U.S. Department of the Interior
Bureau of Land Management

Record of Decision
February 2014

Silver State Solar South Project and Las Vegas Field Office Resource Management Plan Amendment

APPLICANT

Silver State Solar Power South, LLC
353 Sacramento St, Suite 2100,
San Francisco, CA 94111

GENERAL LOCATION

The proposed action is located on public lands managed by the Bureau of Land Management in Clark County, Nevada, 2 miles east of Primm, Nevada, along the California/Nevada state line.

BLM CASE FILE SERIAL NUMBER(S)

N-85801, N-89530, N-90050, and N-90823

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Executive Summary

This document constitutes the Record of Decision (ROD) of the United States Department of the Interior (DOI) and the Bureau of Land Management (BLM) for the Silver State Solar South Project (Project) and associated amendments to the Las Vegas Field Office Resource Management Plan (LVFO RMP; October 1998). This ROD includes right-of-way (ROW) grant decisions and a plan amendment to the LVFO RMP under Title II and Title V of the Federal Land Policy and Management Act (FLPMA; 43 U.S.C. § 1712 and 1761) and applies only to BLM-administered lands.

After extensive environmental analysis, consideration of public comments, and application of pertinent Federal laws and policies, it is the decision of the DOI to approve the Silver State Solar South Project (Project), a 250-megawatt alternating current (MW_{AC}) solar photovoltaic (PV) project and associated infrastructure necessary to interconnect the power generated from the solar facility to the electrical grid system. This decision authorizes:

1) ROW grants for the construction, operation, maintenance, and decommissioning of the solar facility and associated infrastructure proposed by Silver State Solar Power South, LLC; and
2) Amendments to the 1998 Las Vegas Field Office Resource Management Plan (LVFO RMP) to: (i) remove the Special Recreation Management Area (SRMA) designation within the ROW grant area; (ii) change the Visual Resource Management (VRM) classification from Class III to Class IV within the ROW grant area; and (iii) designate a 31,859-acre Area of Critical Environmental Concern (ACEC) adjacent to the ROW grant area.

These decisions approve the BLM Preferred Alternative identified in the *Supplemental Environmental Impact Statement for the Silver State Solar South Project and Proposed Las Vegas Field Office Resource Management Plan Amendment* (SEIS/PRMPA) issued on September 20, 2013. The Final SEIS/PRMPA is available online at: http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/Silver_State_Solar_South.html. The SEIS/PRMPA tiers from the Silver State Solar Energy Project Final EIS (BLM 2010).

The environmental impacts of the proposed action and its alternatives were analyzed in the Draft SEIS/PRMPA issued on October 12, 2012 and October 15, 2012, and the subsequent Final SEIS/PRMPA issued on September 20, 2013, which were prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's (CEQ) NEPA regulations (40 CFR Parts 1500–1508), DOI's NEPA regulations (43 CFR Part 46), and other applicable authorities.

The selected area for the ROW grants is located on public lands administered by the BLM in southern Clark County, Nevada; approximately 2 miles east of the town of Primm and 40 miles south of Las Vegas. The Project area encompasses approximately 2,427 acres of BLM-managed land in the Ivanpah Valley.

Public review and comment on the Project and land use plan amendments were extensive. Public scoping, including three public meetings and numerous agency meetings, initiated the public review process. The BLM held 6 public meetings and received 380 comments on the Draft SEIS/PRMPA. In addition, the BLM received an additional 10 comments on the Final SEIS/PRMPA, even though there was no formal comment period on that document. The BLM carefully reviewed the comments it received and has responded to comments on the Draft SEIS/PRMPA in Appendix D of the Final SEIS/PRMPA, as required under NEPA, and to the extent practicable has responded to the late comments on the Final SEIS/PRMPA in **Appendix D** of this ROD. In addition, twelve formal protest letters were filed with BLM on the proposed plan amendments. In general, protesters were not in support of the proposed amendment 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 SEIS/PRMPA. Therefore, all protests were denied, and no changes were made to the Departmental decision as a result of the protests. Detailed information on protests may be found online at the following location: BLM Washington Office website: http://www.blm.gov/wo/stlen/prog/planning/protestresolution.html

