as eligible and avoided for project management purposes. 2. The ESAs will be designated by marking the boundaries of sites with appropriate buffer zones (generally a buffer of 20 feet beyond the outer limits of the site extent, as demonstrated by surface and/or subsurface indications) using temporary fencing or other easily recognizable boundary defining materials. These areas will be shown on the engineering plans for the project as off limits to construction activities. 3. Once established, an ESA will define areas where construction can occur while preventing construction activities and damage to archaeological resources within the designated ESA. 4. ESAs will be identified and established by a qualified archaeologist prior to initiation of ground disturbing activities and will be maintained for the duration of the work effort in the ESA vicinity. 5. Qualified archaeologist(s) will be on site during construction to observe grading, trenching or other excavation for any facilities, roads or other project components related to the undertaking near ESAs and in other areas determined appropriate for full-time monitoring.			
MM-CULT-3: ~~Unanticipated~~ Post-Review Discoveries Plan. Prior to any construction activity, the Applicant's archaeologist shall implement an unanticipated discovery plan that will describe, in detail, the actions to be taken in the event archaeological resources, including human remains, are inadvertently discovered during the course of construction activities. This plan would require compliance with all governing laws.		Prior to and during construction	BLM
MM-CULT-4: Long Term Management and Monitoring Plan. The applicant is responsible for protection of any historic properties located within and adjacent to the area of potential effects by monitoring the condition of these cultural resources at regular intervals. In accordance with the measures required by the BLM in consultation with the SHPO, within two months of the end of construction the applicant will provide the BLM– a Long Term Management and Monitoring Plan for Historic Properties and Cultural Resources Located within and Adjacent to the Stateline Solar APE. The report will provide a summary of all cultural resources that were recorded or revisited prior to and during construction of the facility. The report will be designed to monitor the conditions of Historic Properties in order to determine any direct and indirect effects that could take place within the 30-year grant period. The report will describe how baseline data will be collected and how monitoring that baseline data at regular intervals will help to identify any expected or unforeseen effects that operation of the facility may have. If at any time during the 30 year grant life historic properties or unevaluated cultural resources are impacted or affected, the applicant's consultant will report any and all such occurrences. If any impacts or effects appear to be adverse, the BLM will consult with the SHPO to determine a resolution to the adverse effects. The report will also include reporting on the condition of any artifacts that are placed into a curation facility and notify the BLM in the event that conditions within the curation facility pose a risk to the preservation of the artifacts and associated curated material. Prior to developing this report, the BLM recommends that the applicant's consultant coordinate with the BLM on the	Added to clearly define the long term monitoring requirements.	Post construction	

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
content of the report, the intervals at which monitoring shall take place, and the standards for reporting**.**			
MM-CULT-5: <u>GEOARCHAEOLOGICAL ASSESSMENT AND REPORT:</u> Testing at specific cultural sites located within the original APE resulted in the identification of a variety of cultural resources within surface and subsurface contexts. Due to the dynamic nature of deposition on the playa, surface characteristics alone along with the subsurface testing that has taken place are not sufficient. . . The applicant shall retain the services of a qualified geoarchaeologist to design data collection methods that can address specific research goals, including but not limited to: • Detailing the geomorphic context and geological background as it relates to site formation processes and the preservation of cultural resources. • Describing the past environment and changing conditions that have impacted depositional processes, and how those changes affect the spatial distribution of surface and subsurface cultural resources. • Understanding the local depositional regime in order to determine the extent, ages and duration of past maximum lake stands, which will serve to provide baseline data by which to place any cultural resources located along the margins of the lake into context. • Understanding the depositional context in order to anticipate at what depths cultural resources have no potential to be present when the age of deposition exceeds the dates commonly accepted when humans were present in this portion of North America. During the geotechnical investigation a geoarchaeologist shall be involved in the planning and execution of that testing so it can serve as the first stage of geoarchaeological data collection. The geoarchaeologist will work with the geotechnical firm to collect initial data that can address the research domains previously summarized. Further, the applicant shall allow the geoarchaeologist to conduct additional studies beyond those associated with the geotechnical studies if the geoarchaeologist demonstrates how additional studies will address specific research goals. The geoarchaeologist shall produce a report to professional standards that will be utilized to guide the design and implementation of all archaeological monitoring. The geoarchaeologist shall be qualified to identify artifacts in the Colorado or Mohave Deserts, so there will not be the need to employ a separate archaeological monitor during geotechnical testing providing the geoarchaeologist is present.	Required in conjunction with the geotechnical testing to provide required subsurface information and inform the project's monitoring requirements.	Prior to and during construction.	
Lands and Realty			
MM-Lands-1: The project shall be designed to accommodate existing uses, including the Primm groundwater wells and pipeline. If disturbance or modification of existing uses were necessary, the Applicant shall coordinate with the owners to determine an acceptable solution. Any such solutions/agreements shall be prepared in writing and submitted to the BLM and County.		Prior to construction	BLM
MM-Lands-2: The Decommissioning Plan shall ensure compliance with all applicable federal, State, and local plans, policies, and regulations at the time of decommissioning.		Prior to decommissioning	BLM
Noise			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
MM-Noise-1: Noise Mitigation. Noise impacts from construction shall be mitigated to minimize effects on individuals, sensitive areas, fauna, and livestock. Noise levels would comply with local regulations. Noise standards developed to comply with those regulations shall be provided to the construction contractors for implementation and shall be enforced by construction inspectors using portable sound level meters to monitor noise levels. The Applicant shall also ensure that construction equipment would be operated on an as-needed basis and shall be maintained according to manufacturer specifications to minimize noise impacts. 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. The use of truck engine compression brakes shall be limited to emergencies.		During construction	BLM
MM-Noise-2: Notification Prior to Construction. Construction haul trucks would pass within 250 feet of a residence and construction activities would occur adjacent to the Primm Valley Golf Club. To help ensure that these areas are not affected by noise and vibration levels, the Applicant shall give advance notice to landowners prior to construction, limit the hours during which construction activities are conducted, and ensure that construction proceeds quickly through such areas. In the event that the contractor expects noise levels to exceed regulated noise standards (based on the types of construction equipment or procedures), notice shall be given to the Applicant so that immediate additional noise mitigation measures could be instituted.		Prior to construction	BLM
MM-Noise-3: Noise Complaint Documentation and Resolution. Throughout the construction and decommissioning phases, the Applicant shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The Applicant shall set up a communication line or procedures to enable individuals to contact the company in the event that construction noise levels affect them. In such circumstances, the Applicant shall conduct noise assessments to ensure that the noise attributable to construction does not exceed 55 dBA L_{eq} at noise sensitive land uses. In the event that noise cannot meet regulated levels, the Applicant shall develop an acceptable alternative construction or decommissioning work plan.		During construction and decommissioning	BLM
MM-Noise-4: Noise Mitigation. If the noise attributable to the operation of any on-site equipment used for maintenance activities exceeds 55 dBA L_{dn} at any noise sensitive land use, the Applicant shall implement noise mitigation measures at the receptor location, such as installation of windows with a Sound Transmission Class Rating acceptable to achieve a 45 dBA interior noise level, sound wall, etc. As such, the Applicant would minimize noise impacts to help ensure that project-related operations would not result in a significant effect on the ambient sound level.		During operations and maintenance	BLM
Paleontology			
MM-Paleo-1: Pre-Construction Ground Survey. Prior to construction, a field survey should be conducted by a qualified paleontologist for the geological units classified as PFYC 3b with an unknown potential for containing paleontological resources. The Applicant should provide the survey team with maps and drawings showing the footprint of the installation, construction lay down areas, facilities, and intended roadways. The maps should identify all areas where ground disturbance is or may be anticipated. The drawings should show the location, depth, and extent of all ground disturbances and should be at a scale of		Prior to construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
1 inch = 40 feet to 1 inch = 100 feet range. Should the footprint of the project or its linear facilities change, then the project owner shall provide maps and drawings reflecting those changes to the Project Paleontologist and BLM's Authorized Officer to determine if additional survey is required. If construction of the Stateline Solar Farm project is to proceed in stages, maps and drawings may be submitted prior to the start of each stage. A letter identifying the proposed schedule should be provided to the Project Paleontologist and BLM's Authorized Officer. Before work commences, the Applicant shall notify the Project Paleontologist and BLM's Authorized Officer of any construction phase scheduling changes. At a minimum, the project owner should ensure that the Project Paleontologist consults weekly with the project superintendent or construction field manager to confirm the area(s) to be worked the following week until ground disturbance is completed.			
MM-Paleo-2: Pre-Construction Training. Prior to construction, a training session on the recognition of the types of paleontological resources that could be encountered within the project area and the procedures to be followed if they are found shall be presented to project construction personnel by a qualified and BLM-permitted professional paleontologist.		Prior to construction	BLM
MM-Paleo-3: Paleontological Mitigation and Monitoring Plan. Should paleontological monitoring conducted as part of mitigation measure MM-Paleo-1 determine that areas of high paleontological sensitivity exist and could be impacted, the Project Paleontologist would implement a Paleontological Mitigation and Monitoring Plan (PMMP) in accordance with the provisions of the California Environmental Quality Act, the County of San Bernardino regulations, and the proposed guidelines of the Society of Vertebrate Paleontology (Scott 2009). The plan shall be implemented by a qualified vertebrate paleontologist as defined in the County of San Bernardino Development Code §82.20.040 (Scott 2009), and must include surveys and mitigation, as specified in Section .08(E)(3) of Manual 8270 (BLM 1998). Under §82.20.040 a qualified vertebrate paleontologist holds an advanced degree (Master's or higher) in geology, biology, or a related discipline (excluding archaeology) and has at least five years experience with collecting, identifying, and curating paleontological (not including cultural) resources.		Prior to and during construction	BLM
MM-Paleo-4: Recovery, Identification, and Curation of Specimens. If construction or other project personnel discover any potential fossils during construction, project operation and maintenance, or decommissioning, the fossils shall be left undisturbed and the BLM Authorized Officer shall be notified immediately. Ground-disturbing activities within the immediate area would be temporarily stopped in the event of an unanticipated paleontological discovery in the course of subsurface disturbance. Qualified paleontologic personnel would recover, identify, and curate specimens identified during the field survey or monitoring program. Specimens would be recovered; prepared in such a way as to allow identification, stabilized, identified, permanently preserved, and curated into the collections of the Division of Geological Sciences of the SBCM. The Applicant would obtain a written repository agreement with the SBCM prior to commencement of the Proposed Action. Mitigation of adverse impacts to significant paleontologic resources would be considered incomplete until all collected specimens have been accessioned into the SBCM's collection. Procedures for the retention of specimen provenance information, specimen identification, and specimen curation would be detailed in the PMMP. To expedite salvage of a paleontological resource, the Project Paleontologist would have the authority to request the assistance of Proposed Action resources (e.g., heavy machinery or construction staff) to remove		During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
the resource and relocate it to a designated stockpile area. Construction would resume at the discovery location after the Project Paleontologist has authorized Proposed Action activities to resume. The Project Paleontologist would identify and curate recovered paleontological specimens and prepare a report detailing the finding, presenting an analysis on the potential for additional paleontological resources, and preparing recommendations for implementation of additional mitigation measures.			
Public Health and Safety			
MM-PH&S-1: ~~Prior to beginning construction,~~ *Prior to the installation of any structures or facilities,* the Applicant shall complete their proposed geotechnical study to evaluate soil conditions and geologic hazards on the project site and submit it for approval to the BLM. The geotechnical study must be signed by a California-registered professional engineer and must identify the following: • Presence, if any, of potentially detrimental soil chemicals, such as chlorides and sulfates; • Appropriate design measures for protection of reinforcement, concrete, and metal-structural components against corrosion (such as use of corrosion-resistant materials and coatings, increased thickness of project components exposed to potentially corrosive conditions, and use of passive and/or active cathodic protection systems); • Location of fault traces and potential for surface rupture; • Potential for seismically induced ground shaking, liquefaction, landslides, differential settlement, and mudflows; • Stability of existing cut-and-fill slopes; • Collapsible or expansive soils; • Foundation material type; • Potential for wind erosion, water erosion, sedimentation, and flooding; • Location and description of unprotected drainages that could be impacted by the proposed development; and • Recommendations for placement and design of facilities, foundations, and remediation of unstable ground. Studies shall conform to industry standards of care and American Society for Testing and Materials (ASTM) standards for field and laboratory testing. Study results and proposed solutions shall be provided for review and approval to the BLM at least 60 days before final project design. The Applicant shall determine the final siting of project facilities based on the results of the geotechnical study and implement recommended measures to minimize geologic hazards. The Applicant shall not locate project facilities on or immediately adjacent to a fault trace. The BLM will evaluate any final facility siting design developed prior to *authorizing construction of structures or facilities* ~~the issuance of the ROW grant~~ to	The geotechnical data is needed to support the design of structure and facilities, but is not needed to support the initiation of grading and road construction, and therefore does not need to delay those activities.	Prior to installation of structures or facilities	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
verify that geological constraints have been avoided.			
MM-PH&S-2: The Applicant shall implement their Emergency Response and Hazardous Materials Management Plan (First Solar 2012b) and submit a SPCC Plan to the BLM for approval. After receiving comments, the Applicant shall reflect all received recommendations in the final documents. Copies of the final Emergency Response and Hazardous Materials Management Plan and SPCC Plan shall be provided to the BLM and the Hazardous Materials Division of the County of San Bernardino Fire Department. The Emergency Response and Hazardous Materials Management Plan shall include the following: • "Good housekeeping" procedures shall be developed to ensure that during operation the site will be kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards. • The plan shall identify all hazardous materials that would be used, stored, or transported at the site. It shall establish inspection procedures, storage requirements, storage quantity limits, inventory control, non-hazardous product substitutes, and disposition of excess materials. The plan shall also identify requirements for notices to federal and local emergency response authorities and include emergency response plans. • The Applicant shall develop a spill prevention and response plan identifying where hazardous materials and wastes are stored on-site, spill prevention measures to be implemented, training requirements, appropriate spill response actions for each material or waste, the locations of spill response kits on-site, a procedure for ensuring that the spill response kits are adequately stocked at all times, and procedures for making timely notifications to authorities. • Secondary containment shall be provided for all on-site hazardous materials and waste storage, including fuel. In particular, fuel storage (for construction vehicles and equipment) shall be a temporary activity occurring only for as long as is needed to support construction activities. • In the event of an accidental release to the environment, the Applicant shall document the event, including a root cause analysis, appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts. Documentation of the event shall be provided to the BLM and other federal and state agencies, as required. The Applicant shall not use any hazardous materials not listed in Tables 4.11-1 and 4.11-2, or in greater quantities than those identified by chemical name in Tables 4.11-1 and 4.11-2, unless approved in advance by the BLM. The proposed soil stabilizer identified as "EccoTex" shall not be used unless a MSDS identifying its chemical content is provided, and its use is approved by BLM. The Applicant shall site all fueling, hazardous materials storage areas, and operation and maintenance activities involving hazardous materials at least 100 feet away from blue-line drainages as identified on USGS topography maps and wetlands. The waste management components of the Emergency Response and Hazardous Materials Management Plan (First Solar 2012b) shall be implemented. These components shall contain, at a minimum, the		Prior to and during construction, operations, and decommissioning	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
following: • A description of all construction, operations and maintenance, and decommissioning waste streams, including projections of frequency, amounts generated, and hazard classifications; • Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, containerization methods, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans; • Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary; • A detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and • A detailed description of how facility wastes will be managed and disposed upon closure of the facility. Any wastewater generated in association with temporary, portable sanitary facilities shall be periodically removed by a licensed hauler and either disposed in the on-site septic and leach field, or introduced into an existing municipal sewage treatment facility. Temporary, portable sanitary facilities provided for construction crews shall be adequate to support expected on-site personnel and shall be removed at completion of construction activities. Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the Applicant shall notify BLM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the Applicant contracts. The health and safety components of the Emergency Response and Hazardous Materials Management Plan (First Solar 2012b) shall be implemented. These components shall contain, at a minimum, the following: • Personal Protective Equipment; • Exposure Monitoring; • Injury and Illness Prevention; • Emergency Action; and • Fire Prevention. The health and safety program shall be developed to protect both workers and the general public during			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
construction, operation, and decommissioning of the project. Regarding occupational health and safety, the program shall identify all applicable federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; OSHA standard practices for safe use of explosives and blasting agents; and measures for reducing occupational electric and magnetic fields exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lightning protection standards). The program shall include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies shall be established.			
MM-PH&S-3: The Applicant shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be available for consultation during site characterization (if needed), demolition, excavation, and grading activities, to BLM and the County. The resume shall show experience in remedial investigation and feasibility studies. The professional engineer or professional geologist shall be given authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil and impact public health, safety and the environment. If potentially contaminated soil is identified during site characterization, demolition, excavation, or grading at either the proposed site or linear facilities, as evidenced by discoloration, odor, detection by handheld instruments, or other signs, the professional engineer or professional geologist shall inspect the site, determine the need for sampling to confirm the nature and extent of contamination, and provide a written report to the project owner, representatives of Department of Toxic Substances Control or Regional Water Quality Control Board, and the BLM stating the recommended course of action. Depending on the nature and extent of contamination, the professional engineer or professional geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If, in the opinion of the professional engineer or professional geologist, significant remediation may be required, the project owner shall contact the BLM and representatives of the Department of Toxic Substances Control for or the Regional Water Quality Control Board, for guidance and possible oversight.		Prior to and during construction	BLM
MM-PH&S-4: The Applicant shall implement their Traffic Control Plan (First Solar 2012e) for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted. This plan shall incorporate measures such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary changes in temporary lane configuration. The Applicant shall consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) shall be identified and addressed in the Traffic Control Plan. The Plan would include designation of an Emergency Response Liaison to coordinate the reduction of traffic for the duration of any emergency.		During construction	BLM
MM-PH&S-5: The Applicant shall implement their Integrated Weed Management Plan (First Solar 2013c) which identifies BMPs that would be implemented for the storage and application of herbicides used to control weeds beneath and around the solar array. The plan shall be developed to ensure that applications		During construction, operations, and	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
would be conducted within the framework of BLM and DOI policies and entail only the use of EPA-registered pesticides. Pesticide use shall be limited to non-persistent, immobile pesticides and shall only be applied in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.		decommissioning	
MM-PH&S-6: A bond to provide performance and financial assurance guarantees to ensure completion of the requirements of the approved Closure, Decommissioning, and Reclamation Plan, acceptable to BLM's Authorized Officer, shall be furnished by the Applicant prior to the issuance of a Notice to Proceed with construction or at such earlier date as may be specified by BLM's Authorized Officer. The amount of this bond shall be determined by BLM's Authorized Officer. This bond must be maintained in effect until removal of improvements and restoration of the right-of-way have been accepted by BLM's Authorized Officer. At least 30 days prior to the start of construction and prior to any Notice to Proceed with construction issued by BLM's Authorized Officer, the project owner shall provide BLM's Authorized Officer with documentation of the following: A. BLM's ROW Grant and final approved Plan of Development; B. The bond satisfactory to BLM's Authorized Officer; C. Certification that the project owner acknowledges that the Desert Stateline, LLC development and all related construction, operation, maintenance and closure activities are to be conducted in conformance with the approved Plan of Development and within the approved ROW boundaries for the life of the project.		Prior to construction	BLM
Recreation			
MM-Rec-1: Maintenance of Access to Open Routes. The applicant shall allow and be required to afford public access to the routes for which BLM grants a right of way, as noted above. By allowing public access to the routes that are redirected around the project perimeter, the current level of public access to recreational areas would be maintained.		Prior to construction	BLM
MM-Rec-2: Interpretive Features. The Applicant shall develop and install interpretive features to be located at the western Ivanpah Dry Lake Recreation Area northern access points. The interpretive features shall include: **Arrowhead Auto Trail Signs** Dark brown four inch square steel tubing posts with caps and vertical strip decals shall be installed along the Historic Arrowhead Trail (NS238) from Whiskey Pete's Hotel/Casino to Colosseum Road and intersections in between to guide visitors to recreation facilities in the vicinity of the west dry lake. Replacement vertical strip decals shall be provided to the BLM for maintenance purposes. **BLM Administrative Portal Sign**	The schedule provided in the PA/FEIS was not sufficient to guarantee completion of the measure before commercial operations begin.	Prior to substation energizing.	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
A large format BLM truncated Portal Sign (48" height x 96" width with image banner) identifying the recreation area shall be installed off of Arrowhead Highway (NN238), on the California side of the California-Nevada state line. The Portal Sign shall consist of a three-tier dark brown BLM truncated sign including agency identification, a Recreation Area landsailing yacht image banner, and Recreation Area identification with ledgestone masonry base and concrete lentil. **Interpretive Site** An interpretive site shall be located at the intersection of designated open routes NN135 and NN238, northwest of Whiskey Pete's Hotel/Casino rear parking area. The site shall consist of: • Post and cable site delineation, consistent in design with the lake bed protective barrier in the same vicinity, including the parking area and interpretive area with pedestrian walk through. • Parking area accommodating 6 automobiles and 2 pull-through spaces for vehicles with trailers. • Information Kiosk, with dark brown square tube steel construction and light brown roof with rib/standing seam panel roofing design. • Interpretation Panels, including First Solar project interpretation; Ivanpah Valley natural landmarks and ecological interpretation; Arrowhead Auto Trail history with Arrowhead Trails Association historic map; Ivanpah Dry Lake Recreation Area interpretation including sport types, rules (BLM provided), history and technology (landsailing, kite buggying, long distance archery, national and international regattas, Greenbird wind powered land speed record); BLM public land management interpretation (BLM provided); map of western Ivanpah Valley open routes and dry lake access/staging areas; and replacement panels and digital graphics provided to BLM for maintenance purposes. **BLM Recreation Site Location Signs** Two BLM truncated recreation identification signs (18" height x 54" width with landsailing yacht image) identifying Ivanpah Dry Lake Staging Areas shall be mounted on 4" X 4" posts and installed at the intersection of Arrowhead Highway (NS238) and the northwest staging area access road, and at the intersection of Arrowhead Highway (NS238) and the Eldorado Ivanpah Transmission Line road on the southwest staging area access road. ~~At least 90 days prior to commercial operation of the solar plant, the~~ *The* Applicant shall submit plans to BLM's Authorized Officer for review and approval for the interpretive site and other recreation enhancements. BLM will review and advise the Applicant within 60 days on the completeness of the plans. The owner shall address BLM's comments on the plans and resubmit for final approval prior to commercial operation. Once final approval of the plans has been received, construction of the Solar/Ecological Interpretive Site and other recreational facilities can begin, and shall be completed *prior to energization of the substation*. ~~within 6~~			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
~~months.~~			
Transportation and Public Access			
MM-Trans-1: Traffic Control Plan. The Applicant shall implement their Traffic Control Plan (First Solar 2012e) for locations along the route where local agencies (e.g., traffic engineering, public works, etc.) identify construction activities that would adversely impact the existing transportation system. Where requested by public agencies, the use of flaggers, warning signs, lights, barricades, cones, etc. will be implemented according to standard guidelines required by the affected jurisdiction. The Applicant shall ensure that the following measures are addressed in the Traffic Control Plan: • The Applicant will ensure that truck traffic is scheduled for off-peak hours to reduce impacts to public roads during periods of peak traffic periods; • The Applicant will clearly identify truck routes to be used for ingress and egress from the project site; • Where lane closures are required, the Applicant will comply with BMPs established by the Work Area Protection and Traffic Control Manual (California Joint Utility Traffic Control Committee 1996); • The Traffic Control Plan will identify traffic control measures, such as flag men, that will be implemented to ensure the safe operation of construction equipment accessing the site; • The Traffic Control Plan will include a section that describes measures to encourage employees to carpool in order to reduce the number of trips to and from the work site; • The Applicant will ensure that signs and public notices about work are distributed one week before disruptions occur, identifying detours to maintain access, the use of flagmen or escort vehicles to control and direct traffic flow, and scheduling roadway work during periods of minimum traffic flow. Notices will be posted along the construction ROW fronting Yates Well Road and Silverton Road as required by local agencies (e.g., traffic engineering, public works, etc.) that show the duration of construction activities within each roadway (e.g., which lane(s) would be blocked, at what times of day, and on what dates) at least one week in advance of construction. • The Applicant will coordinate with emergency service when drafting the Traffic Control Plan to avoid restricting movements of emergency vehicles. Police departments, fire departments, ambulance services, and paramedic services will be notified at least three days in advance by the Applicant of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness. At locations where access to nearby property is blocked, provisions would be ready at all times to accommodate emergency vehicles, such as plating over excavations, short detours, and alternate routes. • The Traffic Control Plan will detail the requirements of local agencies (e.g., traffic engineering, public works, etc.) regarding lane closures. The Applicant will restrict lane closures or obstructions on arterial and collector roadways to off-peak period in urbanized areas to mitigate traffic congestion and delays that would be caused by lane closures during construction. Such closures will be		During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
directed by the affected public jurisdiction depending on specific site conditions. • When working in or near existing roads and open routes, the Applicant will ensure that the construction contractor maintains all equipment within work areas designated by the traffic control devices. The Applicant will also ensure that the construction contractor properly loads equipment onto appropriate trucks and trailers for transport to other work sites; the contractor(s) will not be allowed to use active roadways to relocate construction equipment that are not licensed for use on public roads. • The Applicant will coordinate in advance with public transit agencies to avoid disruption to transit operations. Public transit agencies that operate bus routes on the roadways potentially affected by the proposed construction activities will be informed in advance of construction and the potential impacts at bus stop locations. Alternate pickup/drop-off locations will be determined and signed appropriately. • The Applicant will notify Federal Interagency Communications Commission for San Bernardino County to coordinate access to remote areas, and ensure that proper emergency response personnel are aware of the project. • The Applicant will coordinate with emergency service providers in advance of construction to avoid restricting movements of emergency vehicles. Police departments, fire departments, ambulance services, and paramedic services would be notified at least three days in advance by the Applicant of the proposed locations, nature, timing, and duration of any construction activities and advised of any access restrictions that could impact their effectiveness. In urban areas, the Applicant will consult with local emergency responders to establish a mutually agreeable amount of open trench. Limiting the amount of open trench will reduce detours, and ensure emergency access routes are maintained. At locations where access to nearby property is blocked, provisions would be ready at all times to accommodate emergency vehicles, such as plating over excavations, short detours, and alternate routes. • Prior to finalizing construction plans, the Applicant will work with each jurisdiction to identify land uses along the ROW with access concerns. The Applicant will develop construction schedule that to provide reasonable access to businesses (i.e., Primm Valley Golf Club), institutions, or residential areas. This may include scheduling construction to avoid certain holidays, hours, or days of the week and/or avoiding peak traffic times adjacent to residential areas. If construction activities result in closing the primary access to these areas, the Applicant will make alternative access provisions (signed/marked appropriately). In addition, the Applicant will ensure that at least one access driveway is left unblocked during business hours or hours of use. Where construction activities interfere with access to local businesses and/or residents, property owners would be notified of the potential obstructions.			
MM-Trans-2: Northbound Truck Trips on Friday Afternoon. The construction and decommissioning contractor shall not schedule any truck trips to or from the Stateline Solar Farm Project site after 3:00 p.m. on Fridays to avoid impacts to I-15 mainline traffic LOS.		During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
MM-Trans-3: Restoration of Roads. Public Roads damaged by construction activities shall be restored to their pre-construction condition as required by applicable local agency or federal requirement. The applicant shall enter into a maintenance agreement (prior to issuance of grading permits) with the Department of Public Works, Transportation Operations Division to insure all County maintained roads utilized by the construction traffic shall remain in acceptable condition during construction. Prior to occupancy/final inspection, the developer shall comply with the maintenance agreement during construction if applicable and/or assure that all County maintained roads affected by the project during construction shall be restored to pre-construction condition.		Immediately following construction	County
Vegetation Resources			
MM-Veg-1: Minimize Impacts to Vegetation Communities. Final engineering of the project shall reduce the size of the temporary construction work areas where possible and minimize the impacts to sensitive vegetation communities. Prior to the start of construction, work areas (including, but not limited to, staging areas, access roads, and sites for temporary placement of construction materials and spoils) shall be delineated with orange construction fencing or staking to clearly identify the limits of work and shall be verified by the biological monitor (MM-Veg-2) prior to ground disturbing activities. Fencing/staking shall remain in place for the duration of construction. Spoils shall be stockpiled in disturbed areas lacking native vegetation or where habitat quality is poor. To the extent possible, disturbance of shrubs and surface soils due to stockpiling shall be minimized. All disturbances, vehicles, and equipment shall be confined to the flagged areas. When feasible, construction activities shall drive and crush over vegetation rather than grading, in order to preserve the root systems. Construction equipment would drive over and crush native plants to minimize impacts to the roots of desert shrubs. Drive and crush is expected to reduce the recovery time of desert scrubs within the temporary construction areas.		Prior to construction	BLM
MM-Veg-2: Designated Biologist. Prior to ground disturbing activities, one or more individuals shall be designated by the Applicant and approved by the BLM and CDFW) as a Designated Biologist (i.e., field contact representative). A Designated Biologist will be assigned for the period during which on-going construction and post-construction monitoring and reporting by an approved biologist is required, such as annual reporting on vegetation restoration. The Designated Biologist shall have the authority and responsibility to halt activities that are in violation of the mitigation measures. To avoid and minimize effects to biological resources, the Designated Biologist(s) shall: • Notify BLM's Authorized Officer and the wildlife agencies at least 14 calendar days before initiating ground disturbing activities. • Immediately notify BLM's Authorized Officer and the wildlife agencies, in writing, if the project Applicant does not comply with any of the mitigation measures. • Conduct compliance inspections at a minimum of once per month during on-going construction after clearing, grubbing, and grading are completed, and submit a monthly compliance report to BLM's Authorized Officer until construction is complete.		Prior to and during construction	BLM and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
Prior to project initiation, the Designated Biologist(s) shall develop and implement a Worker Education Awareness Program (WEAP) and shall be available in English and Spanish. Wallet-sized cards summarizing the information will be provided to all construction and O&M personnel. The WEAP shall include the following: • An explanation of the function of flagging that designates authorized work areas. • An explanation of the sensitivity of the vegetation communities and special status plant species within and adjacent to work areas. • The importance of avoiding the introduction of invasive weeds onto the proposed Stateline site and surrounding areas.			
MM-Veg-3: Pre-Construction Soil and Plant Salvage. Prior to construction, the Applicant shall implement their Vegetation Management Plan (First Solar 2012f). The Plan would be amended to include the following requirements: **Soil Characterization and Preservation** A soil baseline characterization shall be conducted and reported to the BLM prior to site disturbance. The characterization shall include: a. Profile description of three representative pedons. (A pedon is the smallest three dimensional sampling unit displaying the full range of characteristics of a particular soil and typically occupies an area ranging from about 1 to 10 square yards [Brady and Weil, 2002]). b. Characterization of surface application (that is, is desert pavement or cryptogamic crust present). Description of cryptogamic crust shall include major groups of organisms identified at the site (filamentous cyanobacteria, other cyanobacteria, mosses, lichens, liverworts) and the characteristics by which they were identified. c. Documentation of soil macro-invertebrates (that is, presence of ants, termites, and other significant macro-invertebrates) d. Soil texture (that is, percent sand, silt, and clay), along with a reference to a widely accepted method for making the determination. e. Bulk density, along with a reference to a generally accepted method for making the determination. f. Fertility (that is, nutrient status, electrical conductivity, sodium adsorption ratio), along with methods by which composite samples were collected and the laboratory methods used to determine these properties. Composite samples shall contain equal contributions from at least six randomly-located collection points within the soil donor area.		Prior to construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
g. Organic matter content and total carbon and nitrogen content, along with a reference to generally accepted methods for making the determinations. Soil compaction shall be determined by measurement of bulk density in grams per cubic centimeter (or numerically equivalent units). Bulk density may be determined by any of several standard measurements, but the method used must be referenced to a widely-accepted soil methodology publication. In no case shall soil be compacted to bulk density that exceeds 1.6 g/cc except where no planting is to take place. Penetrometer measurements are not a substitute for bulk density measurements. Once characterized, topsoil for this project shall be salvaged and stored within the project area. Topsoil is defined as the soil volume from the original surface to 8 inches in depth. For the purposes of this measure, the top 3 inches of topsoil shall be salvaged from the areas when traditional grading will be used for the installation of the solar arrays per the following protocol. The upper 1/4 inch may be collected separately to preserve biological crust organisms. Topsoil may not be distinguishable by color or organic content but shall have most fine roots during the active growing season. Soil shall be collected, transported, and formed into stockpiles only while the soil is dry. The vegetation in place at or immediately before topsoil collection shall be healthy native vegetation with less than 15 percent absolute cover of exotic weed growth. Soil occupied by vegetation of high plant diversity shall be given priority over soil occupied by low diversity native vegetation. Soil may be collected with a front loader, bulldozer, or scraper and transported to storage areas by front loader, dump truck, or scraper. The equipment transporting the soil may not travel across the stockpile more than the minimum number of times required to build the soil to its intended depth. The depth of the stockpiles shall not exceed 4 feet in the case of sandy loam or loamy sand soils. Topsoil stockpiles shall be kept dry and covered if no vegetation is introduced. If native vegetation is grown on the stockpiles to increase seeds and soil organisms, no cover is required. Artificial watering may be provided at the operator's option. Stockpiled topsoil shall be used to grow native plant species for the purpose of producing native seeds and building beneficial microorganisms in the soil volume. All native plant species encountered in the vegetation surveys shall be included in the growing rotation on the stockpiles. Most growing space needs to be dedicated to the species for which the most seeds shall be required. At least half by area of the growing area during each growing cycle shall be dedicated to plant species known to be good mycorrhizal host plants. Members of the families Chenopodiaceae and Amaranthaceae should be limited to less than half the area of the soil stockpiles, with the other half occupied by known mycorrhizal host plant species. **Biological Crust Characterization and Preservation** Soil biological crust is defined here as a mixture of organisms that occupy and protect the surface of the soil in most desert ecosystems. The organisms often include filamentous and non-filamentous cyanobacteria, mosses, lichens, liverworts and fungi. Soil biological crust shall be preserved by collecting the upper 1/4 inch of topsoil from areas to be graded. The applicant shall collect specific areas known to contain biological crust organisms or collect upper soil from the entire area. Collections are to emphasize filamentous cyanobacteria; but other cyanobacteria, mosses, lichens, and liverworts are also considered valuable contributors to the soil biological crust and shall be important in protecting against erosion and reducing	Modified to clarify the amount of topsoil to be salvaged and stored on site.		

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
weed invasion. Soil surface crust shall be air dried and stored dry in a shaded location in containers that allow air movement, such as loose-weave fabric bags. In no case may the stored crust be subject to wetting or direct sunlight during storage. All containers shall be clearly labeled with date and location of original collection; name and contact information of persons responsible for identifying suitable material to collect; and the persons who collected, stored, and maintained collections. Soil biological crust shall be re-applied at the time of replanting by crumbling the stored material and broadcasting it on the surface of the soil. Approximately 10 percent of the stored material shall be broadcast on topsoil storage areas among plants being grown for seed and soil microorganisms. When the growing cycle progresses to new planting, the soil supporting biological crust shall be collected and stored by the same methods prescribed for collections from the original soil, in clearly labeled bags or other suitable containers. **Succulent Transplant** The majority of the succulent plants located in areas to be dragged, rolled or spot graded, or above mowing height shall be salvaged and transplanted into a nursery area. Succulents to be transplanted into the nursery area shall be placed in their same compass orientation as they were in their original location. The salvaged plants also shall be kept in long-term soil stockpiles, along with natives grown on the stockpiles, to keep the soil biota fresh. Succulent transplants done during preparation of the project site shall be fully documented and serve as trials of methods to be used during plant salvage on the project site. Records shall be maintained for each transplanted specimen including species, height, number of branches or pads as appropriate, donor location by UTM coordinates, methods used to remove, transport and store the plant, period of temporary storage, location, facility description and planting medium used for storage, and frequency of watering during storage. The records shall include plant application of planting at the storage area, and quarterly during storage until such time as each plant is placed in the field, or dies. **Seed Collection** Seed collection shall be carried out within the project area. Future seed collection in the project vicinity shall be negotiated separately with BLM. Collection areas shall be within 10 miles of the boundaries of the project site and shall be on similar terrain, soil, exposure, slope and elevation to the project site. Seed collection guidelines shall conform to all laws and regulations in effect at the time of collection and shall follow the guidelines for native seed collection provided by California Native Plant Society. Seed collection shall include all plant species known to be removed from the facility. If insufficient seeds are provided by "seed farming" and collection within 10 miles of the site, BLM may approve collection from a greater distance provided other environmental factors at the collection site are good matches to the project site.			
MM-Veg-4: Integrated Weed Management Plan. The Applicant shall implement their Integrated Weed Management Plan to control non-native invasive weeds, as developed in cooperation with the BLM and		Prior to construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
County of San Bernardino. The Integrated Weed Management Plan for the project shall include a risk assessment of the invasive weed species currently known within the proposed Stateline site, procedures to control their spread on site and to adjacent off-site areas, and procedures to help minimize the introduction of new weed species. The Integrated Weed Management Plan shall be implemented prior to, during, and following the completion of construction for the life of the project.			
MM-Veg-5: Revegetation of Temporary Disturbed Areas and Project Site. The full project site shall be revegetated according to the Applicant's Closure, Decommissioning, and Reclamation Plan (First Solar 2012d) following project decommissioning. In addition, any areas temporarily disturbed during construction would be re-vegetated, using the same methods, as soon as construction is completed. The Plan would be amended to include the following requirements: **Topsoil Application** Stored topsoil would be reapplied as a layer over decompacted subgrade material as a means of implementing the restoration program. The topsoil layer shall be a minimum of 3 inches in depth. The topsoil layer shall be bonded to the subgrade with a lightly-loaded sheepsfoot roller, a land imprinter, or other implement that interlocks material from the two layers without causing bulk density in excess of 1.6 grams per cubic centimeter. Seeds may be distributed concurrently with layer bonding if a land imprinter is employed for both purposes. **Seed Application** The vegetation to be introduced to the site shall consist entirely of plant species native to the northern Mojave Desert. No exotic plant species can be included on the seed lists nor introduced with native species. Exotic species, regardless of their presence in the original vegetation, shall not be counted as successful vegetation establishment. Batches of seeds collected or produced for this project shall be tested by a certified seed testing laboratory that shall provide for each batch of seeds determinations of purity, germination, and seed count. Seeds not sorted by plant species, including collections from under shrubs, from depressions in the soil, and from harvester ant caches, shall be used to supplement defined seed batches but shall not be included in the claim of known seed applications. Seed application would be done by methods that provide good soil contact and protection from granivores. Information about the imprinting process and model specifications for imprinting contracts are available in St. John and Dixon (1996). Seed shall be applied by methods that provide good seed-soil contact. The most successful methods in similar conditions are land imprinting or broadcasting followed by a roller that shall press seeds into the soil but not cause heavy compaction. Mulch application is done at the option of the operator. Mulch application to the soil needs to consist of local non-weedy materials, the collection of which is incidental to other activities onsite. In no case may mowing		Immediately following construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
or grading of native vegetation be carried out for the sole purpose of generating mulch. Mulch needs to be applied only to the soil surface unless the soil has already been inverted or severely disturbed through other procedures. Materials of relatively high nitrogen content, including alfalfa hay, may not be applied. Mycorrhizal inoculation shall be carried out in all planting areas having fewer than one spore per cubic centimeter of topsoil, where topsoil is defined as soil between the surface and 8 inches depth, or to bedrock if the soil is less than 8 inches in depth. Spore counts shall be carried out by methods given in Johnson et al. or other accepted methodology. Inoculation shall result in a minimum of one spore per cubic centimeter of soil as defined for initial spore counts. No inoculation shall be required in areas where the applicant is able to demonstrate that all plant species on the list of final desired vegetation are known to be non-host species. This condition might be found in saline or very alkaline soils. **Succulent Transplanting** Revegetation following decommissioning would include re-transplantation of succulents within the transplant areas. Equipment and methods to be used would be the same as those used for the initial removal and transplanting from the project area. **Performance Monitoring** Qualitative monitoring shall be conducted in years one to 10 at all restored areas. The goal of qualitative monitoring is to document conditions and evaluate the need for remediation to ensure the restored areas are progressing toward the performance success standard. During monitoring, the success parameters (cover, density, and richness of annual and perennial vegetation) shall be estimated. Other site characteristics to be monitored in addition to the success parameters include soil erosion, natural recruitment of native plant species, reproduction, exotic plant species abundance, animal use, and pattern of established vegetation (i.e., presence of large interspaces). Lack of erosion at a site provides evidence that soils have been adequately stabilized, while natural recruitment and/or reproduction indicate that important functional processes are in place that initiate regeneration, such as pollination and seed dispersal. Exotic species potentially compete with native perennial species, and relatively high abundance can have a negative effect on site conditions. Evidence of animal use is an indicator that habitat conditions are being restored. Patterns of established vegetation help determine whether large bare areas are indicative of site conditions or simply a result of the patchiness of surrounding vegetation. Based on monitoring observations, the restored site shall be given a success rating of Exceeds Objectives, Acceptable, Unacceptable, or Severely Deficient, and determinations shall be made regarding remediation activities, as applicable. Remediation activities shall include reseeding the site, spot seeding, adding transplants, erosion control, and fencing. Recommendations may include waiting another year or two prior to any remediation to allow for favorable germination/establishment conditions, with approval of the BLM. Photography shall be used to help document the status of recovery at all sites. Photo points shall be			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
established and photographs shall be taken prior to disturbance, when restoration efforts are completed, and during each monitoring visit. Monitoring shall be scheduled and reported to the BLM once per month during the first growing season after seed application, switching to once per quarter starting in July after seed application. Monitoring may be reduced to once per year in late March through mid-May of each year after the second growing season. Performance monitoring shall be conducted annually during the spring flowering season, between mid-March and mid-May to assess restoration performance. Performance monitoring surveys of all vegetation on the subject sites shall be carried out in a manner able to detect project success. The entire project area shall be divided into vegetation types as described by Sawyer and Keeler-Wolfe. The boundaries of each vegetation type shall be compared with the baseline survey maps. Each vegetation type shall have soil, terrain, exposure, elevation, and slope clearly indicated. For each vegetation type, a list of perennials and appropriate annuals shall be provided. Surveys shall be performed at a season when the year's annuals are identifiable; generally from early March through late April. Survey methodology should emphasize accuracy rather than precision. BLM shall accept rapid methods such as the step-point method (Bonham 1988) provided transects are laid out in a manner that captures the true composition of the vegetation. The combined length of step-point transects in each vegetation type shall approximate the square root of the area of the vegetation type or at least 400 intercepts and shall be laid out to give unbiased representation of all portions of the vegetation type. Vegetation need not be divided into herb and shrub layers as long as all species intercepted by points are included in the survey. Additional species not encountered on the transects shall be recorded separately on a diversity list. Restoration shall be considered successful if plant cover, density, and richness of native perennial vegetation (mainly dominant shrubs) is equal to or exceeds 70 percent for these parameters in undisturbed reference areas. A minimum of two undisturbed reference/control sites in the western Ivanpah Valley area shall be selected in cooperation with BLM.			
MM-Veg-6: Streambed Alteration Agreement. Given the anticipated impacts to CDFW jurisdictional areas, the Applicant would be required to obtain a Streambed Alteration Agreement from the CDFW in accordance with Section 1602 of the California Fish and Game code. This permit would include applicable mitigation measures that would be implemented by the Applicant.		Prior to construction	CDFW
MM-Veg-7: Restoration of Area West of Whiskey Pete's. *Prior to energization of the substation,* the Applicant shall perform restoration of a 6.4-acre area to the west of Whiskey Pete's Hotel/Casino parking lot, entirely within California, to mitigate for ongoing soil compaction and vegetation loss from cumulative projects in the area. Restoration of the impacted area shall include the physical modifications necessary to return the area to a state approaching pre-disturbance conditions. Restoration steps shall include ripping to decompact the soil, vertical mulching, relocation of native shrubs, removal of a small stand of Russian thistle and establishing a single access route from the hotel/casino parking lot through the disturbed area. Small to medium-sized boulders shall be transported from nearby areas using small excavating equipment. Vertical mulching, or relocation of dead vegetation and other organic material, into the area shall be	The schedule provided in the PA/FEIS was not sufficient to guarantee completion of the measure before commercial operations begin.	Prior to substation energizing.	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
performed with hand equipment or excavating equipment. This material, as well as live shrubs for replanting, shall be gathered from areas to be disturbed within the Stateline Solar Farm project area. Only as many plants as needed to mask the restoration area shall be used, and shall not exceed 15 percent of the plants in the surrounding area. Transplanted plants shall consist solely of those species that are common in the surrounding plant community (e.g., creosote bush [*Larrea tridentata*], cheesebush [*Ambrosia salsola*], burrobush [*A. dumosa*], four-winged saltbush [*Atriplex canescens*] cattle spinach [*Atriplex polycarpa*], Mojave yucca [*Yucca spp.schidigera*] and succulents [cholla, club cholla, barrel cactus, hedgehog cactus, pincushion cactus]). To achieve replanting, a hole of adequate size to accommodate the root mass of the shrub shall be manually excavated, and the shrub shall be placed in the hole with care to minimize damage to its roots. Caution shall be exercised to minimize and, where possible, eliminate crushing of vegetation during these activities, consistent with the restoration objectives of the project. Water shall be used to water relocated live shrubs after planting. Water shall be supplied by a water truck or from a water tank carried on a utility truck. The crew for the reclamation effort shall consist of not more than 10 persons including supervisory staff and monitors. The equipment that may be used shall consist of pickup trucks, flat-bed 2½ ton truck and trailer, water truck, small excavating equipment (such as backhoe or bobcat) and a skip loader. Daily preconstruction safety meetings shall take place and all activities shall adhere to a site-specific health and safety plan. The following measures shall be followed to avoid impacts during the restoration activities: • Dust Control. Dust control measures shall be implemented to minimize fugitive dust and vehicle emissions. Water shall be applied to dirt surfaces to minimize visible dust. Rehabilitation activities shall not be conducted during high wind warnings. Work shall be suspended if watering is insufficient to prevent visible dust. Vehicles shall be washed if visible dust accumulates on the outside or undercarriage. Motorized vehicles and equipment shall be kept in good operating condition per manufacturer specifications and not allowed to idle. • Invasive Non-Native Weed Species. To the extent feasible, the spread of invasive non-native weed species shall be avoided by clean vehicles/equipment and limiting the area of disturbance. To limit the potential for the spread of noxious weeds, before entering the proposed work area, project vehicles shall be clean. All vehicles shall be inspected daily prior to entering the work area to ensure that they are free of mud, dirt, and vegetation. Those not clean shall be required to be washed at an offsite vehicle wash station before entering the proposed work area. Biological Monitors shall inspect visible restoration segment prior to ground disturbance activities for presence of target noxious weeds. • Wildlife. To avoid impacts to sensitive biological resources, biological monitoring of all rehabilitation shall be performed during implementation of the proposed activities. All workers shall be trained to recognize desert tortoise and other important sign, and to notify the Biological Monitor of any tortoise sign observations. The approved Biological Monitor shall remain onsite during restoration activities to monitor for compliance with federal agency requirements. The Biological Monitor shall			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
have the authority to stop work in the immediate vicinity of a resource in jeopardy, if necessary. Biological Monitors shall assure that all project-generated trash and food items are placed in closed containers and removed daily. The proposed project activities shall limit the disturbance area to the minimum required to perform the work. Project personnel shall carefully check under parked vehicles and equipment for desert tortoises before operation. A USFWS-approved Authorized Biologist shall only move desert tortoises found in imminent danger to a location away from danger and in accordance with the tortoise handling procedures described in the Guidelines for Handling Desert Tortoise During Construction Projects (Desert Tortoise Council, 1994). In the event of a relocation or observation of a recently dead or injured listed species, the Biological Monitor shall notify the Designated Biologist, who shall notify BLM's Authorized Officer and USFWS immediately by phone and in no event later than noon on the business day following the event, if it occurs outside normal business hours, so that the agencies can determine what further actions, if any, are required to protect listed species. The Designated Biologist shall prepare written follow-up notification via FAX or electronic communication to these agencies within 2 calendar days of the incident and include the following information, as relevant: the date, time, location, circumstances of the incident, and the name of the approved veterinary facility where the animal was taken. • Cultural Resources. Protection measures shall be implemented to mitigate any potential adverse impacts caused by inadvertent discovery of buried cultural resources during project execution. These measures include: (1) designation of a cultural resources specialist to be on-call to investigate any cultural resources finds made during proposed activities; (2) implementation of a construction worker training program; (3) procedures for halting work due to inadvertent discovery of archaeological deposits or human remains; (4) procedures for evaluating an inadvertent archaeological discovery; and (5) procedures to mitigate adverse impacts on any inadvertent discovery of National Register of Historic Places eligible archaeological resources. • Monitoring and Maintenance. Upon completion, maintenance activities shall consist of irrigation of transplanted vegetation and management of the Russian thistle area. The restoration effort shall also be monitored to assess the effectiveness of the restoration, and additional restoration efforts shall be conducted as needed to achieve the objectives of the proposed action over a five-year period. Restoration status reports shall be submitted to the BLM annually.			
MM-Veg-8: Revegetation of Solar Arrays Following Construction. As discussed in Section 2.8.3, BLM considered evaluation of an alternative that would limit site preparation techniques to mowing, leaving the original topography and vegetation in place. As discussed in that section, this alternative was determined to be infeasible due to construction requirements and safety considerations. However, those constraints apply only to construction, and not to operations. Therefore, the Applicant shall de-compact and re-vegetate the solar array areas following the completion of construction. The area of re-vegetation would include only areas under and between solar panels which are not used for vehicle access for inspection and maintenance of panels. The 20-foot wide pathways between arrays would be exempted, and would continue to be used for vehicle access. Following completion of construction, the Applicant would de-compact the soil. If the space between arrays is too narrow to allow entry of small		Immediately following construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
equipment (such as a bobcat), de-compaction would be done using hand-tools. The de-compacted areas would be seeded using a seed mix agreed upon by the BLM. The seed mix would be developed to encourage growth of vegetation with the following properties: • Native plants only, which may provide forage or habitat for wildlife, and which are desired to be included in the final re-vegetation following decommissioning; • Build soil nutrients and discourage weeds; • Assist in preventing soil loss; • Would not grow to heights that would interfere with operations; • Provide diversity to avoid accumulation of plant pests and diseases; and • Have shade-tolerance and root system properties that may be amenable to growth under panels. Selection of the seed mix may vary depending on the area of the site. Investigation of growth which is successfully occurring under mirrors at Ivanpah SEGS shall be considered when developing the seed mix. Upon agreement by the BLM AO, different seed mixes may be used to establish test plots in order to identify species with the greatest potential for success. The seed source and application method would be the same as described in mitigation measure MM-Veg-5. De-compaction and re-vegetation of the disc and roll areas would be initiated within one year of construction completion, unless otherwise authorized by the BLM due to limited frequency and duration of rainfall events. Upon completion of seeding, the areas would be subject to weed control, monitoring, reporting, and re-seeding as specified in mitigation measure MM-Veg-5. Under no circumstance shall a population of invasive or noxious weeds be allowed to develop within the re-vegetation area. Of particular concern are Sahara mustard (*Brassica tournefortii*) and saltcedar (*Tamarix ramosissima*), which must not be allowed to produce seeds.			
Visual Resources			
MM-VR-1: The Applicant shall revegetate disturbed soil in temporarily disturbed areas following completion of construction. In order to specifically address visual concerns, the Decommissioning and Restoration plans shall include reclamation of the area of disturbed soils used for laydown, project construction, and siting of the other ancillary operation and support structures. Revegetation shall re-establish the pre-existing colors, textures and form to the landscape and visually integrate into the adjacent edges removing the lines of demarcation.		Immediately following construction	BLM
MM-VR-2: The Applicant shall design and install all long-term exterior lighting and all temporary construction lighting such that: (a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; (b) lighting does not cause reflected glare; (c) illumination of the project and its immediate vicinity is minimized; and (d) the plan complies with local policies and ordinances. The Applicant shall submit to the BLM and San Bernardino County for review and approval a lighting mitigation plan that		Prior to construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
includes the following: • Location and direction of light fixtures that take the lighting mitigation requirements into account; • Lighting design that considers setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements; • Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated; • Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security; • All lighting shall be of minimum necessary brightness consistent with operational safety and security; and • 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.			
MM-VR-3: The Applicant shall treat the surfaces of all Project structures and buildings visible to the public such that a) their colors minimize visual contrast by blending with the characteristic landscape colors; 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 non-specula and nonreflective, and the insulators shall be nonreflective and nonrefractive. The Applicant shall comply with BLM requirements regarding appropriate surface treatments for Project elements. BLM's color shadow gray shall be used for all buildings and other structures unless otherwise directed by BLM when under development. Additional mitigation measures include: • Color treat the inverter boxes, office buildings, storage facilities, non-lattice transmission towers, electrical substation equipment and components shadow gray from the BLM Environmental Color Chart, as has been done on previous PV projects in the area; • Use dark gray gravels or color treat the gravel surfaces with Permeon or other coloring agent on roads and exposed perimeter graveled surfaces, where appropriate; • Chain link fence shall be either powder coated, fused vinyl bonded coated dark green or black or acid etched/ washed to achieve a non-specular treatment; • PV panel supports and holding pins shall be powder coated, fused vinyl bonded coated dark green or black or acid etched/ washed to achieve a non-specular treatment. • Lattice transmission towers and electrical conductors shall be non-specular.		Prior to construction	BLM
MM-VR-4: The Applicant shall use proper design fundamentals to reduce the visual contrast to the		Prior to construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
characteristic landscape. These include proper siting and location; reduction of visibility; repetition of form, line, color, and texture of the landscape; and reduction of unnecessary disturbance. Design strategies to address these fundamentals shall be based on the following factors: • Earthwork: Select locations and alignments that fit into the landforms to minimize the size of cuts and fills. • Vegetation Manipulation: Retain as much of the existing vegetation as possible. Use existing vegetation to screen the development from public viewing. Use scalloped, irregular cleared edges to reduce line contrast. Use irregular clearing shapes to reduce form contrast. Feather and thin the edges of cleared areas and retain a representative mix of plant species and sizes. • Structures: Minimize the number of structures and combine different activities in one structure. Use natural, self-weathering materials and chemical treatments on surfaces to reduce color contrast. Bury all or part of the structure. Use natural appearing forms to complement the characteristic landscape. Screen the structure from view by using natural land forms and vegetation. Reduce the line contrast created by straight edges. Use road aggregate and concrete colors that match the color of the characteristic landscape surface. Co-locate facilities within the same disturbed corridor.			
Water Resources			
MM-Water-1: Demonstrate compliance with water quality permits. Prior to construction, the Applicant shall submit satisfactory evidence to the BLM and San Bernardino County that all of the agencies listed below have been contacted and whether or not each agency requires a permit associated with the Stateline facility. Permits may include, but are not limited to, well construction permits from San Bernardino County, a Streambed Alteration Agreement from the CDFW, a Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) General Permit for stormwater discharges associated with construction activities, including a Stormwater Pollution Prevention Plan (SWPPP) with Best Management Practices (BMPs) for stormwater management, and a Clean Water Act Section 401 certification from the Lahontan Regional Water Quality Control Board (RWQCB). Where a permit is required, the Applicant shall provide a copy of all the conditions required by that agency to BLM and the County. The BLM and the County, as applicable, shall review these conditions for consistency with proposed plans. During construction, the Environmental Monitor shall be aware of these other agency conditions and, if non-compliance is observed, shall contact the affected agency. For post-construction measures, the Environmental Monitor shall notify the affected agency should non-compliance be observed. The Applicant shall maintain and make available on site at all times an approved copy of all required permits.		Prior to and during construction, operations, and decommissioning	BLM and County
MM-Water-2: Develop a Water Supply Contingency Plan for Construction. Prior to construction, the Applicant shall coordinate groundwater withdrawal plans with the Lahontan RWQCB. No groundwater resources from overdrafted basins shall be used to meet project needs. The Applicant shall implement their proposal for two supply wells, a primary supply well and a secondary supply well. The Water Supply Contingency Plan shall identify the well sites, proximity to other active wells, estimated total depth, well screen depth, diameter, estimated yield and water quality, and time required to have the wells drilled, constructed, developed and fully operational (if the wells are to be drilled specifically for the project, as		Prior to construction	BLM, County, and LRWQCB