In addition to the U.S. Environmental Protection Agency (USEPA), National Park Service (NPS), U.S. Army Corps of Engineers (USACE), Nevada Department of Wildlife (NDOW), and Clark Country Department of Aviation (CCDOA), which formally served as cooperating agencies, the BLM also coordinated and consulted with the U.S. Fish and Wildlife Service (FWS), Nevada State Clearinghouse, Advisory Council on Historic Preservation (ACHP), Nevada State Historic Preservation Office (SHPO), and potentially affected Native American tribes.

The decisions in this ROD reflect careful consideration and resolution of the issues by BLM and the DOI, and were thoroughly analyzed in the environmental review process. These decisions best fulfill the Agency's statutory mission and responsibilities, considering economic, environmental, and technical factors. Granting the ROW(s) contributes to the public interest in providing a reliable electricity supply that allows for the development of renewable power that meets Federal and State renewable energy goals. The ROW grants and mitigation measures will ensure that authorization of the project will protect environmental resources and comply with environmental standards. These decisions reflect the careful balancing of the many competing public interests in managing the public lands for public benefit. These decisions are based on a comprehensive environmental analysis and full public involvement. The BLM has engaged highly qualified technical experts to analyze the environmental effects of the Project. Members of the public have contributed to the analysis and consideration of the many environmental issues arising out of the environmental review process. The BLM and DOI and other consulted agencies have used their expertise and existing technology to address the important issues of environmental resource protection. The DOI and the BLM have determined that the measures contained in the Final SEIS/PRMPA and the reasonable and prudent measures contained in the

United States Fish & Wildlife Service's (FWS) Biological Opinion (BO) significantly minimize and/or mitigate environmental damage and protect resources.

I. Introduction

This ROD explains the decisions of the DOI and BLM to determine whether to approve, approve with modifications, or deny the proposed ROW application(s) for the Project and the LVFO RMP amendment. In addition, this ROD provides the background on the Project identifies and summarizes the alternatives studied in the Draft and Final SEIS/PRMPA, describes the decision selected and the rationale for approving that decision, and discusses relationships to other plans, policies, and programs (e.g., the BLM LVFO RMP, county and local plans, and compliance with the Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA)). Applicant-committed environmental protection measures are also described. These are actions, practices, or design features that are part of all action alternatives. Mitigation measures, monitoring requirements can be found in Section VIII of this ROD. These are measures to reduce or eliminate potential environmental impacts that were considered in the Final SEIS/PRMPA and are adopted as required measures in this ROD. In addition, Reasonable and Prudent Measures and Terms and Conditions in the FWS BO, provided in **Appendix B** of this ROD, were also considered and are adopted as required measures in this ROD.

The decisions in this ROD are based on consideration of the information generated during the analytical and public participation processes required by the National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and DOI tribal consultation policies. The BLM carefully considered its analysis regarding the range of reasonable alternatives to the proposed solar energy development project in Clark County, Nevada, including: potential impacts on environmental and cultural resources; practicable means to avoid, minimize, or mitigate those impacts; and national policy goals to promote renewable energy projects. This information was presented and analyzed in the Draft and Final SEIS/PRMPA. The BLM will not issue notices to proceed (NTP) for the project until the BLM determines that compliance with applicable ROW lease/grant stipulations has been satisfied.