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
opposed to use of existing wells). If the water quality or yield of the primary supply well is inadequate or becomes inadequate to meet the project requirements, the secondary supply well shall be used in order to produce water of appropriate quality. Use of a secondary supply well would not alter the quantity of groundwater pumped for project purposes; the purpose of the secondary supply well would be to avoid potential impacts associated with withdrawals from the primary supply well. The Water Supply Contingency Plan shall specify when the secondary supply well shall be used, what conditions would trigger necessary use of the secondary supply well, the person responsible for determining when to utilize the secondary supply well, and how such use shall be reported. The Environmental Monitor shall verify that the secondary supply well is installed and is capable of producing daily yields sufficient to supplement or replace the primary supply well in meeting construction water demand, as needed. If needed to generate water of sufficient quality, water treatment using a mobile, self-contained ion exchange or reverse osmosis unit will be implemented. Water use volumes evaluated in this document apply to groundwater withdrawal rates, not actual final water use rates. Therefore, withdrawal of higher water volumes of groundwater to meet the same water usage rate shall not be permitted. Wastestreams from the treatment units shall be disposed of offsite in accordance with applicable federal, state, and local requirements. Wastes shall not be disposed in the Primm wastewater infiltration ponds, or in any other location that returns the waste material to groundwater within the Ivanpah Valley Groundwater Basin.			
MM-Water-3: Amend and Implement Groundwater Monitoring and Reporting Plan. The Applicant shall amend and implement their Groundwater Monitoring and Reporting Plan (West Yost 2013b) prior to the onset of construction. The Applicant shall propose a water quality standard, or methodology for developing a standard, to be used as an indicator of potential adverse groundwater quality impacts. This standard shall include the baseline numerical total dissolved solids concentration and/or electrical conductivity value from which deviation will be measured, as well as which wells will be used for such measurements. This standard shall be proposed to the County and BLM for review and approval. The Groundwater Monitoring and Reporting Plan shall provide detailed methodology for monitoring background and site groundwater levels, water quality, and flow. Monitoring shall be performed during pre-construction, construction, and project operation with the intent to establish pre-construction and project-related groundwater level and water quality trends that can be quantitatively compared against observed and simulated trends near the project pumping wells and near potentially impacted existing private wells. Water quality monitoring shall include annual sampling and testing for TDS, chloride, sodium, calcium, arsenic, and other anions and metals that could be mobilized from depth or from Ivanpah Dry Lake. Water quality samples shall be drawn from both project supply wells and the three monitoring wells. During construction, quarterly water level and water quality monitoring data reports shall be submitted to the BLM and the County for review and approval. Reports shall include the pumping rates for both project wells. Based on the results of the quarterly water level trend analyses, the Applicant shall determine if the project pumping has resulted, or will likely result if pumping continues, in water level decline of five feet or more below the projected baseline trend at nearby private wells. If drawdown of five feet or more occurs at off-site		Prior to and during construction, operations, and decommissioning	BLM and County

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
wells, and a majority of this drawdown can be attributable to pumping of the Applicant's wells, then the Applicant shall immediately reduce groundwater pumping until water levels stabilize or recover, sustaining drawdown of less than five feet. The Plan shall include a schedule for submittal of quarterly monitoring data reports by the Applicant to the BLM and County. The BLM and County shall determine whether groundwater wells surrounding the project site and project supply well(s) are affected by project activities in a way that requires additional mitigation and, if so, shall determine what measures are needed.			
MM-Water-4: Install pervious and/or high-roughness groundcover where applicable. Prior to the onset of construction, the Applicant shall submit a drainage design and hydrologic and hydraulic analysis to the BLM for review and approval and to San Bernardino County for review and comment. The Applicant shall also implement their Storm Water Management Plan (First Solar 2012k). In the design plans, groundcover for the onsite substation and O&M Building shall be comprised of a pervious and/or high-roughness material (for example, gravel) to the maximum extent feasible, in order to ensure maximum percolation of rainfall after construction. Debris/sediment basins shall be installed to reduce local increases in runoff, particularly on frequent runoff events (up to 10-year frequency). Downstream drainage discharge points shall be provided with erosion protection and designed such that flow hydraulics exiting the site mimic the natural condition as much as possible.		Prior to construction	BLM
MM-Water-5: Design onsite drainage improvements to maximize groundwater recharge. Prior to onset of construction, the Applicant shall design onsite drainage improvements (and include on all applicable construction plans) to include the following components to maximize groundwater basin recharge: drainage from impervious surfaces (e.g., roads, driveways, buildings) shall be directed to a common drainage basin; the project shall design as few basins as possible for the entire development; and where feasible, mass grading and contouring shall be done in a way to direct surface runoff towards the above-referenced basins (and/or closed depressions).		Prior to construction	BLM
MM-Water-6: Develop Master Drought Water Management and Water Conservation Education Programs. Prior to the onset of construction, a Master Drought Water Management Program shall be prepared by the Applicant and submitted to the BLM for approval. The Drought Water Management Program shall provide guidelines on how all future water use will be managed during "severe" drought year(s). During construction and operation, these measures would go into effect during periods of "severe" drought. Once it is determined that a "severe" drought condition exists, restricted (drought) water usage measures shall remain in effect until it is shown satisfactorily to the BLM that the "severe" drought condition no longer exists. This plan shall include, but is not limited to the following measures: • The definition of a "severe" drought year (as defined by the National Oceanic and Atmospheric Administration's (NOAA) Palmer Drought Severity method or other similarly recognized methodology); • Identification of general measures available to reduce water usage for future development (to be refined as needed for each use approved);		Prior to construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
• Identification of specific measures to be applied for landscape watering; • Determination of appropriate early triggers to determine when "severe" drought conditions exist and process for initiating additional water conservation measures for [tract] and future development. Along with the Drought Water Management Program and prior to the onset of construction, the Applicant shall develop and submit to the BLM for approval, a Master Water Conservation Education Program for all future operators and employees for use during drought periods. Such a program shall be developed by an appropriate expert for each onsite activity using water. Once the program is developed, the Applicant shall also include the means by which this information will be disseminated to any future operators of the project. The Drought Water Management Program and Water Conservation Education Program shall be implemented throughout the construction, operation, and decommissioning phases. For any year that a "severe drought" state has been recognized, the Applicant shall submit a letter to the BLM by November 1 of that year identifying what measures were implemented to conserve water and to provide water conservation education, as well as the effectiveness of such measures.			
MM-Water-7: Flood and Erosion Structure Damage Protection. Aboveground project features shall not be placed within waterway protection corridors (floodways) defined by city and county codes, and shall be located outside of known watercourses. Aboveground project features shall be designed and engineered to withstand potential flooding and erosion hazards. Although some project features may need to be placed within 100-year floodplain boundaries, or Flood Hazard Areas, they shall be designed per the County's Land Development Standards including Flood Control Standard Plats and Detention Basin Policy.		Prior to construction	BLM
MM-Water-8: Construction SWPPP Specifications. A Construction SWPPP shall be developed for the Stateline facility. Notices of Intent (NOIs) shall be filed with the State Water Resources Control Board (SWRCB) and the Lahontan Regional Water Quality Control Board. A Waste Discharge Identification Number (WDID) shall be obtained prior to the issuance of construction permits. The SWPPP shall be stored at the construction site for reference by construction personnel and for inspection review. The SWPPP shall include BMPs that would be adhered to during construction in order to stabilize graded areas and waterways, and reduce erosion and sedimentation. Such BMPs may include but are not limited to those described below. • Erosion minimizing efforts such as straw wattles, water bars, covers, silt fences, and sensitive area access restrictions (for example, flagging) that would be installed before clearing and grading begins. For protection of desert tortoise and other wildlife, silt fence shall only be installed on interior fences located within the exterior desert tortoise fence, so that tortoises will not be able to come in contact with the silt fence. • Mulching, seeding, or other suitable stabilization measures would be used to protect exposed areas during construction activities. • During construction activities, measures would be in place to ensure that contaminants are not discharged from the construction sites. • Debris and sediment basins would be established, both upgradient and downgradient, as		Prior to and during construction	SWRCB and LRWQCB

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
necessary, to capture silt and other materials, which might otherwise be carried from the site by rainwater surface runoff. The basins shall be designed in accordance with the County Detention Basin Policy, which includes standards for sizing and armoring. This would require armoring on both the upgradient and downgradient (water release) sides of each basin. • Straw wattles (or comparably effective devices [as determined by the onsite Civil Engineer, in consultation with the Environmental Monitor]) shall be placed on the downslope sides of the proposed work which would direct flows into temporary sedimentation basins. • Stormwater protection berms positioned in the area of facility structures (substation and O&M Building). • The SWPPP shall include a Sedimentation and Erosion Control Plan to minimize the potential for project sediment to leave the site and result in downstream sedimentation. • All erosion control materials shall be biodegradable and natural fiber. All be BMPs required by the SWPPP shall be checked and maintained regularly and after all larger storm events. All remedial work shall be done immediately after discovery so sedimentation control devices remain in good working order during the entire construction phase. Proper implementation will be verified by the Environmental Monitor.			
MM-Water-9: Storm Water Management Plan. The project owner shall implement the requirements of their Storm Water Management Plan (First Solar 2012k) to operate and monitor to effectiveness of their proposed stormwater management system. The Storm Water Management Plan shall be submitted to both the BLM and the County for review and approval, and shall include a plan to monitor and inspect periodically, before first seasonal and after every storm event. The plan shall include the following elements: • Security and Tortoise Exclusion Fence: Inspect for damage and buildup of sediment or debris. • Facility structures within drainages or subject to drainage overflow: Inspect for tilting, damage, depth of scour compared to depth below ground. • Drainage Channels: Inspect for substantial migration or changes in depth, and transport of trash, debris, or broken PV module components. • Stormwater protection features, including protection berms, culverts, and cement road crossings. • Constructed Debris and Sediment Basins: Inspect for scour and structural integrity issues caused by erosion, and for sediment and debris buildup. • Ivanpah Playa Surface: Inspect for changes in the surface texture and quality from sediment buildup, erosion, or transported debris. Short-Term Incident-Based Response:		Prior to and during construction, operations, and decommissioning	BLM and County

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
• Security and Tortoise Exclusion Fence: Repair damage, and remove built-up of sediment and debris. • Facility structures: Remove broken materials, damaged structure, and wiring from the ground, and replace with materials meeting original construction specifications. • Drainage Channels: No short-term response necessary unless changes indicate risk to facility structures. • Constructed Debris and Sediment Basins: Repair damage, maintain erosion control measures and remove built-up sediment and debris. • Ivanpah Playa Surface: Remove transported debris, notify BLM to develop plan for addressing sedimentation or erosion issues. Long-Term Design-Based Response: • Propose operation/BMP modifications to address ongoing issues. Include proposed changes to monitoring and response procedures, frequency, or standards. • Propose design modifications to address ongoing issues. This may include construction of additional active storm water management diversion channels and/or detention ponds. • Inspection, short-term incident response, and long-term design-based response may include activities both inside and outside of the approved right-of-way. For activities outside of the approved right-of-way, the Applicant will notify BLM and acquire environmental review and approval before field activities begin. At least sixty (60) days prior to commercial operation, the project owner shall submit to the BLM and the County a copy of the Storm Water Management Plan for review and approval prior to commercial operation. The Applicant shall retain a copy of this plan onsite at the power plant at all times.			
MM-Water-10: Accidental spill control and environmental training. Prior to the onset of construction of the Stateline facility, the following specifications must be provided by the Applicant to the BLM: define areas where hazardous materials would be stored, where trash would be placed, where rolling equipment would be parked, fueled and serviced, and where construction materials such as reinforcing bars and structural steel members would be stored. The Applicant shall also prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and shall include an emergency response program to ensure quick and safe cleanup of accidental spills. These specifications may be included in the project's SWPPP, or may be included as a separate plan. Prior to and during construction, an environmental training program shall be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures, and SWPPP measures, to all field personnel. A monitoring program shall be implemented to ensure that the plans are followed during all construction, operations and maintenance, and decommissioning activities. Storage of fuels and hazardous materials shall be prohibited within 200 feet of surface water features and		Prior to and during construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
private groundwater supply wells, and within 400 feet of community or municipal groundwater supply wells (if it is determined that such wells exist on or in close proximity to the project site). During construction/ground disturbing activities and operation, all vehicles and equipment, including all hydraulic hoses, shall be maintained in good working order so that they are free of any and all leaks that could escape the vehicle or contact the ground, and to ensure that any leaks or spills during maintenance or storage can be easily and properly removed. Compliance will be verified by the Environmental Monitor and the local SWPPP authority at the time of construction.			
MM-Water-11: Drinking Water Source. Upon receipt of initial analytical results from the on-site production well, the Applicant shall make a determination, with concurrence of BLM and the County, regarding whether water quality meets EPA's National Secondary Drinking Water Regulation for TDS of 500 mg/L. If the analytical results from the initial sample, or from any of the subsequent results from periodic monitoring events, indicates that the water does not meet this standard, the water shall not be used for drinking water, and the Applicant shall arrange for provision of drinking water from an offsite source, as opposed to the on-site wells.		During construction	BLM and County
MM-Water-12: Portable Toilet Use for Construction. The Applicant shall use temporary, portable toilet facilities throughout the project area (both office area and solar array fields) during construction. A temporary septic tank and leach field system will not be used.		During construction	BLM
Wildland Fire			
MM-Fire-1: The Applicant shall implement the fire prevention and response components of their Emergency Response and Hazardous Materials Management Plan (First Solar 2012b) for use during construction and decommissioning. The Applicant shall submit the Plan, along with maps of the project site and access roads, to the San Bernardino County Fire Department for review and approval prior to the issuance of a right of way grant. The Plan shall contain notification procedures and emergency fire precautions including, but not limited to, the following: a. All internal combustion engines used at the project site shall be equipped with spark arresters. Spark arresters shall be in good working order. b. Light trucks and cars shall be used only on roads where the roadway is cleared of vegetation. Mufflers on all cars and light trucks shall be maintained in good working order. c. Fire rules shall be posted on the project bulletin board at the contractor's field office and areas visible to employees. d. Equipment parking areas and small stationary engine sites shall be cleared of all extraneous flammable materials. e. Personnel shall be trained in the practices of the Fire Safety Plan relevant to their duties. Construction and maintenance personnel shall be trained and equipped to extinguish small fires in order to prevent them from		During construction and decommissioning	BLM and County

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
growing into more serious threats. f. The Applicant shall make an effort to restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives to outside of the official fire season. When the above tools are used, water tanks equipped with hoses, fire rakes, and axes shall easily accessible to personnel. g. Smoking shall be prohibited in wildland areas and within 50 feet of combustible materials storage, and shall be limited to paved areas or areas cleared of all vegetation. h. Fires ignited onsite shall be immediately reported to BLM and the San Bernardino County Fire Department. i. Install electrical safety signage. Prior to energization or final inspection, whichever occurs first, the Applicant shall install electrical safety signage on all solar arrays in the immediate vicinity of all wiring and on all electrical conduit using weather-resistant and fade-proof materials. The purpose of this measure is to reduce the risk of electric shock and fire. Warning signs shall be designed to be evident to any person tampering with, working on, or dismantling project photovoltaic panels. Signs shall read: "CAUTION: Solar PV Wiring May Remain Energized After Disconnection during Daylight Hours. Tampering with Wiring May Result in ELECTRIC SHOCK or FIRE. Death or Serious Injury May Result. Do Not Expose Wires to Vegetation or Other Flammable Materials." This requirement shall be clearly stated in the fire prevention plan. j. The engineering, procurement, and construction contract(s) for the project shall clearly state the requirements of this mitigation measure.			
MM-Fire-2: Project facilities shall be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health and safety requirements. In compliance with San Bernardino County requirements. The fire prevention and response components of the Emergency Response and Hazardous Materials Management Plan shall include: • The purpose and applicability of the plan; and • Procedures for fire prevention and response that include identification of site-specific and operational risks, tools and equipment needed, and fire prevention and safety considerations; red-flag warning system, activity levels, fire-related training, and coordination with BLM and San Bernardino County.		Prior to construction	BLM and County
Wildlife Resources			
APM-Wild-1: The Project would adopt the applicable desert tortoise protection measures prescribed by the NEMO Plan, and applicable measures adapted to the Project from the BMPs and mitigation measures prescribed for renewable energy projects on public land.		Prior to construction	BLM
APM-Wild-2: Desert tortoise relocation would occur as described in the Project BO, Incidental Take Permit, and associated CDFW permitting, and would also be discussed in the Project Desert Tortoise Translocation Plan. Unavoidable impacts to desert tortoise habitat would be mitigated by habitat replacement at a ratio indicated in the Project EIS and as determined through the formal consultation process.		Prior to construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
APM-Wild-3: The perimeter fence will include tortoise exclusion fencing as appropriate to project mitigation measures, to prevent desert tortoises from entering the Proposed Solar Farm. The fence will be installed prior to pre-construction clearance surveys.		Prior to construction	BLM, USFWS, and CDFW
APM-Wild-4: The Applicant will implement their Integrated Weed Management Plan provided in support of the Project EIS. This Plan would be implemented during all Project phases.		Prior to construction	BLM
APM-Wild-5: The applicant would implement conservation measures during construction as defined in their Bird and Bat Conservation Strategy (First Solar 2012g). These measures are: 1. Vegetation clearing and grading would be avoided wherever possible. 2. Vegetation clearing would be conducted outside of the bird breeding season to the extent practicable. When vegetation clearing during breeding season cannot be avoided, the applicant would communicate the rationale to BLM, USFWS, and CDFW. If this occurred, the Lead Bird Biologist or their designee would oversee construction to locate active nests, establish exclusion zones, and, if necessary, stop construction activities that disturb an active nest. 3. Exclusion zones would be established around active nests, areas of high levels of bat and bird use, and known bat roosts. Clearance surveys would be conducted within 30 days prior to vegetation removal, and exclusion zones established and monitored. Exclusion zones would be established 200 feet from active nests for passerines, 500 feet from an active raptor nest, two miles from any active eagle nest, and 250 feet from any active burrowing owl nests. Exclusion distances for bat roosts sites, maternity colonies, or hibernacula would be established by the Lead Biologist depending on disturbance type, time of year, and duration of disturbance, but would be a minimum of 165 feet. 4. Worker Environmental Awareness Plan training would include bird nest and bat colony avoidance, including identification of and compliance with exclusion zones. 5. The project would follow APLIC guidance for overhead utilities. 6. Construction activities would be conducted in a manner to reduce potential fire hazards. 7. Trash would be removed and disposed promptly to avoid attracting birds and bats. 8. The applicant would implement their Integrated Weed Management Plan to reduce the risk of introducing or spreading invasive plant species. 9. Re-vegetation would be done using only native plants. The applicant would also implement conservation measures during operations as defined in their Bird and Bat Conservation Strategy (First Solar 2012g). These measures are: 1. The applicant would avoid creating or maintaining features that would attract birds or bats. Road kills would be removed and disposed to avoid attracting scavengers, vegetation around substations would be removed to reduce raptor foraging, and no open water sources would remain on-site		During construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
during operations. 2. Lighting would be designed to use the minimum necessary for safety and security. Also during operations, the applicant would conduct avian monitoring and reporting, as described in Section 5 of their Bird and Bat Conservation Strategy (First Solar 2012g). The monitoring program would continue for a minimum of three years following completion of construction, and would be extended if specific mortality level triggers are reached, or in the event of a take of a listed species or eagle. Monitoring would include next surveys, seasonal point counts, and mortality studies.			
APM-Wild-6: The Applicant's Dust Control Plan will be implemented in accordance with Mojave Desert Air Quality Management District requirements prior to construction. The plan will detail control measures to reduce fugitive emissions from construction and operational activities, including but not limited to watering of unpaved roads and other disturbed surface areas, vehicle speed limits, windbreaks, transport container covers, and cleaning and maintenance procedures.		During construction	BLM
APM-Wild-7: The level and intensity of lighting would be the minimum needed for security and safety reasons. These lights would be turned on either by a local switch or by motion sensors that would be triggered by movement at a human's height during maintenance or emergency activities. Lights used for a particular operation would be extinguished once that operation has been completed, providing they are not required for ongoing safety or security purposes. There would be no lights around the Project perimeter in order to minimize the Project's visual impact on surrounding receptors and roads. Sensors on the security fencing would alert security personnel of possible intruders. Exterior lights would be shielded and focused downward and toward the interior of the site to minimize lighting impacts to the night sky and to neighboring areas.		Prior to construction	BLM
APM-Wild-8: Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals are not expected to be used on site. Most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed to contain leaks and spills in containment areas or containment plans. Appropriate spill containment and clean-up kits would be kept on site during construction and maintained during the operation of the Project. Construction wastes would be disposed of in accordance with local, state and Federal regulations. Damaged or retired modules would be returned to First Solar's manufacturing facility in Ohio, where they would be recycled into new modules or other new products.		During construction, operations, and decommissioning	BLM
APM-Wild-9: Bulk fuel containers would be stored in secondary containment to catch any potential fuel spills. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Spilled petroleum hydrocarbon wastes would be collected and transported to an off-site disposal facility authorized to accept the wastes.		During construction, operations, and decommissioning	BLM
APM-Wild-10: Solid wastes generated by the Project would be temporarily stored in wind- and wildlife-secure containers on site and then transported to an off-site disposal facility authorized to accept the wastes.		During construction, operations, and decommissioning	BLM
APM-Wild-11: Construction activities would typically be limited to daytime hours, thereby minimizing nighttime noise disturbance. Construction activities that must be conducted at night for safety reasons would		Prior to and during	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
comply with San Bernardino County standards for construction noise levels.		construction	
MM-Wild-1: Designated Desert Tortoise Biologist: Prior to ground disturbing activities, one or more individuals shall be designated by the Applicant and approved by the BLM and wildlife agencies (USFWS and CDFW) as a Designated Biologist (i.e., field contact representative). The Designated Biologist should possess a bachelor's degree in biology, ecology, wildlife biology, herpetology, or closely related fields as determined by the BLM and USFWS. The Designated Biologist must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign. In addition, the Designated Biologist would have the ability to recognize and accurately record biological information. The Designated Biologist shall be employed for the period during which on-going construction and post-construction monitoring and reporting by an approved biologist is required, such as annual reporting on habitat restoration. Each Designated Biologist shall be approved by the BLM's Authorized Officer (i.e., BLM field manager, Needles Field Office). The Designated Biologist shall have the authority to ensure compliance with the Conservation Measures for the desert tortoise set forth in the BO and mitigation measures specified in the BLM ROW grant, and will be the primary agency contact for the implementation of these measures. The Designated Biologist will have the authority and responsibility to halt any proposed Stateline facility activities that are in violation of the BO Conservation Measures or terms and conditions. A detailed list of responsibilities of the Designated Biologist is summarized below. To avoid and minimize effects to biological resources, the Designated Biologist shall: • Notify BLM's Authorized Officer and the USFWS at least 14 calendar days before the initiation of ground disturbing activities. • Immediately notify BLM's Authorized Officer and the USFWS in writing if the Applicant does not comply with any BO Conservation Measures or terms and conditions including, but not limited to, any anticipated failure to implement BO Conservation Measures or terms and conditions within the periods specified. • Conduct compliance inspections daily during on-going construction as clearing, grubbing, and grading are completed, and submit a monthly compliance report to BLM's Authorized Officer until construction is complete.		Prior to and during construction	BLM, USFWS, and CDFW
MM-Wild-2: Desert Tortoise Authorized Biologists and Biological Monitors. An appropriate number of authorized biologists and biological monitors shall be present during construction for the protection of desert tortoises. The names of all authorized biologists shall be submitted to the BLM, USFWS, and CDFW for review and approval at least 30 days prior to initiation of any desert tortoise clearance surveys. Project activities shall not begin until authorized biologists and biological monitors have been approved. Replacements of authorized biologists shall require BLM and USFWS approval. Authorized Biologists are those biologists who have been approved to handle desert tortoises by the USFWS and CDFW under authority of the Biological Opinion and State Incidental Take Permit. Biological Monitors are qualified biologists who perform construction monitoring activities but lack authority to handle desert tortoises, except when a tortoise is in immediate danger. The BLM shall approve all biological monitors.		Prior to and during construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
The Biological Monitor will be a qualified biologist who shall be responsible for identification of habitat that supports special status species. The Biological Monitor shall be responsible for implementation of measures requiring a qualified biologist's intervention. Biological monitors work under the direction of Authorized Biologists and the Designated Biologist(s). Authorized biologists and biological monitors would be assigned to monitor each area of activity where conditions exist that may result in take of desert tortoise (e.g., clearing, grading, lowering in pipe, backfilling, recontouring, and reclamation activities). An Authorized Biologist or Biological Monitor shall be assigned to each active construction area. The Authorized Biologist and Biological Monitor shall also be responsible for inspecting the integrity of tortoise fencing through the project life, and walking the fenceline to identify and, if necessary, handle tortoises that show signs of fenceline distress. The Authorized Biologist and Biological Monitor shall have the contractual authority to temporarily halt construction should a federally listed, state listed, or special status species be found or encountered during construction activities so that procedures may be implemented to either relocate the species (if applicable) or notify the appropriate agency personnel. Only Authorized Biologists approved by the USFWS and CDFW shall be permitted to handle desert tortoises in cases where a tortoise must be moved out of harm's way or translocated. Only Authorized Biologists may handle desert tortoises to implement the requirements of the Translocation Plan. Biological Monitors shall provide clearance when heavy equipment is driven or tracked to new areas of the Proposed Action or areas that have not been actively in construction. Clearing is achieved by walking or driving ahead of (escorting) the equipment and surveying for desert tortoises that could be crushed. If a desert tortoise is found in a travel lane, travel shall be halted until the tortoise has either moved off of the road on its own, or if after 15 minutes, an Authorized Biologist has moved it from the road. Authorized biologists, under the direction of the Designated Biologist, shall be responsible for determining compliance with measures as defined by the Biological Opinion and other agreements. Authorized biologists shall maintain a detailed record of all desert tortoises encountered during project surveys and monitoring. Environmental inspection and monitoring procedures will be in compliance with the environmental commitments documented in the EIS/EIR and any special conditions that will be required as part of other applicable Federal and/or State permits, approvals, or licenses.			
MM-Wild-3: Worker Environmental Awareness Program (WEAP). All applicant employees and contractors working in the field would complete a WEAP administered by a qualified biologist that is familiar with the species in question. Program content would be approved by the BLM and appropriate state agencies. Training shall primarily be administered in a location off of the ROW; however, Biological Monitors may provide in-field training in situations where this is necessary. A detailed log of all personnel having received WEAP training shall be maintained. At a minimum, the program would cover species identification, distribution, general behavior and ecology, sensitivity to human activities, threats (including introduction of exotic plants and animals), legal protection, penalties for violations of federal and state laws, reporting requirements, and Project-related protective measures in the Biological Opinion. All field workers would be instructed that activities must be confined to locations within the approved Proposed Action area. In addition, the program would include fire prevention measures to be implemented by employees during construction of the Proposed Action. The program would		Prior to construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
instruct participants to report all special status species observations during construction activities to a Biological Monitor.			
MM-Wild-4: Delineation and identification of sensitive areas. Prior to construction, the Applicant shall stake, flag, fence or otherwise conspicuously delineate all environmentally sensitive areas that are to be protected in place and remain undisturbed during construction. All disturbances, vehicles, and equipment shall be excluded from the flagged areas.		Prior to construction	BLM
MM-Wild-5: Existing routes of travel. Existing routes of travel would be used for ingress and egress to the project site. Access roads that require improvement in habitats occupied by desert tortoise or other special-status or protected wildlife would have an authorized biologist or biological monitor survey the area prior to modification of the route. Cross-country travel by vehicles and equipment would be prohibited. *Traffic speeds on unpaved roads shall be limited to no more than 25 miles per hour within the desert tortoise fenced areas and 15 miles per hour outside the fenced areas* ~~Speed limits along all access roads shall not exceed 15 miles per hour~~ in order to minimize dust during construction and O&M activities.	Traffic speed limits will act both to protect wildlife and to reduce air emissions. The lower speed limit of 15 mph was developed specifically for wildlife protection, and is not necessary for air emissions. Therefore, a higher speed limit inside the fenced areas is appropriate.	Prior to and during construction	BLM
MM-Wild-6: Pre-construction surveys for desert tortoise. Construction sites, staging areas, and access routes would be cleared by a qualified desert tortoise biologist before the start of construction, ground-disturbing activities, equipment or vehicle staging, or other actions with the potential to harm or kill desert tortoises or other special-status and protected wildlife. Authorized biologist(s) or biological monitor(s) must survey the site for desert tortoises using agency-approved survey techniques. If construction occurs during the desert tortoise active season (March 1 through October 31), or when temperatures and environmental conditions are conducive to tortoise activity as determined by an authorized biologist, the survey would occur within 48 hours before surface disturbance. During the inactive season (November 1 through February 28, except as noted above), when conditions are not conducive to tortoise activity as determined by an authorized biologist, one survey must occur within 72 hours of surface disturbance or up to five days in advance of disturbance if conditions are not favorable for tortoise activity.		Prior to construction	BLM, USFWS, and CDFW
MM-Wild-7: Desert Tortoise Handling. Impacts on the desert tortoise shall be mitigated by relocating any individuals observed within the immediate construction area to suitable habitat outside the development		Prior to and during	BLM, USFWS,