The Final SEIS/PRMPA was released for a 30-day protest period for the proposed land use planning decisions and 60-day Governor's consistency review commencing on September 20, 2013. 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 SEIS/PRMPA. Therefore, all protests were denied, and no changes were made to the Departmental decision as a result of the protests. Detailed information on protests may be found online at the following location: BLM Washington Office website: http://www.blm.gov/wo/stlen/prog/planning/protestresolution.html. Even though no comment period was provided for on the Final SEIS, the BLM did receive 10 comment letters, which were included to the extent practical and responses to which are included in **Appendix D**. This ROD details the DOI and BLM's final decision, including any required mitigation for the project.

II. Background

The Silver State Solar Power South, LLC (the Applicant), submitted a ROW application for the construction, operation, maintenance, and termination of a 250 - 350-MW_{AC} solar energy generation facility within a 13,184-acre area of public land east of Primm, Nevada, 40 miles south of Las Vegas, in Clark County, Nevada. The proposed solar energy project would consist of single-axis tracker systems or fixed panels, an underground and overhead electrical power collection system, a substation, two step-up transformers, 230 kilovolt (kV) and/or 220 kV transmission lines, an operation and maintenance area, a switchyard, paved access and maintenance roads, flood and drainage controls, and a fire break.

The proposed solar facility was previously analyzed as Phases II and III in the Silver State Solar Energy Project Final EIS (BLM 2010). The 2010 Final EIS analyzed the development of a 400-MW_{AC} project to be constructed in phases. Phase I, which became the Silver State Solar North Project that is currently operational, consisted of the construction, operation, maintenance, and ultimate decommissioning of a 50-MW_{AC} solar plant and associated facilities. Phases II and III, which are the subject of the SEIS/PRMPA, consisted of the construction, operation, maintenance, and decommissioning of the remaining 350-MW_{AC} project to complete the 400-MW_{AC} solar project.

The ROD for the 2010 Final EIS, signed on October 12, 2010, authorized only the first phase (Phase I) of project development. With regard to the remaining 350-MW_{AC} of proposed development, the ROD stated that subsequent phases (i.e., Phases II and III) may require supplemental analysis under the NEPA and additional public involvement.

The SEIS/PRMPA addresses new information associated with the project analyzed in the 2010 Final EIS for the Silver State Solar Energy Project (BLM 2010). These changes include (1) modified layouts of the solar arrays and appurtenant facilities identified as Phases II and III in the 2010 Final EIS; (2) amendments to the LVFO Resource Management Plan (RMP) that are required to approve the Project as proposed, as it would be out of compliance with the existing RMP; and (3) consideration of comments received during scoping for the SEIS/PRMPA and the public comment period for the Draft SEIS/PRMPA. In addition, the analysis in the SEIS/PRMPA considered an ACEC nomination brought forth during scoping. The ACEC nomination included 98,300 acres of land in Nevada and 31,079 acres in California. The BLM determined that 40,180 acres of the nominated area within Nevada meets the criteria for both relevance and importance. Of the 40,180 acres, a 31,859-acre ACEC is included as part of the BLM Preferred Alternative because these areas meet the relevance and importance criteria for the Agassiz's desert tortoise. The remainder of the ACEC nomination area in Nevada will be addressed through the LVFO RMP revision process. The California portion of the ACEC nomination is being addressed separately by BLM-California.

The 2010 Final EIS provided an analysis of proposed development within a 7,925-acre right-of way (ROW) application area (N-85801). In early 2011, the Applicant submitted a ROW application (N-89530) for the Silver State Solar South Project encompassing an additional 5,610 acres of BLM-administered public lands. This area includes 5,069 additional acres immediately north of the previously analyzed ROW application area (N-85801) and a 541-acre area

immediately west. This additional acreage allowed the development of site layout alternatives for the Silver State Solar South Project to avoid impacts to interstate drainages, reduce impacts to desert tortoise and other special status species, and minimize impacts to recreational areas in the Jean Lake/Roach Lake SRMA. Of the previously analyzed 7,925-acre ROW application area, 7,373 acres is included in the ROW application for Silver State Solar South. An additional 200-acre ROW application was submitted under number N-90823, bringing the entire ROW application area to 13,184 acres.