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
impact footprint, as feasible. Only an Authorized Biologist, possessing necessary permits, shall relocate individuals. All relocations of desert tortoises shall be documented and reported to the appropriate jurisdictional agencies, and consultation prior to relocation may be required. Tortoises excavated from burrows must be relocated to unoccupied natural or artificially constructed burrows immediately following excavation. Relocation of tortoises shall be done in accordance with the Applicant's Translocation Plan, Conservation Measures specified in the BO, and mitigation measures specified in the BLM ROW grant. All potential desert tortoise burrows found in the construction zone, whether occupied or not, shall be excavated by an authorized biologist to allow removal of desert tortoises or desert tortoise eggs. Tortoises and nests found within the Proposed Action area must be relocated by an authorized tortoise biologist in accordance with the latest USFWS-approved protocol detailed in the Desert Tortoise Field Manual (USFWS 2009). Unoccupied burrows would be collapsed or blocked to prevent tortoise re-entry. Any desert tortoise burrows and pallets that are observed outside of but within 50 feet of the construction work area must be flagged for avoidance. No stakes or flagging shall be placed on the berm or in the mouth of a desert tortoise burrow. Desert tortoise burrows shall not be marked in a manner that facilitates poaching. Avoidance flagging must be designed to be easily distinguished from access route or other flagging, and would be designed in consultation with experienced construction personnel and authorized biologists. All flagging shall be removed following construction activities. Procedures for handling tortoises would follow those described in the Desert Tortoise Field Manual (USFWS 2009c). All tortoises would be handled using disposable surgical gloves. The gloves would be disposed of after handling each tortoise. Equipment or materials that contact desert tortoises must be sterilized, disposed of, or changed before contacting another tortoise. Desert tortoises must only be moved for the purpose of moving the tortoises out of harm's way. The authorized biologist would document each tortoise encounter/handling with the following information, at a minimum: a narrative describing circumstances; vegetation type; dates of observations; conditions and health; any apparent injuries and state of healing; if moved, the location from which it was captured and the location where it was released; maps; whether animals voided their bladders; and diagnostic markings (that is, identification numbers marked on lateral scutes). Whenever a vehicle or construction equipment is parked longer than 10 minutes within desert tortoise habitat, whether the engine is engaged or not, the ground around and underneath the vehicle shall be inspected for desert tortoises prior to moving the vehicle. If a desert tortoise is observed, an authorized biologist shall be contacted. If the tortoise does not move on its own within 15 minutes, the tortoise shall be removed and relocated by the authorized biologist prior to vehicle movement. Water shall not be allowed to pool on the access roads, or any other area of the Proposed Action where the potential for desert tortoise presence exists. In particular, water storage tanks shall be monitored for leaks, and dust control trucks shall be monitored for pooling water. Any construction pipe, culvert, or similar structure with a diameter greater than three inches above ground on the construction site for one or more nights shall be inspected for tortoises before the material is moved, buried, or capped by the Applicant. As an alternative, structures may be capped before being stored on the		construction	and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
construction site. Any movement of a desert tortoise identified in advance of construction would be limited to that necessary to move the individual out of harm's way. The movement would be conducted only by the Authorized Biologist, in accordance with procedures defined in the Biological Opinion. A Biological Monitor would be present during operation and maintenance activities within occupied desert tortoise habitat, and pre-maintenance clearance surveys. Exclusionary fencing would be required in occupied desert tortoise habitat if the maintenance action requires significant ground disturbance.			
MM-Wild-8: Habitat Acquisition for Desert Tortoise. To compensate for desert tortoise habitat affected during construction, these effects would be offset through either an acceptable land acquisition, habitat improvements or an assessed financial contribution, based on the final construction footprint. **Compensation Ratio** The Applicant would provide compensatory mitigation at a 3:1 ratio for impacts to 2,143 acres (for the Proposed Action) or other acreage disturbed by the final project footprint. For compliance with the California Endangered Species Act (CESA), as administered by the CDFW, at least two-thirds of the 3:1 mitigation would be achieved by acquisition, in fee title or in easement, of land suitable for desert tortoise, or by habitat enhancement, such as retirement of grazing, as allowed for under the CDFW's Interim Mitigation Strategy As Required by SB X8 34, September, 2010. The Applicant would provide funding for the acquisition, initial habitat improvements, and long-term management endowment of these CDFW compensation lands. The remaining one-third of the 3:1 compensatory mitigation would be developed in accordance with BLM's mitigation requirements as described in the NEMO Plan Amendments. The formula includes both payment of credits into a conservation fund, and land purchase. This mitigation would require the acquisition of up to 2,143 acres of land (or area equivalent to the final approved ROW grant) within the Eastern Mojave Recovery Unit, or desert tortoise habitat enhancement or rehabilitation activities that meet BLM's approval, or some combination of the two. Potential habitat enhancement or rehabilitation activities could include, but are not limited to: fencing of major road ways; facilitation of tortoise connectivity (e.g. adding culverts); removal of grazing (as already identified in NEMO); tortoise head start; restoration of illegal, unauthorized, or closed routes; safing of abandoned mines; or providing increase law enforcement or education out reach. Under federal law, mitigation is required to be reasonably related to the affected area (nexus) and roughly proportionate to the development's proposed impacts. Land that is acquired and donated to the federal government for management by the BLM remains subject to all public land laws, including FLPMA. **Route Rehabilitation Specifications** For route rehabilitation completed as part of the compensation requirements, restoration of the impacted area shall include the physical modifications necessary to return the area to a state approaching pre-disturbance conditions. The following provides specifications for the rehabilitation. Restoration steps shall include ripping to decompact the soil, vertical mulching, relocation of native shrubs,		Prior to the energizing of the project substation.	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
and removal of Russian thistle or other non-native species. Small to medium-sized boulders shall be transported from nearby areas using small excavating equipment. Vertical mulching, or relocation of dead vegetation and other organic material, into the area shall be performed with hand equipment or excavating equipment. This material as well as live shrubs for replanting shall be gathered from areas to be disturbed within the Stateline Solar Farm project area. Only as many plants as needed to mask the restoration area shall be used, and shall not exceed 15 percent of the plants in the surrounding area. Transplanted plants shall consist solely of those species that are common in the surrounding plant community (e.g., creosote bush [*Larrea tridentata*], cheesebush [*Ambrosia salsola*], burrobush [*A. dumosa*], four-winged saltbush [*Atriplex canescens*] cattle spinach [*Atriplex polycarpa*], Mojave yucca [*Yucca spp.schidigera*] and succulents [cholla, club cholla, barrel cactus, hedgehog cactus, pincushion cactus]). To achieve replanting, a hole of adequate size to accommodate the root mass of the shrub shall be manually excavated, and the shrub shall be placed in the hole with care to minimize damage to its roots. Caution shall be exercised to minimize and, where possible, eliminate crushing of vegetation during these activities, consistent with the restoration objectives of the project. Water shall be used to water relocated live shrubs after planting. Water shall be supplied by a water truck or from a water tank carried on a utility truck. The crew for the reclamation effort shall consist of not more than 10 persons including supervisory staff and monitors. The equipment that may be used shall consist of pickup trucks, flat-bed 2½ ton truck and trailer, water truck, small excavating equipment (such as backhoe or bobcat) and a skip loader. Daily preconstruction safety meetings shall take place and all activities shall adhere to a site-specific health and safety plan. Dust control measures shall be implemented to minimize fugitive dust and vehicle emissions. Water shall be applied to dirt surfaces to minimize visible dust. Rehabilitation activities shall not be conducted during high wind warnings. Work shall be suspended if watering is insufficient to prevent visible dust. Vehicles shall be washed if visible dust accumulates on the outside or undercarriage. Motorized vehicles and equipment shall be kept in good operating condition per manufacturer specifications and not allowed to idle. To the extent feasible, the spread of invasive non-native weed species shall be avoided by clean vehicles/equipment and limiting the area of disturbance. To limit the potential for the spread of noxious weeds, before entering the proposed work area, project vehicles shall be clean. All vehicles shall be inspected daily prior to entering the work area to ensure that they are free of mud, dirt, and vegetation. Those not clean shall be required to be washed at an offsite vehicle wash station before entering the proposed work area. Biological Monitors shall inspect visible restoration segment prior to ground disturbance activities for presence of target noxious weeds. To avoid impacts to sensitive biological resources, biological monitoring of all rehabilitation shall be performed during implementation of the proposed activities. All workers shall be trained to recognize desert tortoise and other important sign, and to notify the Biological Monitor of any tortoise sign observations. The approved Biological Monitor shall remain onsite during restoration activities to monitor for compliance			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
with federal agency requirements. The Biological Monitor shall have the authority to stop work in the immediate vicinity of a resource in jeopardy, if necessary. Biological Monitors shall assure that all project-generated trash and food items are placed in closed containers and removed daily. The proposed project activities shall limit the disturbance area to the minimum required to perform the work. Project personnel shall carefully check under parked vehicles and equipment for desert tortoises before operation. A USFWS-approved Authorized Biologist shall only move desert tortoises found in imminent danger to a location away from danger and in accordance with the tortoise handling procedures described in the Guidelines for Handling Desert Tortoise During Construction Projects (Desert Tortoise Council, 1994). In the event of a relocation or observation of a recently dead or injured listed species, the Biological Monitor shall notify the Designated Biologist, who shall notify BLM's Authorized Officer and USFWS immediately by phone and in no event later than noon on the business day following the event, if it occurs outside normal business hours, so that the agencies can determine what further actions, if any, are required to protect listed species. The Designated Biologist shall prepare written follow-up notification via FAX or electronic communication to these agencies within 2 calendar days of the incident and include the following information, as relevant: the date, time, location, circumstances of the incident, and the name of the approved veterinary facility where the animal was taken. Protection measures shall be implemented to mitigate any potential adverse impacts caused by inadvertent discovery of buried cultural resources during project execution. These measures include: (1) designation of a cultural resources specialist to be on-call to investigate any cultural resources finds made during proposed activities; (2) implementation of a construction worker training program; (3) procedures for halting work due to inadvertent discovery of archaeological deposits or human remains; (4) procedures for evaluating an inadvertent archaeological discovery; and (5) procedures to mitigate adverse impacts on any inadvertent discovery of National Register of Historic Places eligible archaeological resources. Maintenance activities shall consist of irrigation of transplanted vegetation and management of areas where non-native vegetation has been removed. The restoration effort shall also be monitored to assess the effectiveness of the restoration, and additional restoration efforts shall be conducted as needed to achieve the objectives of the proposed action over a five-year period. Restoration status reports shall be submitted to the BLM annually. **Compensation Timing** The compensation requirements shall be completed no more than 18 months following the start of project construction.			
MM-Wild-9: Night Lighting. The Applicant shall minimize night lighting during construction by using shielded directional lighting that is pointed downward thereby avoiding illumination to adjacent natural areas and the night sky.		During construction	BLM
MM-Wild-10: Raven Control Plan. The Applicant shall implement their Raven Control Plan (First Solar 2012h) for the project. The Raven Control Plan shall identify the purpose of conducting raven control and		During construction	BLM

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
include, at a minimum, training on how to identify raven nests and how to determine whether a nest belongs to a raven or a raptor species; describe the seasonal limitations on disturbing nesting raptors; describe raven control methods to be employed (e.g. perching and nesting deterrents); and describe procedures for documenting the activities on an annual basis. The plan shall provide details on the specific measures for storage and disposal of all litter and trash to discourage scavengers that may prey on the desert tortoise. The Applicant shall include in the trash abatement program a provision to require trash containers or bags be in or affixed to all project vehicles. All trash, including food scraps and cigarette butts, shall be placed immediately into a raven-proof container on the ROW for weekly removal or be placed in a crew vehicle trash container that shall removed daily. Trash shall not be discarded onto the ROW.			
MM-Wild-11: Bird and Bat Conservation Strategy. The Applicant shall implement their Bird and Bat Conservation Strategy (First Solar 2012g), which includes measures for protection and monitoring of golden eagles. The document includes measures to identify resident and migratory birds, and bat species that could potentially be present, identifies project-related activities that could affect individuals or habitat, defines measures to be used to minimize the potential for impacts, and establishes a monitoring program to evaluate the strategy. The Bird and Bat Conservation Strategy also serves as an Eagle Conservation Plan to address Stateline facility impacts to golden eagles. The Eagle Conservation Plan was prepared in accordance with the Draft Eagle Conservation Plan Guidance (USFWS 2011c). The Eagle Conservation Plan describes the golden eagle studies completed for the proposed facility; a risk analysis; advanced conservation practices to be implemented during operations (if needed), including a description of the adaptive management strategy for the proposed facility and compensatory mitigation; and post-construction monitoring and reporting procedures for golden eagles.		During construction	BLM, USFWS, and CDFW
MM-Wild-12: Bird breeding season. The Applicant's Bird and Bat Conservation Strategy (First Solar 2012g) includes measures to mitigate construction impacts to MBTA species. The Applicant would perform vegetation removal prior to MBTA nesting season, implement seasonal buffers, and adhere to timing restrictions. Timing restrictions and buffers would be cooperatively determined by the agencies (USFWS, BLM, and CDFW). Vegetation within a disturbance area that may support active nests shall only be removed during the non-nesting season (approximately September-March). If this is not possible, a pre-construction nest survey must be conducted by a qualified biologist to determine the presence of any active nests. If an active nest (defined as a nest showing supporting evidence of new material having been added during the season) is identified within the project area, it must be immediately protected until the young have fledged from the nest or the nest becomes inactive. Work can commence in adjacent areas, but an appropriate "no-occupancy" buffer zone must be established to protect the nest and its inhabitants until fledging. The size of the buffer zone is species and habitat dependent, and should be determined in coordination with the BLM, USFWS and CDFW. Minimum buffer zones are typically 50 feet and they may be larger for listed species or raptors. Sound or visual barriers may be erected in coordination with biological monitoring if necessary.		During construction	BLM, USFWS, and CDFW
MM-Wild-13: **Management of Temporary Water Storage Ponds.** Temporary water storage ponds shall be fitted with protective netting or other structures, as required by CDFW, to eliminate their use as a water source by avian species. The design and construction of the ponds will use the following:		During construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
• Anti-perching devices will be installed around the perimeter of each pond to exclude ravens and other birds from accessing the edge of the ponds; • Ponds will be lined to avoid infiltration and re-surfacing of open water outside of the pond area; • The ponds will be covered with netting or other structures to reduce avian access; • Ponds will operate only for the minimum amount of time necessary to complete construction in the area they were intended to support, and will be closed once construction in each area is completed; • Monitoring of the ponds and the integrity of the netting/structures will be performed. The Applicant shall consult with BLM, USFWS, and CDFW regarding appropriate netting material and other design requirements.			
MM-Wild-14: **Compliance Reporting**. All encounters with special status species shall be immediately reported to the Designated Biologist, who shall record the following information: • Species name; • Location (narrative and maps) and dates of observations; • General condition and health, including injuries and state of healing; • Diagnostic markings, including identification numbers or markers; and • Locations moved from and to (if applicable). Within 60 days following project completion, the applicant shall submit a post-construction monitoring report to the BLM and USFWS. The report shall document the effectiveness of each avoidance and minimization measure; the actual acreage disturbed by project activities by habitat type; the number of individual special status species observed during construction; the number of individuals killed, harmed, harassed, or injured in accordance with the incidental take statement; and any other pertinent information. The report shall also make recommendations for modifying avoidance and minimization measures in order to enhance species protection in the future.		During construction, operations, and decommissioning	BLM, USFWS, and CDFW
MM-Wild 15: Desert Kit Fox Protection. To avoid direct impacts to desert kit fox, the Applicant shall implement their Desert Kit Fox and American Badger Monitoring and Management Plan (First Solar 2013b). The Plan shall include the following measures: 1. **Prepare Desert Kit Fox Management Plan:** At least 45 days prior to construction, the Applicant shall prepare a Desert Kit Fox Management Plan that: 1) incorporates desert kit fox census and health survey findings from the clearance surveys into a cohesive management strategy that minimizes disease risk to kit fox populations; 2) specifically identifies preconstruction survey methods for kit foxes in the Project area; 3) describes preconstruction and construction-phase relocation methods from the site, including the possibility for passive and active relocation from the site (and outlines identified CDFW permit and MOU requirements for active relocation), and; 4) coordinates survey findings prior to and during construction to meet the		Prior to and during construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
information needs of wildlife health officials in monitoring the health of kit fox populations. The Plan shall include contingency measures that would be performed if canine distemper were documented in the Project area or in potential relocation areas, and measures to address potential kit fox reoccupancy of the site. The contents and requirements of the Plan shall be subject to review and approval by the BLM Authorized Officer in consultation with USFWS and CDFW. 2. **Implement Desert Kit Fox Management Plan:** If canine distemper is not identified in the Project area or relocation areas during baseline surveys, the mitigation strategy may utilize passive means or active means with appropriate CDFW authorization to relocate kit foxes from the site. The approach below assumes that canine distemper is not detected during baseline surveys. a. Pre-Construction Surveys: Biological Monitors shall conduct pre-construction surveys for desert kit fox no more than 30 days prior to initiation of construction activities. Surveys shall also consider the potential presence of active dens within 100 feet of the project boundary (including utility corridors and access roads) and shall be performed for each phase of construction. If dens are detected each den shall be classified as inactive, potentially active, or definitely active. b. Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by kit fox. c. Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for five consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance. d. 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. e. If tracks are observed, the den shall be progressively blocked with natural materials (rocks, dirt, sticks, and vegetation piled in front of the entrance) for the next three to five nights to discourage the kit fox from continued use. After verification that the den is unoccupied it shall then be excavated and backfilled by hand to ensure that no kit fox are trapped in the den. f. If an active natal den (a den with pups) is detected on the site, the BLM Authorized Officer and CDFW shall be contacted within 24 hours to determine the appropriate course of action to minimize the potential for animal harm or mortality. The course of action would depend on the age of the pups, location of the den on the site (e.g., is the den in a central area or in a perimeter location), status of the perimeter site fence (completed or not), and the pending construction activities proposed near the den. A 500-foot no-disturbance buffer shall be maintained around all active dens. g. The following measures are required to reduce the likelihood of distemper transmission: i. No pets shall be allowed on the site prior to or during construction, with the possible exception of kit fox scat detection dogs during preconstruction surveys, and then only with prior CDFW approval; ii. Any kit fox hazing activities that include the use of animal repellents such as coyote			

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
urine must be cleared through CDFW prior to use, and; iii. Any sick or diseased kit fox, or documented kit fox mortality shall be reported to CDFW and the BLM Authorized Officer within 24 hours of identification. If a dead kit fox is observed, it shall be retained and protected from scavengers until CDFW determines if the collection of necropsy samples is justified. Relocation sites on BLM administered lands remain subject to public land laws, including FLPMA.			
MM-Wild 16: Burrowing Owl Mitigation Plan. The Applicant shall prepare and implement a final Burrowing Owl Mitigation Plan. The Plan shall be approved by the BLM AO in consultation with USFWS and CDFG, and shall: a. identify suitable sites as close as possible to the Project site, and within 1 mile of the Project Disturbance Areas for creation or enhancement of burrows prior to passive relocation efforts; b. provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl; c. provide detailed methods and guidance for passive relocation of burrowing owls occurring within the Project disturbance area; and d. describe monitoring and management of the passive relocation effort, including the created or enhanced burrow location and the project area where burrowing owls were relocated from and provide a reporting plan. e. include the following elements related to artificial burrow relocation: i. A brief description of the project and project site pre-construction; ii. The mitigation measures that will be implemented; iii. Potential conflicting site uses or encumbrances; iv. A comparison of the occupied burrow site(s) and the artificial burrow site(s) (e.g., vegetation, habitat types, fossorial species use in the area, and other features); v. Artificial burrow(s) proximity to the project activities, roads and drainages; vi. Artificial burrow(s) proximity to other burrows and entrance exposure; Photographs of the site of the occupied burrow(s) and the artificial burrows; vii. Map of the project area that identifies the burrow(s) to be excluded as well as the proposed sites for the artificial burrows; viii. A brief description of the artificial burrow design; ix. Description of the monitoring that will take place during and after project implementation including information that will be provided in a monitoring report.		Prior to and during construction	BLM, USFWS, and CDFW

Mitigation Measure	Modification & Rationale	Timing for Implementation	Monitoring Agency(s)
x. A description of the frequency and type of burrow maintenance f. address the following elements related to the exclusion plan: i. Confirm by site surveillance that the burrow(s) is empty of burrowing owls and other species by use of a fiber-optic endoscope or comparable device; ii. Describe the type of scope and appropriate timing of scoping to avoid impacts; iii. Describe occupancy factors to look for and what will guide determination of vacancy and excavation timing (e.g., one-way doors should be left in place 48 hours to ensure burrowing owls have left the burrow before excavation, visited twice daily and monitored for evidence that owls are inside and can't escape); iv. Identify how the burrow(s) will be excavated (excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow); v. Describe removal of other potential owl burrow surrogates or refugia on site; Photographing the excavation and closure of the burrow to demonstrate success and sufficiency; vi. Describe required monitoring of the exclusion site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take; vii. Identify how the impacted site will continually be made inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until development is complete. 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 to August 31st) the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall make recommendations to minimize or avoid such disturbance. Relocation sites on BLM administered lands remain subject to public land laws, including FLPMA.			