The Draft and Final SEIS/PRMPA addressed new information associated with N–89530 and updated as necessary the consideration of N–85801, which was analyzed in the Final EIS for the Silver State Solar Energy Project as a 400MW_{AC} solar PV energy facility. The BLM approved a ROD on October 12, 2010, for the Silver State Solar Energy Project, and authorized ROW N–85077 for the construction and operation a 50MW_{AC} solar PV energy facility on 618 acres of BLM-administered lands, which represented the first phase of that proposed project development and became the Silver State Solar North Project. The ROD did not authorize ROW application N–85801, which is now included as part of the Silver State Solar South Project, along with ROW application N–89530.

The BLM prepared the SEIS/PRMPA in compliance with NEPA in response to the ROW application(s). Title V of FLPMA, 43 U.S.C. 1761–1771, authorizes the BLM, acting on behalf of the Secretary of the Interior, to issue a grant on, over, under, or through the public lands for generation, transmission, and distribution of electric energy. The BLM's implementation of its statutory direction for ROW authorizations is detailed in 43 CFR 2800.

The SEIS/PRMPA tiers from the Silver State Solar Energy Project Final EIS (BLM 2010). The Council on Environmental Quality (CEQ) encourages Federal agencies "to tier their environmental impact statements to eliminate repetitive discussion of the same issues and to focus on the actual issues ripe for decision at each level of environmental review (Section 1502.20). As such, the SEIS/PRMPA document only includes information that has been added or revised subsequent to the publication of the 2010 Final EIS to address and analyze specific changes and new information. A supplemental EIS is intended to provide BLM decision makers detailed description and analysis of changes or new information related to a project and also to give the public an additional opportunity to participate in the NEPA process (40 Code of Federal Regulations [CFR] 1502.9[c][4]).

The Authorized Officer administers the ROW authorization and ensures compliance with the terms and conditions of the ROW lease/grant. The term "Authorized Officer" means any employee of the DOI with delegated authority to perform the duties described in 43 CFR 2800. For these specific ROW authorizations, this authority has been delegated to the Field Manager, LVFO, BLM.

III. Decision

The NEPA analysis contained in the SEIS/PRMPA considered the following decisions to be made:

a. **Right-of-Way** – The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to the Applicant for the Silver State Solar South Project. Modifications may include the proposed use or location of the proposed facilities (43 CFR 2805.10[a][1]).

   If the decision is made to grant a ROW, the BLM will also make the decision on which alternative to approve and which terms and conditions are to be included in the ROW grant. The BLM may also consider a combination of Project elements from among the alternatives analyzed in the SEIS/PRMPA, or may consider approving a ROW of less than that requested in the ROW application (as was done for the Silver State Solar North project).

b. **Land Use Plan Amendment** - The BLM will consider a concurrent amendment of the LVFO RMP to: 1) reduce the size of the Jean Lake/Roach Lake SRMA to ensure that the ROW action proposed in Silver State's application is in conformance with the existing LVFO RMP and to ensure a balanced use of the public lands and the resources affected by those uses; 2) revise the VRM classification of lands within the Project footprint to ensure management is in conformance with existing LVFO RMP decisions; and 3) evaluate a proposed ACEC and identify management prescriptions for a portion of the proposed ACEC nomination area to address concerns associated with desert tortoise connectivity corridor characteristics in the Ivanpah Valley.

After extensive environmental analysis, consideration of public comments, and application of pertinent Federal laws and policies, it is the decision of the DOI to approve the Silver State Solar South Project (Project), a 250-MW_{AC} solar photovoltaic (PV) project and associated infrastructure necessary to interconnect the power generated from the solar facility to the electrical grid system. This decision authorizes:

1) ROW grants for the construction, operation, maintenance, and decommissioning of the solar facility and associated infrastructure proposed by Silver State Solar Power South, LLC; and
2) Amendments to the 1998 Las Vegas Field Office Resource Management Plan (LVFO RMP) to: (i) remove the Special Recreation Management Area (SRMA) designation within the ROW grant area; (ii) change the VRM classification from Class III to Class IV within the ROW grant area; (iii) designate a 31,859-acre Area of Critical Environmental Concern (ACEC) adjacent to the ROW grant area. These decisions approve the BLM Preferred Alternative identified in the SEIS/PRMPA issued on September 20, 2013.