APPENDIX 5

ENVIRONMENTAL CONSTRUCTION AND COMPLIANCE MONITORING PROGRAM

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ENVIRONMENTAL AND CONSTRUCTION COMPLIANCE MONITORING PROGRAM

STATELINE SOLAR FARM PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

December 2013

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ENVIRONMENTAL AND CONSTRUCTION COMPLIANCE MONITORING PROGRAM

STATELINE SOLAR FARM PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

Lead Agency:

United States Department of the Interior
Bureau of Land Management

Environmental Impact Statement
Case File Number: CACA No. 48669

Stateline Solar Farm Project
Decision to Grant Right-of-Way

United States Department of the Interior, Bureau of Land Management
Needles Field Office
1301 South Hwy. 95
Needles, California 92363

December 2013

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TABLE OF CONTENTS

FIGURE

ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

AO	authorized officer
BLM	Bureau of Land Management
CD	compliance director
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CL	compliance lead
CM	compliance manager
County	County of San Bernardino
ECCMP	environmental and construction compliance monitoring plan
ECM	environmental compliance monitor
EI	environmental inspector
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Endangered Species Act
NEPA	National Environmental Policy Act
NTP	Notice to Proceed
PM	project manager
POD	Plan of Development
ROD	Record of Decision
ROW	right-of-way
SCT	surface compliance technician
SSFR	Stateline Solar Farm Project
SWPPP	Storm Water Pollution Prevention Plan
USFWS	United States Fish and Wildlife Service
WEAP	Worker Environmental Awareness Program

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1.0 INTRODUCTION

1.1 BACKGROUND

The United States Bureau of Land Management (BLM) may issue a right-of-way (ROW) grant authorizing the construction, operation, maintenance, and decommissioning of the Stateline Solar Farm Project (SSFP). The applicant, Desert Stateline, LLC, is a wholly-owned subsidiary of First Solar Development, Inc. The ROW will be issued for a term of 30 years with a right of renewal in accordance with 43 Code of Federal Regulations (CFR) 2807.22. The ROW grant will allow the SSFP the right to use, occupy, and develop public lands to construct, operate, maintain, and decommission an approximately 2,143-acre, 300-megawatt alternating current solar photovoltaic energy generation facility in San Bernardino County (County). The SSFP site is located in the Ivanpah Valley near the California-Nevada border, approximately 2 miles southwest of the community of Primm, Nevada, and approximately 0.5 mile to the west of Interstate 15. Under the BLM's Selected Alternative, which is Revised Alternative 3 in the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR), the SSFP would be located entirely on public lands managed by the BLM Needles Field Office.

The BLM will have the primary oversight and regulatory authority over the SSFP's construction lifecycle in accordance with the National Environmental Policy Act (NEPA). Under Memorandum of Understanding Agreement No. 03-1211 between the BLM and the County, facilities requiring groundwater wells fall under the County's jurisdiction and would, therefore, be required to comply with County Ordinance No. 3872 regarding permitting and monitoring of groundwater extraction wells, including applicable local conditions of approval and mitigation measures stipulated in the well permit and Final EIS/EIR, respectively.

The Council on Environmental Quality has established regulations for implementing NEPA (40 CFR 1500-1508). NEPA requires mitigation monitoring in 40 CFR 1505.2(c), with additional specificity provided in the BLM NEPA Handbook (H-1790-1), Chapter 10 (Monitoring). The BLM also served as the lead federal agency for Section 7 consultation under the Endangered Species Act (ESA), and Section 106 consultation under the National Historic Preservation Act for the SSFP.

1.2 PURPOSE

The BLM requires holders of ROW grants to prepare and fund an environmental and construction compliance monitoring program and adhere to an environmental and construction compliance monitoring plan (ECCMP) developed by the BLM. The purpose of the ECCMP is to provide an on-the-ground approach to compliance during project construction which is designed to facilitate successful implementation. This, in part, includes ensuring the developer complies with the following:

- Required mitigation approved in the Record of Decision (ROD), designated to minimize and/or offset impacts to the human, environmental, and cultural environment
- Implementation plans based on mitigation requirements

- Terms, conditions, and stipulations in the ROW grant
- Conditions in Notices to Proceed (NTPs)
- Approved methodologies and construction plans within the Plan of Development (POD) for the project, which mirror the action approved in the ROD

1.3 OBJECTIVES

The overall objective of the ECCMP is to clarify agency requirements and expectations of the SSFP and the BLM Compliance Monitoring Team during the preconstruction, construction, and initial operation phases of the SSFP. The following elements are included in the ECCMP to support this objective:

- A description of the roles and responsibilities of the Compliance Monitoring Team
- A definition of the decision-making authority for each role within the Compliance Monitoring Team
- The level of effort anticipated from the Compliance Monitoring Team members
- Communication protocols among Compliance Monitoring Team members
- A description of the monitoring, reporting, and documentation requirements, including adaptive management processes during construction

In order to ensure the ECCMP remains applicable to changing site-specific conditions throughout project development, the ECCMP is a dynamic plan and may be modified at any juncture of the SSFP's lifecycle. Modifications to the document may be requested by Desert Stateline, LLC, the BLM project manager (PM), or the Compliance Director (CD). Ultimate approval of any modifications to the plan will be made by the BLM Administrative Officer.

2.0 AUTHORITY OF THE ECCMP

In addition to the BLM's administration of approved activities on public land, other local, State, and federal agencies may have jurisdiction over resources or activities within the project limits and may issue permits containing conditions for these activities. Jurisdictional agencies' designated representatives may visit construction areas at any reasonable and safe time, and may require information regarding the status of compliance with permit conditions issued by their respective agencies. While these data requests will be satisfied by Desert Stateline, LLC and coordinated with the BLM Compliance Monitoring Team, the CM team will be responsible for tracking implementation of and adherence to these conditions during the preconstruction and construction process in support of the BLM. It is expected that Desert Stateline, LLC will ensure this documentation is provided to the BLM CD and PM in a timely fashion.

2.1 FEDERAL

The following federal documents may contain environmental mitigation requirements, stipulations, terms, conditions, and other measures requiring deliverables from Desert Stateline, LLC prior to, during, and post construction:

- 2014 ROD for the SSFP (lead agency, BLM), containing:
  - Project design features and mitigation
  - A Biological Opinion (2800P) issued by the United States Fish and Wildlife Service (USFWS) developed in accordance with the ESA (16 United States Code 1531-1544)
  - An Incidental Take Statement issued by the USFWS pursuant to Section 7(a)(2) of the ESA
- Federal Land Policy and Management Act ROW Grant (lead agency, BLM), containing:
  - Terms, conditions, and stipulations
  - Notices to Proceed, which may contain additional conditions
  - Construction procedures in the approved POD for the project

2.2 STATE

The following State permits and documents may contain environmental mitigation requirements, stipulations, terms, conditions, and other measures requiring deliverables from Desert Stateline, LLC prior to, during, and post construction:

- Section 1601 Lake or Streambed Alteration Agreement process under the California Fish and Game Code (lead agency, California Department of Fish and Wildlife [CDFW])
- Clean Water Act, Sections 401 and 402, California Porter-Cologne Water Quality Control Act, California Water Code, Division 7. Water Quality 401 Certification, Stormwater Construction

General Permit 99-08-DWQ and Stormwater Pollution Prevention Plan (SWPPP), National Pollutant Discharge Elimination System General Permit, Waste Discharge Requirements (Lahontan Regional Water Quality Control Board)

2.3 LOCAL

The following local permits may contain environmental mitigation requirements, stipulations, terms, conditions, and other measures requiring deliverables from Desert Stateline, LLC prior to, during, and post construction:

- County of San Bernardino
  - Water wells (production and monitoring)
- Mojave Desert Air Quality Management District
  - Dust Control Plan

3.0 ROLES AND RESPONSIBILITIES

Desert Stateline, LLC will establish a Compliance Monitoring Team for the SSFP. The organization chart depicted in Figure 1 provides the organizational structure of the team. In general, the Compliance Monitoring Team will consist of BLM personnel; third-party contractor compliance personnel, hired by Desert Stateline, LLC but accountable to and directed by the BLM; and Desert Stateline, LLC personnel. This section describes roles, responsibilities, level of effort, and authority of key project personnel within the Compliance Monitoring Team with respect to the ECCMP.

3.1 BLM PERSONNEL

The BLM's Compliance Monitoring Team will consist of the authorized officer (AO) and/or his/her designated officer, or project manager (PM) in charge of compliance.

3.1.1 BLM Authorized Officer

The BLM AO will be the BLM Needles Field Office Manager with the administrative authority for the ROW grant issuance and authority for accepting and approving project-related changes. This may be the field office manager or his/her delegate.

3.1.2 BLM Project Manager

The BLM PM is designated by the BLM AO as the point of contact for all compliance-related issues. The BLM PM is the primary point of contact at the BLM for the CM and provides unified agency direction to the BLM/Desert Stateline, LLC Compliance Team. The BLM PM will ensure, to the extent practicable, that information requiring agency review will be disseminated internally and that comments and direction are consolidated and presented to the Compliance Monitoring Team.

3.1.3 BLM Resource Specialists

Various resource specialists may be involved with implementation of this project. They will assist the BLM PM and environmental monitors with evaluation of conditions and project status relative to mitigation requirements or other stipulations. The support staff will include archaeologists, biologists, geologists, and other specialists as required. Any information, maps, reports, findings, etc. that need to be reviewed by the BLM Resources Specialists shall be coordinated with the BLM's PM and the CM.

3.1.4 Surface Compliance Technician

The surface compliance technician (SCT) will serve as the on-the-ground BLM person responsible for observing and reporting compliance with the terms and conditions of the BLM

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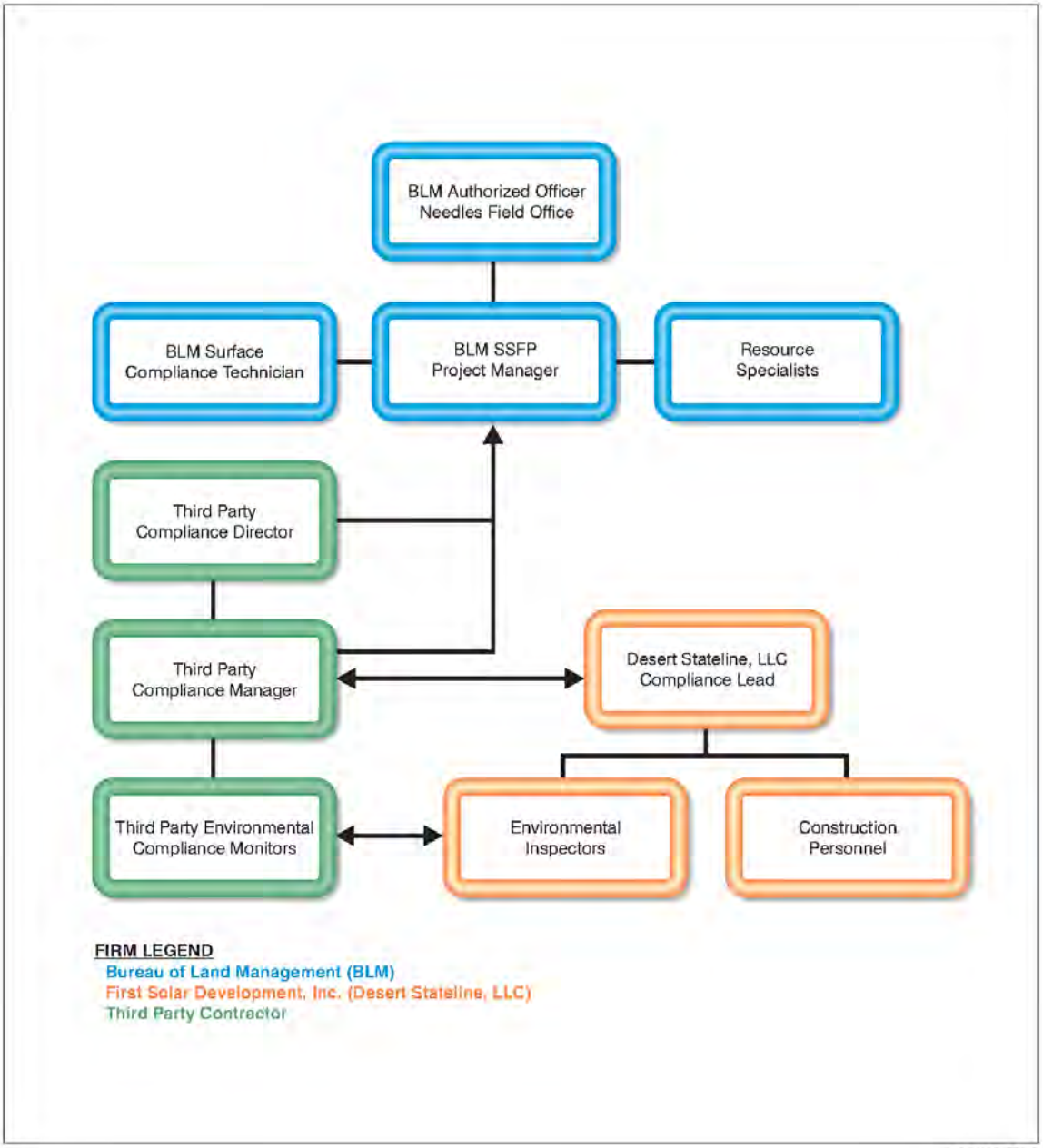

FIGURE 1

Stateline Solar Farm Project

Organization Chart
Environmental and Construction
Compliance Monitoring Program

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ROW authorization for all phases of project construction. The SCT will report to the BLM PM and his/her AO and will regularly collaborate with the CM and the Desert Stateline, LLC environmental inspectors (EIs). The SCT will report all issues/concerns noted along the ROW to the Desert Stateline, LLC EI and/or the BLM environmental compliance monitors (ECMs) and/or CM.

3.2 THIRD-PARTY COMPLIANCE CONTRACTOR PERSONNEL

A third-party compliance contractor will be responsible for providing BLM third-party oversight and reporting services for the SSFP. The third-party compliance contractor will conduct such monitoring and reporting as extension of BLM staff. The third-party compliance contractor shall enter into a contractual agreement with Desert Stateline, LLC for third-party monitoring and reporting program services associated with implementing the SSFP and all necessary support activities.

The third-party compliance contractor will provide the expertise, staffing, and technical capabilities required for monitoring and reporting associated with a third-party compliance contractor program.

The third-party compliance contractor will not be responsible for implementation of the BLM terms, conditions, and stipulations in the ROW grant, the POD, and required mitigation as provided for in the ROD; these will be the responsibility of the ROW grant holder, Desert Stateline, LLC. Similarly, the third-party compliance contactor will not direct the day-to-day activities of the Desert Stateline, LLC personnel or subcontractors working on the site.

3.2.1 Compliance Director

The CD will have the oversight of contracts, budgets, and administrative processes, and may be consulted on major compliance issues with the CM. The CD may also facilitate the permit-to-construction transition process.

3.2.2 Compliance Manager

The CM will be the primary point of contact position for the BLM and Desert Stateline, LLC regarding all compliance-related issues (including variances) from an administrative perspective. The CM reports to the BLM AO and the BLM PM for compliance.

Specific responsibilities of the CM include, but are not limited to, the following:

- Overseeing management of the ECCMP
- Participating in the preconstruction meeting
- Supervising the ECMs' monitoring activities and schedules
- Providing guidance on and review of compliance issues
- Revising and processing variances
- Facilitating weekly construction progress meetings and providing weekly status updates

- Managing project documentation with respect to compliance (reviewing Desert Stateline, LLC and BLM Compliance Monitoring Team reports, and correspondence for the administrative record, etc.)
- Disseminating weekly reports
- Ensuring adherence to the Scope of Work and discussing all potential modifications with Desert Stateline, LLC

3.2.3 Environmental Compliance Monitors

The ECMs will serve as the on-the-ground personnel responsible for observing and reporting compliance with the terms and conditions of the BLM ROW authorization for all phases of project construction. The ECMs report to the CM, but collaborate with the Desert Stateline, LLC EIs on a daily basis.

Responsibilities. In general, the ECMs will be deployed on site to observe activities performed by Desert Stateline, LLC's EIs and construction and development crew and to ensure these activities meet the description outlined in the POD; the intent of approved mitigation; and the terms, conditions, and stipulations of the ROW grant.

Prior to the start of construction, the ECMs will become familiar with the SSFP's approved project design and the environmental and construction compliance management program, participate in the preconstruction meeting, participate in the Worker Environmental Awareness Program (WEAP) on an as-needed basis, and receive additional training as needed from Desert Stateline, LLC personnel. The ECMs will become familiar with the roles and responsibilities of the SSFP's immediate field team, environmental reporting responsibilities, and the chain of command.

Throughout construction, the ECMs will document Desert Stateline, LLC's compliance and/or non-compliance with the environmental requirements through the use of approved forms. The ECMs will record observations, including digital photograph documentation at each location visited. This process will ensure consistent and accurate reporting of site conditions at the time of inspection and will serve to record evolution of the site with respect to development. Each activity monitored will be assigned a compliance level.

The ECMs will regularly evaluate the effectiveness associated with environmental compliance monitoring in consultation with the CM and BLM PM to ensure the intent of the compliance plans are being adequately met. Designated environmentally sensitive areas (marked and/or flagged by the Desert Stateline, LLC EIs) will be regularly inspected to ensure protection of the resources.

The ECMs will review Level 1 Variances on site and may approve Level 1 Variance Requests, as appropriate to their authority level, for implementation of limited variations from mitigation measures previously agreed to by Desert Stateline, LLC or stipulated by other agencies (see Section 8, Variances).

In order to ensure a collaborative approach to environmental compliance, the ECMs will maintain, at a minimum, contact with the Desert Stateline, LLC environmental staff and the construction and development crew. This approach will allow Desert Stateline, LLC and the ECMs to exchange information on the status of construction and to discuss any significant construction events scheduled in

the near future. The ECMs may inspect all construction activities with Desert Stateline, LLC construction monitors or independently.

Authority. The ECMs on site will have the authority to halt any construction activity that has the potential to damage a sensitive resource. This could include activity in Non-compliance with a term, condition, or stipulation of a ROW grant, etc. In the event of potential Non-compliance, the ECM will immediately notify the Desert Stateline, LLC EI and the CM. The Desert Stateline, LLC lead EI will initiate his/her approved chain of command system to initiate issue resolution.

Level of Effort. The level of monitoring effort and staffing will be evaluated by the CD and the CM in consultation with the BLM PM, with input from the ECMs throughout the life of the project. The number of ECMs may be determined based on the specific activities during each construction phase.

3.3 DESERT STATELINE, LLC COMPLIANCE PERSONNEL

The Desert Stateline, LLC Compliance Monitoring Team will be responsible for development and implementation of the SSFP's compliance program. The Desert Stateline, LLC Compliance Monitoring Team will report internally to Desert Stateline, LLC supervisors and will report to the CM and the BLM, jointly.

In general, the Desert Stateline, LLC Compliance Monitoring Team will be responsible for communication and coordination with the applicable regulatory agencies and ensuring compliance with the various conditions and requirements of the full range of project permits and approvals. Desert Stateline, LLC will ensure excellent record keeping with respect to due diligence on mitigation (including plans, surveys, reports, and keeping plans current) and distribution of those materials to the BLM Compliance Monitoring Team via electronic methods.

The Desert Stateline, LLC compliance representatives for the project are identified in the following sections.

3.3.1 Compliance Lead

The compliance lead (CL) will be responsible for providing the appropriate level of resources for successful implementation of the ECCMP. The CL is the primary sole point of contact for the Desert Stateline, LLC Compliance Monitoring Team and, as such, will directly communicate with the CM as identified in Section 3.2.2 of this ECCMP. The CL directs the development and implementation of the preconstruction environmental planning, permitting, and compliance activities; the environmental inspection program; and environmental training. The CL will be the designated official responsible for high-level coordination and dispute resolution with respect to mitigation compliance and authorized terms and conditions of the ROW.