IV. Alternatives Considered in the SEIS

The Final SEIS analyzed four action alternatives and a No Action Alternative (Alternative A). Under the No Action Alternative, the Applicant's ROW application(s) to develop the proposed Project would not be approved, no BLM ROW would be granted, and there would be no associated amendment to the LVFO RMP. Since the Project would not be developed, existing land uses within the Project area would continue. The No Action Alternative forms the baseline against which the potential impacts of the Proposed Action and alternatives are compared, and satisfies the CEQ NEPA regulations which require the inclusion of "the alternative of no action"

(40 CFR §1502.14[d]). The No Action Alternative includes current actions and activities in the Project area. No additional actions are assumed to occur in the absence of approval of any of the action alternatives. Selection of the No Action Alternative would not preclude the future approval of other ROWs for energy development or other projects.

Alternative B is the Applicant's original proposal (as described in their Plan of Development/POD dated July 2011). It is similar to Phases II and III of the Proposed Action evaluated in the 2010 Final EIS, but the layout of the Project, including solar arrays, drainage facilities, and appurtenant structures, had been revised since 2010 to avoid potential impacts to resources, particularly to jurisdictional waters of the United States. The proposed generating capacity remains the same (350-MW_{AC}) as evaluated in the 2010 Final EIS. Alternative B would disturb up to 3,881 acres of Federal land.

Alternative C represents Phases II and III of the original Proposed Action evaluated in the 2010 Final EIS. Project and related facilities would disturb a total area of 2,546 acres, all within the 7,925-acre ROW application area analyzed in the 2010 Final EIS.

Alternative D would disturb up to 3,110 acres of Federal land and is a modified layout of the Applicant's original proposal (Alternative B above) that would allow access through a historically-used recreation route, avoid impacts to interstate drainages, and reduce impacts to desert tortoise and other special status species.

The BLM Preferred Alternative is a modification of Alternative D and was developed after release of the Draft SEIS/PRMPA to address public and agency concerns related to desert tortoise demographic connectivity within the Ivanpah Valley and agency and public interest in a reduced-scale project. The BLM Preferred Alternative is smaller in area than the other analyzed project alternatives and reduces electricity generation capacity to 250-MW_{AC}. The BLM Preferred Alternative would disturb up to 2,427 acres of Federal land entirely within the footprint of alternatives analyzed in the Draft SEIS/PRMPA, and thus involves no new areas of effect. The BLM Preferred Alternative also included consideration of a 31,859-acre area for designation as an ACEC and management prescriptions that would be required for the designated ACEC. This area constitutes a portion of the area in Nevada nominated by Basin and Range Watch, and was determined by a BLM Interdisciplinary Team to meet the relevance and importance criteria for consideration as an ACEC (refer to Appendix B in the Final SEIS/PRMPA for BLM evaluation of the ACEC nomination).

The addition of this new alternative in the Final SEIS/PRMPA is consistent with CEQ regulations (40 C.F.R. 1505.1(e)) guidance allowing an agency to develop new alternative(s) that are variations of alternatives analyzed in a Draft EIS and do not result in significant new impacts. This new layout is located entirely within the footprint of the alternatives analyzed in the Draft SEIS/PRMPA and is smaller in total area, representing a reduction of over 20 percent in total acreage in comparison to Alternative D. Thus, the BLM Preferred Alternative involves no new areas of effect and, in fact, reduces the Project's environmental impacts in comparison to those identified in the Draft SEIS/PRMPA.

V. Alternatives Considered but Dismissed from Further Analysis

A number of alternatives were recommended during the scoping period for the SEIS/PRMPA. The alternatives put forth were similar to alternatives suggested during the EIS process for the Silver State Solar Energy Project analyzed in the 2010 Final EIS, including consideration of alternative technologies; alternative locations (e.g., brownfield development, alternative BLM lands and lands in California); and alternative size and layout. With the exception of the alternative size and layout recommendation, the other alternatives were eliminated from further analysis as they were not viable and did not meet BLM's purpose and need.

VI. Preferred Alternative

In the Final SEIS/PRMPA published on September 20, 2013, the BLM identified the BLM-Preferred Alternative. This alternative reasonably accomplishes the purpose and need for the Federal action while fulfilling the BLM's statutory mission and responsibilities, giving consideration to economic, environmental, and technical factors. In particular, this alternative best addresses public and agency concerns regarding project size and desert tortoise connectivity in the Ivanpah Valley while meeting the BLM's purpose and need. Further, the total estimated acreage of surface disturbance under the Preferred Alternative is the least surface disturbance of all action alternatives analyzed in the Final SEIS/PRMPA. The smaller overall project footprint also reduces impacts to other resources and uses (e.g., wildlife, visual resources, soils, vegetation).

VII. Environmentally Preferred Alternative

The CEQ regulations require the ROD to identify one or more environmentally preferred alternative. An environmentally preferred alternative is an alternative that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historic, cultural, and natural resources. Because it would cause the least damage to the biological and physical environment, the BLM has determined that the No Action Alternative is the environmentally preferred alternative. However, the No Action Alternative would not allow development of the energy generating project and would not meet the purpose and need of the project.

VIII. Mitigation and Monitoring

c. Required Mitigation

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 Project have been adopted by this ROD. In some cases the desert tortoise mitigation measures presented in the Final SEIS/PRMPA have been revised to include minor clarifications and to identify known costs of implementing the measures. The ROW grant authorizations are subject to the following measures, terms and conditions:

- Avoidance, Minimization, and Mitigation Measures provided in the Final SEIS/PRMPA, Chapter 2.7, amended as in **Appendix A** of this ROD

- Reasonable and Prudent Measures and Terms and Conditions in the FWS BO, provided in **Appendix B** of this ROD, as such may be amended over time;

These mitigation measures will be strictly adhered to throughout the duration of all project activities. Application of these measures will reduce the impacts to BLM-administered lands and resources as described in the Final SEIS/PRMPA. These measures, terms, and conditions are determined to be in the public interest pursuant to 43 CFR 2805.10(a)(1).

d. **Monitoring and Enforcement**

The ROW authorization provides the legal authority to enforce compliance with all mitigation measures required for implementation in this ROD, including the measures contained in the biological assessment (BA) and the reasonable and prudent measures and terms and conditions contained in the BO issued by the FWS. Monitoring will occur throughout the duration of the Project for each component of construction, operation, maintenance, and decommissioning of the solar facility. In addition, the Project will include ongoing research to determine whether the desert tortoise connectivity corridor has been narrowed by the Project to a point where its effectiveness will be compromised or even eliminated by way of the area being unoccupied. The BO for this Project contains additional mitigation measures and requirements for desert tortoise to minimize adverse impacts.

The ROW grant(s) issued for the Silver State Solar South Project will be for a term of 30 years with a right of renewal so long as the lands are being used for the purposes specified in the grants, and it will allow the grantee the right to use, occupy, and develop the described public lands to construct, operate and maintain, and decommission a 250-MW_{AC} solar PV generating facility and associated facilities in Clark County, Nevada, as the BLM identified and evaluated in the Final SEIS/PRMPA.