3.3.1.1 Environmental Inspectors

The EIs will be the on-the-ground compliance personnel responsible for implementing the compliance program mitigation dictated under the ROD, the ROW grant, and the NTP conditions for all phases of project construction. This includes resolution of all Problem Areas or activities found to be in Non-compliance. A lead on-site EI will be designated for the project and will serve as the primary point of contact for the ECM on site. A designated biological resource manager and cultural resource manager will be identified as part of the EI team and will be approved by the BLM per applicable mitigation measures and ROW stipulations. Other environmental specialists, approved by the BLM and Desert Stateline, LLC, will be called upon to support the CL and overall environmental compliance efforts.

4.0 COMMUNICATION

As previously discussed, communication and collaboration is a critical component of a successful environmental compliance program and can promote a positive and efficient work environment. BLM expects Desert Stateline, LLC's CL and EIs to interact regularly with the BLM Compliance Monitoring Team and to maintain professional, responsive communications at all times. Similarly, it is expected that Desert Stateline, LLC representatives will coordinate closely with BLM's Compliance Monitoring Team to address and resolve issues in a timely manner. This section provides several tools/requirements for open and transparent communication throughout the project, and to facilitate efficient dissemination of project information about ongoing surveys and mitigation measures, construction activities, and planned or upcoming work.

4.1 PRECONSTRUCTION COMPLIANCE COORDINATION

In accordance with mitigation measures and ROW terms and conditions, Desert Stateline, LLC is required to perform a number of pre-construction activities, including but not limited to preconstruction biological surveys, preparing and submitting dust control plans, submitting and obtaining permits for grading, and submitting and obtaining BLM approval of mitigation plans. The purpose of the preconstruction coordination process between Desert Stateline, LLC and the BLM Compliance Monitoring Team is to discuss submittal status, agency review and approval cycle, and preconstruction mitigation status (e.g., acquisition of mitigation lands). Additionally, the goal of the preconstruction process is to complete all required actions so the BLM and other agencies, as appropriate, can issue NTPs for each project component. The BLM Compliance Monitoring Team, CD and CM may be asked to review preconstruction plans to ensure the plans meet required federal, state, or local standards, as well as the intent of mitigation measures adopted in the ROD.

4.1.1 Preconstruction Kickoff Meeting(s)

A preconstruction meeting and/or several meetings will be held with the BLM, the Desert Stateline, LLC compliance and construction team, the BLM Compliance Monitoring Team, and other agencies or parties as deemed appropriate by the BLM. The preconstruction kickoff meeting will serve to outline agency expectations of the team, to refine the ECCMP if appropriate, to agree on the project's communication protocol and chain of command, discuss the WEAP, and to further discuss the POD.

4.1.2 Construction Meetings

Desert Stateline, LLC will conduct field meetings as-needed with PMs, contractor supervisors and foremen, and Desert Stateline, LLC's environmental representatives to discuss work completed, work anticipated for the following period, and the implementation status of mitigation measures. The field meetings will also be a forum for discussing safety and environmental compliance issues. Desert Stateline, LLC will include the BLM on-site Compliance Monitoring Team in daily construction and safety briefings to facilitate communication. Desert Stateline, LLC may request the BLM's and any other

agency's monitors to participate in the meeting to help resolve any issue that may have arisen during the previous period. Alternatively, Desert Stateline, LLC or BLM ECM(s) may recommend a separate meeting to discuss mitigation, potential variances, or other project-related issues.

In addition to the progress meetings conducted at the field level, the Desert Stateline, LLC CL, the Desert Stateline, LLC CM, the Desert Stateline, LLC EIs, the BLM ECMs, the BLM PM, and/or other jurisdictional agencies may participate in a regular teleconference call (see Section 5.3, Weekly Updates). The teleconference calls would be similar to the progress meeting; however, the conference calls would focus on the mitigation monitoring.

4.2 COMMUNICATION PROTOCOL DURING CONSTRUCTION

The following protocols have been formulated to ensure that timely and accurate information is disseminated to all parties involved in the construction process of the SSFP, facilitating a responsive, solution-oriented work environment:

- The BLM Compliance Monitoring Team will adhere to a mutually agreed-upon communication protocol between Desert Stateline, LLC and the BLM; the Desert Stateline, LLC protocol will not interfere or inhibit the ECM's ability to communicate transparently with the BLM.
- In general, the BLM ECMs' primary point of day-to-day contact on site will be the Desert Stateline, LLC EIs. If issues can't be resolved at the ECM/Desert Stateline, LLC EI level, they will be initially elevated to the CM and the BLM PM, and the Desert Stateline, LLC CL via email or phone, whichever is determined to be applicable/appropriate to the situation.
- Desert Stateline, LLC will inform the BLM ECM of all survey and construction activity on a daily basis, including, but not limited to, location of such activities and Desert Stateline, LLC personnel mobilization associated with such activities. This will help facilitate timely and appropriate dispersion of BLM ECMs based on activity level.
- The BLM ECMs and any other designated agency representatives or staff may converse with any and all personnel on the construction site to ask questions about their activity, but the construction personnel may opt to refer him/her to the appropriate Desert Stateline, LLC official for an answer. If the question relates to a potential resource-threatening Non-compliance issue, the BLM ECM will immediately notify the Desert Stateline, LLC EI and jointly discuss the issue with the construction personnel on site.
- Desert Stateline, LLC personnel will not, under any condition, direct the work of a BLM ECM. If concerns about an ECM arise, the CM will be notified immediately.
- Desert Stateline, LLC will provide a list of all EIs or resource monitors on site, their titles/responsibilities, and their contact information. Updated distributions will be utilized to keep all parties informed of monitor and staff additions/changes. This list of personnel and all subsequent updates shall be distributed to all persons on the list throughout the construction process.

4.2.1 Communication Specific to Non-compliance

There are varying levels of severity with respect to non-compliant events. The communication protocols identified below have been formulated for non-severe Non-compliance events. Severe Non-compliance

events specific to BLM's scope of authority, such as "take" or discovery of human remains during construction on the project, have established protocols within approved documents such as the Biological Opinion, the Historical Properties Treatment Plan, the Native American Graves Protection and Repatriation Act, and their appendices. Regardless, the BLM and the CM will be immediately notified by Desert Stateline, LLC or the Compliance Monitoring Team if such event occurs, and appropriate communication channels will be initiated.

- **Step 1.** The BLM ECM will notify Desert Stateline, LLC EI of the suspected Non-compliance issue. The issue and communication is documented on the daily form.
- **Step 2.** The BLM ECM will notify the CM. Desert Stateline, LLC will notify agencies directly if the Non-compliance issue relates to a permit condition issued by those agencies. The Non-compliance activity and communication efforts are noted on a consolidated tracking sheet for Non-compliance incidents.
- **Step 3.** Desert Stateline, LLC acknowledges the Non-compliance issue and provides a response plan for corrective action to the BLM and the Compliance Team. Desert Stateline, LLC will track the corrective actions and report completion status.
- **Step 4.** The BLM AO or the PM may inform other interested parties (e.g., permitting agencies) if Non-compliance actions relate to their jurisdictional authority or recognized interests.

As previously discussed in Section 2, the ECCMP protocols do not limit the authority of the BLM to administer ROWs on public lands pursuant to 43 CFR 2800 and may issue relevant notices to the holder if non-compliant activities would warrant such notices.

4.3 COORDINATION WITH OTHER AGENCIES

As identified in Section 2, several local, state, and federal agencies have jurisdiction over portions of the project. The BLM, as the lead agency, is responsible for ensuring that mitigation measures reviewed and approved by the BLM during the NEPA process are implemented throughout construction. Other jurisdictional agencies are required to ensure compliance with their respective measures under their jurisdiction and may visit the project site from time to time and request information regarding the status of an applicable mitigation measure.

Desert Stateline, LLC will be responsible for satisfying requests from jurisdictional agencies and will notify and copy the BLM on all correspondences related to final approvals and verifications for the project if not otherwise copied on the correspondence.

The BLM CM and the Desert Stateline, LLC CL will include other agencies, such as the USFWS or the CDFW in the monitoring and documenting of environmental compliance to the extent requested by those agencies and authorized by the BLM; however, the primary point of contact regarding these requirements for the BLM CM will continue to be the BLM AO or designee.

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5.0 REPORTING AND DOCUMENTATION

5.1 NOTICES TO PROCEED

As stipulated in approval and authorization documents, project-related construction activities will not begin until certain preconstruction mitigation measures and submittals have been satisfied. Desert Stateline, LLC shall submit comprehensive documentation proving satisfaction of preconstruction requirements to the CM and the BLM prior to the BLM issuing an NTP for project construction. In the event BLM elects to issue multiple NTPs for the project, this same documentation will be required prior to each NTP issuance. Additionally, the NTP may include applicable conditions or requirements that must be satisfied prior to the start of work or during construction. BLM will further refine "comprehensive documentation" during the preconstruction meeting in collaboration with Desert Stateline, LLC, agencies, and the BLM Compliance Monitoring Team. This could include, but is not limited to, the following:

- A further refined description of the activities, the duration of activities, and the sequential phase during which the activities will occur (schedule)
- Detailed maps, photographs, and/or other supporting documents or geographic information system data not already included as part of the POD package
- Verification that all mitigation measures have been met or do not apply to the work covered by the NTP
- Verification that all applicable jurisdictional permits or agency approvals have been obtained
- Verification of agency approval of specific biological monitors

5.2 DAILY REPORTING

5.2.1 Desert Stateline, LLC Environmental Inspector

Desert Stateline, LLC will compile all daily site observation forms (which could include biological or general-focused reports) completed by Desert Stateline, LLC EIs and distribute them to the BLM, the BLM Compliance Monitoring Team, and the Desert Stateline, LLC team via a mutually agreed-upon methodology (e.g., email or password-protected project website) at the completion of daily construction activities. The daily forms will identify, but will not be limited to, the type of construction activities occurring, compliance levels, and communication between all parties on site regarding the status of environmental compliance. If archaeology-focused reports are required, the BLM may request a specific password-protected site be established for this process.

5.2.2 Environmental Compliance Monitor

The ECM will provide a daily site observation form to the CM at the completion of daily site observations. The ECM report will identify compliance levels (see Section 6.0, Compliance Reporting During Construction) with environmental mitigation measures and communications provided to any

Desert Stateline, LLC representative and/or agency representative. Based on the ECM daily report compliance levels, the CM may distribute to the BLM PM and/or discuss issues/concerns via email or phone.

5.3 WEEKLY UPDATES

5.3.1 Weekly Meetings

It is anticipated at this time that the BLM will hold weekly calls during construction between Desert Stateline, LLC personnel, the CM, and the ECMs, and other agencies as invited to disseminate critical information, discuss issues, and address other matters regarding the project's progress and compliance status. Weekly agendas and minutes will be distributed to capture the discussions and follow-up items.

5.3.2 Weekly Progress Reports

The BLM CM will submit an AO's Weekly Report. The AO's Weekly Report will be sent directly to the BLM's AO and PM. The AO's Weekly Report will include, but will not be limited to, descriptions of activities relating to site mobilization, temporizing staging, construction, implementing (or not implementing) mitigation, and digital photographs.

5.4 MONTHLY AND QUARTERLY REPORTS

Monthly summary reports will be prepared by Desert Stateline, LLC that briefly describe construction activities during the reporting period and summarize by compliance level the number of reports completed by the BLM CMs during the reporting period and cumulatively for the construction period for that phase of the project. The monthly summary report will also include a table of Problem Area and Non-compliance reports issued by the BLM CMs during the reporting period and the Level 1, 2, and 3 Variance Requests approved during the reporting period. The monthly summary report will also include a table summarizing the net acreage of land affected by approved variances on federal land for the Archeological Resources Protection Act and Endangered Species Act for the reporting period as well as cumulatively.

5.5 FINAL REPORT

Desert Stateline, LLC will provide all final documentation to the BLM in a compiled report, including all finalized mitigation plans (inclusive of revisions), regular EI and monitor reports required by ROW stipulations, and administrative record emails regarding issue resolution. This may be submitted to the BLM directly or via the project's password-protected site.

The CM will provide all final documentation to the BLM regarding weekly reports, meeting minutes, variance requests, and administrative record emails regarding issue resolution.

Prior to the SSFP's Operation and Maintenance Phase, the BLM may elect to have a final closeout meeting to discuss the construction process of the SSFP project, recommendations, and lessons learned in an effort to ensure the future betterment of the overall agency compliance process.

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6.0 COMPLIANCE REPORTING DURING CONSTRUCTION

The BLM ECMs will perform compliance inspection throughout the construction period to ensure compliance with all applicable mitigation measures, plans, permits, and conditions of approval. Supplemental information provided by Desert Stateline, LLC, including preconstruction submittals, survey reports, weekly reports, meeting notes, and agency correspondences, will also be used to verify compliance.

The BLM ECMs will document observations along the ROW through the use of field notes and digital photography. The photographs will be provided in the daily reports and correlate to a discussion of specific construction or compliance activity. In addition, standardized field inspection forms will be utilized in the field to document compliance of specific crews, construction activities, or resource protection measures. A sample site inspection form has been included in Attachment A, but may be modified to accommodate site-specific issues as identified throughout the construction process.

6.1 COMPLIANCE LEVELS

The BLM ECM and the Desert Stateline, LLC EI shall document all observations and communications in daily site observation forms and will determine whether the observed construction activities are consistent with mitigation measures, mitigation plans, ROW stipulations, conditions outlined in the NTP and the POD, and applicable permits. The activities will be assigned a compliance level, which include: Acceptable, Problem Area, and Non-compliance.

6.1.1 Acceptable

An “Acceptable” compliance level will be assigned to an activity when an inspected area or activity complies with the project specifications, and all mitigation measures have been adequately implemented. No corrective action is necessary.

6.1.2 Problem Area

A “Problem Area” compliance level will be assigned when an activity does not meet the definition of acceptable but is not considered to be in Non-compliance. This level indicates that a minor deviation from an approved activity or condition has occurred and action is being addressed in the field to immediately remedy the situation. The ECMs and the EIs would confirm that no resources are being impacted, and no potential for resource damage exists. If a minor deviation is not corrected in a timely fashion, it could become a cumulative issue and result in Non-compliance status.

The Problem Area category will be used to report a range of events and observations including the following:

- An unforeseeable action that occurs not in conformance with, but not in violation of, certain specifications, and the applicant's response is appropriate and timely (e.g., a fuel drip from heavy equipment to which project personnel respond properly by stopping, containing, and cleaning up the spill in accordance with the required SWPPP.
- A location in which the project is not out of compliance with the specifications but, in the judgment of the BLM ECM and/or the Desert Stateline, LLC EI, damage to resources could occur if corrective actions are not taken (e.g., an improperly constructed/located erosion control structure; trash that scatters on the project site and could migrate to surrounding public lands if not collected and disposed of).

If a Problem Area level is resolved in a timely manner, it is not likely to be considered Non-compliant. If a Problem Area is found to be a repeat situation (or multiple instances of a similar nature occur), is not corrected within the established time frame, or results in resource damage because timely corrective action failed to occur, the BLM ECM and/or the Desert Stateline, LLC EI may document the Problem Area as in Non-compliance as described in the following section.

6.1.3 Non-compliance

A "Non-compliance" level will be assigned to an activity when the activity results in damage to resources, places sensitive resources at unnecessary risk, or is a repeated scenario of actions noted as "Problem Areas." Non-compliance may also include deficient or nonexistent implementation of mitigation measures/stipulations, ultimately having the potential to result in irreversible environmental damage; this can include not implementing mitigation measures in accordance with stipulated timing restrictions.

Examples of Non-compliant activities include, but are not limited to, the following:

- Use of new access roads, staging areas, or extra workspaces not identified on the project drawings, approved for use during construction, and/or outside of the permanent or temporary ROW boundary
- Heavy equipment or truck encroachment into a designated avoidance area (environmentally or culturally sensitive area)
- Grading, ground-disturbing activities, or panel erection work without a biological monitor on site, if presence is required per stipulations
- Failure of erosion or sediment control structures if it puts a sensitive resource at risk
- Discharge of sediment-laden trench or water into a jurisdictional waterbody
- Clearing vegetation outside the approved work limits
- Gross negligence in vegetation salvage as defined in restoration and revegetation plans
- Construction activity in locations where seasonal restrictions exist, if applicable

Protocols for communication for suspected or confirmed Non-compliance activities are identified in Section 4.2, "Communication Protocol during Construction."

All Non-compliance activities will be consolidated into one tracking sheet by the ECM and will be made available via the password-protected website in a time frame determined appropriate by the AO. Similarly, the CM will include Non-compliance incidents on the weekly report.

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7.0 RECORDS MANAGEMENT

7.1 AGENCY RECORDS DURING MONITORING (NON-PUBLIC WEBSITE)

The third-party contractor will develop a password-protected website for use by lead and responsible agencies during preconstruction and construction to facilitate the sharing of project documents, files, reports, and maps. The non-public, password-protected project website will host the preconstruction mitigation plans, daily reporting forms, weekly monitoring reports, Non-compliance tracking spreadsheet, and documentation relevant to the submittal and approval of variance requests. The BLM and CM representatives will have access to the entire website. Access levels and privileges for other team members and/or outside permitting agencies will be determined by the BLM and the CM.

7.2 PUBLIC WEBSITE

In order to facilitate public awareness about the SSFP, the BLM's CM will establish and maintain a website for the SSFP. This will be hosted by the third-party compliance team. Documentation of the construction monitoring process may include, but would not be limited to, the ECCMP; links to the BLM website containing the Final EIS/EIR, the ROD, and the ROW grant; NTP (s); variances; maps and photographs; project schedule; and links to other publicly available permits issued by other agencies. If determined appropriate by the BLM, the public website will also include a project hotline by which interested parties can contact the BLM regarding project concerns throughout construction.

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8.0 VARIANCES

During construction, unforeseen or unavoidable site conditions could result in the need for changes from the approved mitigation measures and construction procedures. Additionally, the need for extra workspace, or changes to previously approved construction work areas may arise. Changes to previously approved mitigation measures, construction procedures, and construction work areas will be handled in the form of variance requests to be submitted by the applicant and reviewed and approved or denied by the BLM, with the delegation of some authority for variances to the CM. The variance process can also be a good mechanism to clarify discrepancies or inconsistencies discovered in project materials and/or to distribute information to the entire project team.

A system of three variance levels (Levels 1, 2, and 3) will be used to categorize and process variance requests. The three variance levels, the review and distribution process, and the decision-making authority proposed for each level are discussed in the following sections. A sample Variance Request Form is provided in Attachment D.

8.1 LEVEL 1 VARIANCES (FIELD DECISIONS)

Level 1 Variances are site-specific, minor, performance-based changes to project specifications, or construction methods that provide equal or better protection to environmental resources or better constructability. These minor variance requests can be reviewed and either approved or denied by the ECM in the field during normal construction operations.

Examples of Level 1 Variance Requests include the following:

- Minor variations in site-specific plans that reflect differences in site conditions from those that were expected when the plan was developed (e.g., relocation of a spoil storage area within previously approved work areas)
- Minor changes to the project design necessitated by site-specific restrictions

To initiate a Level 1 Variance Request, a Desert Stateline, LLC representative will fill out a Variance Request Form using the form in Attachment D and obtain the appropriate signatures. The Desert Stateline, LLC representative will then contact the BLM ECM on site to review the proposed change. If determined necessary, the BLM ECM may request to confer with the CM or relevant BLM Compliance Team members prior to signature.

The ECM will document the variance approval and will provide the fully executed form to the BLM PM and the CM, and will then post it on the project's internal password-protected website.

If the requested variance exceeds the lead ECM's authority level, the lead ECM will inform Desert Stateline, LLC's representative that a Level 2 or Level 3 Variance Request is required.

8.2 LEVEL 2 VARIANCES

A Level 2 Variance Request exceeds the field decision authority of the BLM ECM and requires processing by the CM and concurrence from the BLM. Level 2 Variance Requests generally involve project changes that would affect an area outside of the previously authorized limits of disturbance, but within the areas previously surveyed for cultural resources and biological resources. Level 2 Variance Requests typically require the review of supplemental documents, correspondence, and records. These reviews may constitute preparation of a Documentation of NEPA Adequacy Worksheet at the discretion of the BLM.

Examples of Level 2 Variance Requests may include, but are not limited to, the following:

- The use of extra workspace outside the previously approved disturbance limits but within previously surveyed areas and ROW limits in support of the EIS/EIR
- The use of existing access roads that have not been previously approved as part of the ROW grant

To initiate a Level 2 Variance Request, the Desert Stateline, LLC representative or other designated representative will fill out a Variance Request Form, prepare the appropriate supporting documentation, and obtain the required signatures from Desert Stateline, LLC personnel.

The Desert Stateline, LLC representative will complete and submit the Variance Request Form and supporting documentation to the CM. The CM will consult with the BLM on the appropriate level of NEPA documentation required for processing the variance.

If the Level 2 Variance Request is approved by the BLM, the BLM PM will sign the variance request and email the approved form (scanned copy) to the CM, the Desert Stateline, LLC representatives, and the BLM ECMs. The variance may be implemented in the field as soon as the approved variance is received. The CM will document the variance approval and post it on the non-public and public project websites.

8.3 LEVEL 3 VARIANCES

Level 3 Variance Requests generally involve project changes that would affect an area outside the previously approved work area that is outside the areas previously surveyed for cultural resources, sensitive species, and biological resources, or one that would change the function, structure, technology required, or other part of the project previously approved in the ROD. Level 3 Variances may need to be implemented through an amendment to the ROW grant.

To initiate a Level 3 Variance Request, a Desert Stateline, LLC representative fills out a Variance Request Form, prepares the appropriate supporting documentation, and obtains the required signatures from the Desert Stateline, LLC personnel. This will be submitted via email (scanned copy) or fax to the CM, who will submit the request to BLM. Level 3 Variance Request approvals must be signed by the BLM PM. The variance may be implemented in the field as soon as the approved variance is received. The CM will document the variance approval and post the approved Variance Request Form on the project website.

9.0 WORKERS ENVIRONMENTAL AWARENESS PROGRAM TRAINING

As specified in the environmental measures identified in the Final EIS/EIR, prior to project initiation, Desert Stateline, LLC shall develop and implement a WEAP. WEAP training will be provided to all construction personnel prior to completing any work activities.

The CM, the BLM PM, and the BLM AO will be provided the opportunity to participate in the WEAP training to present an overview of the ECCMP and to become familiar with the ROW holder's environmental documentation and reporting program and personnel. The CM or the BLM PM will explain the various components of the ECCMP, emphasizing the objectives of the ECCMP.

The WEAP training shall be provided in both English and Spanish (if requested) to ensure the workers are fully aware of the environmental measures to be implemented during construction activities. The initial WEAP training will be conducted by the BLM-permitted archeologist, a tribal sensitivity trainer, and a BLM-approved biologist. The WEAP training, at a minimum, shall include the following:

- An overview of the ECCMP and the associated reporting protocols, roles, and responsibilities
- An explanation of the function of flagging that designates authorized work areas
- An explanation of the sensitivity of the vegetation communities and special-status plant species within and adjacent to work areas
- The importance of avoiding the introduction of invasive weeds onto the site and surrounding areas
- An explanation of the sensitive wildlife that could be present on site and measures required to minimize impacts (e.g., reduced speed limit and reporting)
- An explanation of spill cleanup procedures and measures being implemented to minimize impacts to water quality
- Waste management and the importance of maintaining good housekeeping practices
- Fire prevention measures and points of contact and steps to be implemented in the event a fire occurs
- Tribal cultural resource sensitivity training, an overview of sensitive archaeological resources present on site, and measures to be implemented in order to ensure resources are not impacted during construction activities
- Communication and reporting protocol as to what needs to be implemented when a sensitive resource may have been impacted during operations and maintenance activities

Sign-in sheets shall be provided to the CM and posted on the non-public project website following completion of WEAP training (see Attachment C for a sign-in sheet). All WEAP attendees shall be provided with wallet-sized cards summarizing the information presented during the WEAP training, and a hardhat sticker should be provided to each worker indicating that the worker has attended the WEAP training.

10.0 MITIGATION MONITORING PROGRAM TABLE

Appendix E lists the mitigation measures included in the Final EIS/EIR and adopted in the BLM ROD dated [insert date]. The Mitigation Monitoring Program table is the core document for environmental requirements on the project and will be the primary guideline for determining compliance with the ECCMP. A copy of the table should be kept on site, and all supervisory staff working on the project should be familiar with its contents.

10.1 EFFECTIVENESS/IMPLEMENTATION REVIEW

While development, review, and approval of preconstruction mitigation plans make up a best attempt at due diligence with respect to ensuring intent of mitigation measures are successfully met, it is possible that some mitigation strategies, once implemented on the ground, may prove infeasible, impractical, or unsuccessful. To reduce the likelihood of this scenario, the BLM may conduct an on-the-ground assessment of implementation activities designed to meet mitigation measures, and provide adaptive strategies through collaboration with the CM, the BLM ECMs, Desert Stateline, LLC, and other regulatory agencies as appropriate to ensure successful implementation. To further reduce the likelihood of unsuccessful implementation of mitigation strategies, the BLM may request as-needed meetings with the CM, the ECMs, Desert Stateline, LLC, and other regulatory agencies prior to on-the-ground implementation. Additionally, the BLM may coordinate milestone site visits to view the progress of implementation to ensure collective visions come to fruition.

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11.0 SSFP OPERATIONS

The ECCMP has been prepared to document and ensure compliance during the construction phase. Mitigation measures and stipulations of the ROW grant require Desert Stateline, LLC to implement long-term mitigation activities for the life of the ROW grant beyond the construction phase. The AO, at his or her discretion, may determine that the long-term implementation of mitigation as required of the ROW holder may necessitate engaging a third party to assist in tracking and monitoring these mitigation efforts on behalf of the BLM. If such determination is made, a separate compliance and reporting plan will be devised between the BLM and the ROW holder to ensure successful implementation of mitigation measures applicable to ongoing project operational activities for the life of the ROW grant. This plan would include at a minimum, the following provisions:

- A CM representing the holder, in the role of ensuring compliance with the plan
- Adaptive management procedures to address change in conditions, regulations, etc.
- Means of accurately tracking compliance (e.g., compliance tracking database)
- Coordination with the BLM and other agencies to report Non-compliance issues
- Initial training and refresher training of personnel, commensurate with their roles and responsibilities
- Inspection and monitoring procedures
- Reporting and recordkeeping procedures
- Measures to address decommissioning of the project at partial and final closure

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ATTACHMENT A

DAILY SITE OBSERVATION FORM

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PROJECT: STATELINE SOLAR FARM PROJECT

ENVIRONMENTAL MONITORING DAILY SITE OBSERVATION FORM

Report Number: _____ Date of Report: _____

Construction Monitor/Designated Biologist: _____

Compliance Level : ☐ Communication ☐ Non-compliance
☐ Acceptable
☐ Problem Area

Location: _____

SITE INSPECTION CHECKLIST

Air Quality	**Yes**	**No**
Is dust control being implemented (i.e., access roads watered, haul trucks covered, streets cleaned on a regular basis)?		
Do vehicles or equipment appear to be idling unnecessarily?		
Biology	**Yes**	**No**
Are appropriate measures in place to protect sensitive habitat (i.e., flagging, signage, exclusion fencing, biological monitor)?		
Are all activities being conducted within the approved work limits?		
Have impacts occurred to adjacent habitat (sensitive or non-sensitive)?		
Cultural and Paleontological Resources	**Yes**	**No**
Are known cultural resources clearly marked for exclusion?		
Is a cultural monitor on site if grading is occurring near known cultural sites?		
Is a paleontological monitor on site if grading is occurring (see mitigation measure for specifications)?		

Hazardous Materials	**Yes**	**No**
Have all spills been cleaned-up in accordance with the project's SPCC?		
Are fuels, oils, lubricants, and other hazardous materials on site labeled and stored in appropriate containers?		
Water Quality	**Yes**	**No**
Have temporary erosion and sediment control measures been installed?		
Are BMPs in good condition and functional?		
Is mud tracked onto roadways cleaned-up in accordance with the project's SWPPP?		

DESCRIPTION OF OBSERVED ACTIVITY

ISSUES REQUIRING CORRECTIVE ACTION

Issue Requiring Corrective Action	Applicant Notification	Corrective Actions Implemented by Applicant

Photographs:

Completed by:

Name: _____

Affiliation: _____

Date: _____

Distribution:

ATTACHMENT B

BLM AUTHORIZED OFFICER WEEKLY REPORT

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BLM Authorized Officer
Weekly Report

Address:_____ Phone:_____ Website:_____

City, State Zip_____ Fax:_____

Project: Stateline Solar Farm Project

Weekly Project Update

Prepared By:

Reporting Period:

Summary:

Site Inspections/Mitigation Monitoring:

- Issues/Concerns with Applicable Conditions of Certification

Construction Activities:

Compliance:

Construction Schedule:

- Scheduled Activities for Next Week
- Potential Delays to the Online Date of the Project

Notice to Proceed

NTP No.	Date Issued	Project Component	Conditions Included (Y/N)

Variance Requests

Variance Request No.	Variance Level	Submitted	Description	Status	Approval Date

Project Photographs from Week:

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ATTACHMENT C

CERTIFICATION OF COMPLETION OF WORKER ENVIRONMENTAL AWARENESS PROGRAM

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Certification of Completion
Worker Environmental Awareness Program

This is to certify these individuals have completed a mandatory Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials.

No.	Employee	Title/Company	Signature	Sticker #
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				

Cultural Trainer: _____ Signature: _____ Date: _____/ _____ /____
Paleo Trainer: _____ Signature: _____ Date: _____/ _____ /_____
Biological Trainer: _____ Signature: _____ Date: _____/ _____ /_____

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ATTACHMENT D

VARIANCE REQUEST FORM

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Variance Request Form

Company

Variance: _

Address

Request No.: ____

__

City, State, Zip

Date Submit: ___

___

Phone

Date Approval Needed: ___

__

Date Agency Received: _

Agency Approval Reference No.: _

Request Prepared by:

Spread/ Location:

(Milepost):

Net acreage affected:

____acre

Alignment Sheet/Sta. No.:

Tract No:

Landowner:

In or within 50 feet of a wetland: ☐ Yes ☐ No

Within 50 feet of a water body: ☐ Yes ☐ No

Current Land Use/ Vegetative Cover:

Nearby Features (Water body, T&E Habitat, Wetland, Noxious Weed):

Area, Residence, Cultural Resource Site (distance, etc.):

Variance Level: ☐ Level 1 ☐ Level 2 ☐ Level 3 **(To Be Assigned by Designated Representative)**

Variance From: ☐ Permit ☐ Plan/Procedure ☐Specification ☐ Drawing ☐Mitigation Measure ☐ Other:

Detailed Description of Variance: Attachments? Yes ☐ No ☐ Photos? Yes ☐

Variance Justification:

For (Company Name) Use Only

Additional Surveys Required	Surveyed Corridor Description	Additional Surveys Completed
Cultural Survey ☐ Yes ☐ No		☐ Yes ☐ No
T&E Survey ☐ Yes ☐ No		☐ Yes ☐ No
Reporting Document Survey:		

Sign-off (as appropriate)	Name (print)	Approval Signature	Conditions (See Attached)
Contractor Sup't. or Env. Coordinator			☐Yes ☐ No
Lead Environmental Inspector			☐Yes ☐ No
Spread Supervisor			☐Yes ☐ No
Environmental Field Manager			☐Yes ☐ No
			☐Yes ☐ No

For BLM Project Manager or Compliance Contact Use Only

Variance Approved: ☐ Variance Denied: ☐ Date:

Signature:

For Compliance Manager and Monitor Use Only

Variance Approved: Variance Denied Date:

Signature:

Stipulations

Spread: OPPC Variance Request No.:

VARIANCE CONDITIONS

Name: Title: Organization:

Name:	Title:	Organization:

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ATTACHMENT E

MITIGATION AND MONITORING REPORTING PROGRAM

(TO BE PROVIDED)

E.1 INTRODUCTION

The following table presents the Mitigation Measures (MM) adopted in the Record of Decision (ROD) for the Stateline Solar Farm Project. The purpose of the table is to provide a single comprehensive list of the measures that will be implemented to avoid or reduce impacts of the Stateline Solar Farm Project on the human environment, the timing for their implementation, and related monitoring and reporting requirements.

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APPENDIX 6

RESPONSES TO FEBRUARY 4, 2014 LETTER FROM THE LABORERS INTERNATIONAL UNION OF NORTH AMERICA, LOCAL 783

Responses to February 14, 2014 Letter from Christina Caro, on behalf of the Laborers International Union of North America (LiUNA) Local 783

1. ***The FEIS failed to provide separate responses to LiUNA's expert comment letters, and failed to provide meaningful and reasoned responses to the legal summary of the comments.***

LiUNA's expert comment letters on the DEIS/DEIR were not responded to separately because they were not addressed and submitted to BLM and the County. Supporting documentation developed by a commenter's consultant and addressed to the commenter does not constitute a comment to the agencies. The BLM did, however, address all issues included directly in LiUNA's comment letter.

Separate responses were not provided to the legal summary portion of the comment letter because the claims of legal insufficiency were based solely on brief summaries of the technical comments, and these technical comments were provided in more detail in the remainder of the letter. Because the legal summary only provided a summary of the technical comments, and did not raise any specific new technical issues, separate responses were not provided to those summarized comments. Response number 66-1 in Appendix G of the FEIS/FEIR specifically stated that the legal portion of the letter was a summary of the detailed technical comments, and that responses were provided where the technical comments were made in more detail.

2. ***The FEIS fails to analyze and mitigate numerous significant impacts of the project.***

This section of the letter does not mention any specific impacts or mitigation measures, so no response can be made. The remainder of the letter does discuss specific impacts and mitigation measures, and responses to those specific comments are provided below.

3. ***The FEIS fails to assess the impacts of the project on downstream resources.***

Page 4.19-10 of the FEIS/FEIR presents the results of surface water flow modeling which was specifically designed to assess the impact of the project on downstream resources. The quantitative results of the analysis are provided in Table 4.19-3, and the effect of the result on downstream impacts is discussed in the paragraph following the table. The analysis concluded that the project would have a minimal effect (less than 2 percent) on flow rates downstream of the facility. The paragraph following the table explains why the development would have such a limited effect on flow rates.

4. ***The FEIS fails to show that the project will meet pre-construction conditions per the State Water Resources Control Board Construction General Permit.***

It is not a requirement that the FEIS/FEIR demonstrate, in advance, compliance with all conditions of all permits which may ultimately be required for the Project. The discussion of Section 402 of the Clean Water Act on Page 3.19-7 of the FEIS/FEIR acknowledges that the project will be required to obtain the Construction General Permit from the State Water Resources Control Board. Mitigation Measure MM-Water-8 specifies that the permit shall be acquired by the filing of a Notice of Intent (NOI) with the Board. At the time of filing, the Board will use the information in the NOI, as well as the analyses in the FEIS/FEIR, to determine if additional information is needed and to confirm that the NOI complies with the pre-construction conditions. The Board has also been included on mailing lists, has received copies of the Draft

and Final EIS/EIRs, and has been given the opportunity to comment on the hydrologic analysis and discussions of the permit requirements.

5. ***The FEIS defers mitigation of air quality impacts by failing to include an Air Construction Management Plan for public review.***

The reference list in Section 8 of the FEIS/FEIR lists the Air Quality Construction Management Plan as having a date of May 2012. The components of the plan are discussed on Pages 2-19 and 2-20, and in mitigation measure MM-Air-1 on Page 4.2-24 of the FEIS/FEIR. The plan exists, and has been used by the agencies in their analysis. NEPA does not require that an agency provide, in the Draft or Final environmental documents, or in the Record of Decision, all of the technical resources used in the analysis of a project.

6. ***The FEIS fails to identify the types of dust suppressants proposed to be used at the project site.***

Page 4.11-5 of the FEIS/FEIR lists the names of the products, states that the agencies have reviewed the applicable Materials Safety Data Sheets (MSDSs), and lists the contents of the products. That discussion points out that the MSDS for one of the proposed products does not specify the contents, so impacts from that particular product cannot be determined. Mitigation measure MM-PH&S-2 specifically prohibits the use of that particular product until a complete MSDS is provided, and the product's contents can be reviewed and approved by BLM.

7. ***The FEIS fails to indicate how the solar panels would be cleaned.***

The solar panels would not require cleaning. The Applicant has stated that, based on their operational experience at other sites, the action of wind and occasional precipitation is sufficient to keep the panels operational.

8. ***The FEIS fails to adequately assess the risks to local groundwater resources resulting from the project's groundwater extraction. The FEIS relies on the highest estimated recharge scenario to conclude that the project will not have significant impacts.***

This same comment was made on the DEIS/DEIR, and was responded to in Appendix G of the FEIS/FEIR in responses 66-4, 66-29, and 66-32. The comment raises no new information that would change the conclusion of the FEIS/FEIR.

9. ***The FEIS includes a Mitigation Measure MM-Water-6 requiring a Master Drought Water Management Program, but fails to implement an adequate program for non-drought years.***

The Applicant's proposed action, and the mitigation measures developed by the agencies to address impacts associated with that action, comprise the overall plan to manage water use during normal conditions, which is equivalent to the commenter's reference to "non-drought years". Groundwater withdrawal would be limited to amounts specified in the FEIS/FEIR, and impacts of this withdrawal would be monitored as required in mitigation measure MM-Water-3. Any identified impacts would be responded to as specified in MM-Water-2. No separate plan is necessary to address water management during non-drought years because the entire proposed action comprises that plan.

10. ***The FEIS failed to consider adequate alternatives, including the alternative of re-configuring the project closer to Interstate 15 and the golf course, which would significantly reduce habitat fragmentation and impacts to sensitive biological resources***

such as desert tortoise and special-status plants.

This same comment was made on the DEIS/DEIR, and was responded to in Appendix G of the FEIS/FEIR in response number 66-50. The comment raises no new information that would change the conclusion of the FEIS/FEIR.

Please note that, in response to this and other comments on the DEIS/DEIR, the FEIS/FEIR did include a revision to the footprint of Alternative 3, which is evaluated in the FEIS/FEIR as Revised Alternative 3. This revision primarily involved drawing in the northern boundary of the project to improve the width of habitat connectivity between the project and the Stateline Hills. This revision largely accomplishes the objective of the comment, which is to reduce impacts to tortoise and special-status plants in that northern area.

11. The FEIS provides inconsistent information pertaining to the viability of the desert tortoise population in the project area.

The comment does not explain what appears to be inconsistent. It is correct that the FEIS/FEIR states that the current population is viable, and acknowledges that the project would have adverse effects on the resident desert tortoise population. But the FEIS/FEIR never states that the adverse effects of the project would reduce the status of the population from viable to not viable. Instead, Page 4.22-13 of the FEIS/FEIR specifically states that the project would not have any substantial effect "*with respect to the USFWS-recommended reserve size*", and provides the quantitative analysis which supports that statement. This conclusion is not inconsistent with the general statement that the project would have an adverse effect on the resident tortoise population, nor is it inconsistent with the conclusion in the Project's Biological Opinion.

12. The BLM and County have not demonstrated that adverse effects to the desert tortoise population in the western lobe can be mitigated at all, let alone to less than significant levels.

Page 4.22-13 of the FEIS/FEIR quantitatively analyzes the viability of the tortoise population in the western lobe with respect to the USFWS Recovery Plan recommendations for tortoise reserves, provides the rationale for why the effects of the project are not expected to substantially alter the viability of this population, and correctly states that compensatory mitigation and effectiveness monitoring would contribute to recovery of the species. The fact that adverse effects would occur to tortoises within the project footprint, an effect which is acknowledged in the FEIS/FEIR, does not nullify a quantitative analysis of the impacts and evaluation of the efficacy of the mitigation and compensation measures.

13. The FEIS erroneously concludes, without adequate analysis, that elimination of golden eagle foraging habitat does not constitute take of the species.

Page 4.22-19 of the FEIS/FEIR discusses the manner in which BLM reached this conclusion, including analysis of the action as required by BLM Instruction Memorandum 2010-156, and submittal of the conclusion and its supporting rationale in a letter to the USFWS. That rationale, which is based on observations of golden eagle activity in the project area since 2010, is summarized in this text on Page 4.22-19. The comment provides no site-specific information or data suggesting that a golden eagle take, as defined in the comment, has occurred or would occur.

14. The FEIS failed to respond to comments calling for project-specific mitigations for impacts to special-status plants. The FEIS erroneously relies on mitigations and significance findings adopted for the nearby ISEGS Solar Project, and fails to require project-specific mitigation measures to avoid, minimize, or mitigate impacts on rare or special-status plants in the project area.

The response to comment 66-23 in Appendix G of the FEIS/FEIR states that the impacts to special-status would be less than significant under CEQA, based on the limited numbers of the plants in the project area. Therefore, mitigation specific to the special-status plants would not be required under CEQA. Even with this less-than-significant conclusion, Page 4.17-7 of the FEIS/FEIR states that mitigation measures MM-Veg-1 and MM-Veg-3 would apply to special-status plants as well as the natural vegetation community. It should be noted that the requirements under NEPA and CEQA are different and that neither the BLM nor its decision are subject to the requirements of CEQA.

The response to comment 66-45 in Appendix G of the FEIS/FEIR states that the requirements of mitigation measure MM-Veg-3 were specifically developed to address special-status plants. Therefore, the comment that the FEIS/FEIR does not adequately call for mitigation for impacts to special-status plants is not accurate.

The comment regarding reliance on the findings and mitigations associated with the ISEGS solar project is not accurate. In response 66-21 in Appendix G of the FEIS/FEIR, BLM explained that the ISEGS conclusion had later been modified, so there was no conflict between the conclusions for ISEGS and Stateline. In fact, the conclusions for ISEGS and Stateline are different. For ISEGS, the final conclusion, based on site-specific analysis by the CEC under CEQA, was that impacts would be less than significant after mitigation. For Stateline, the final conclusion, based on site-specific analysis by the County, is that impacts would be less than significant under CEQA even without mitigation. These conclusions were based on site-specific analysis of survey results at each site, without regard to the other site. The reason for the difference is most likely due to the fact that the ISEGS site is much higher on the alluvial fan, where concentrations of special-status plants are higher. The Stateline project is sited much lower on the alluvial fan, closer to the unvegetated playa, and has a generally lower concentration of special-status plants.