Once ROW grant documents have been approved by the BLM, actual on-site construction or other surface-disturbing activities will be authorized by the issuance of a single or phased series of written NTPs by the BLM Authorized Officer. These NTPs will specify authorized activities, location of the authorized activities, and the timing of the authorized activities. Should non-compliance issues, environmental issues, or other problems be encountered during authorized activities, the BLM Authorized Officer may amend or rescind any NTP previously issued. Silver State Solar Power South, LLC may, on approval from the BLM, assign the ROW lease/grant to another party in conformance with the Part 2800 ROW regulations.

Consistent with BLM policy, the Silver State Solar South Project ROW grant(s) will include a diligent development and performance bonding requirement for installation of facilities consistent with the approved POD (BLM Instructional Memoranda (IM) No.

2011-003; Solar Energy Development Policy). Construction of the initial phase of development must commence within 12 months after issuance of the NTP but no later than 24 months after the effective date of the issuance of the ROW grants. The holders shall complete construction within the timeframes approved by the BLM.

The ROD is conditioned on implementation of mitigation measures, monitoring programs and agreements/protest resolutions as identified **Appendix A** of this ROD, Final SEIS/PRMPA, the BO issued and as may be amended by the FWS, and issuance of all other necessary local, state, and Federal approvals, authorizations, and permits.

IX. Management Considerations in Choosing the Selected Alternative

The decision to approve the Silver State Solar South Project takes into account statutory, legal, and national policy considerations, as well as the Applicant's technical and financial capability to construct the project for which the ROWs are is requested. The decision was also based on input provided by and received from the public, industry, as well as other Federal and state agencies and affected Indian tribes. Through this review process, all practicable methods to reduce environmental harm have been incorporated into the decision and no undue or unnecessary degradation will result from this project. The decision is consistent with BLM's multiple use mandate under FLPMA.

Secretarial Order 3283 "Enhancing Renewable Energy Development on the Public Lands," was signed January 16, 2009. This Secretarial Order established renewable energy as a Departmental policy and committed the DOI to achieve the goals established in Sec. 211 of the Energy Policy Act of 2005. The Act encourages the development of renewable energy resources, including solar energy. Section 211 of the Act established a goal for the Secretary of the Interior to approve at least 10,000 MW of non-hydropower renewable energy projects on public lands by 2015. Secretarial Order 3285 "Renewable Energy Development by the Department of Interior," signed March 11, 2009, as amended on February 22, 2010, establishes the development of renewable energy as a priority for the DOI and creates a Departmental Task Force on Energy and Climate Change. The Congress, and the President, through the DOI, has established a national policy priority for renewable energy development.

The proposed Project could potentially help displace older fossil-fuel electric generating facilities with clean, renewable power, which would contribute to the reduction of greenhouse gas (GHG) emissions. In addition, the proposed Project would further the objectives of President Obama's Climate Action Plan (June 2013) to eliminate or reduce GHG emissions and promote the deployment of renewable energy technologies. 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 State of Nevada has also enacted legislation requiring area utility companies to provide energy from renewable energy sources as part of the State's renewable portfolio standard to

achieve a goal of 25 percent of its energy production from renewable energy sources by the year 2025.

The decision to approve the proposed resource management plan amendments takes into account Section 202 of FLPMA that states: "The Secretary shall, with public involvement…develop, maintain, and when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands" (43 USC 1712). Construction of the Silver State Solar South Project is in a planning area managed according to the LVFO RMP, which is currently being revised. The BLM began the process of formally updating the LVFO RMP in 2010, and expects to complete the update in 2015. The RMP allows for multiple uses of public lands and does not prohibit the development of alternative energy sources on the public lands that compose the Project site. As noted, this ROD amends the LVFO RMP to remove the SRMA designation and change the VRM class from VRM Class III to VRM Class IV within the ROW grant area and designate a 31,859 acre ACEC. Approval of the first two amendments makes the Project in compliance with the LVFO RMP.

The BLM lands in the ROW application area and vicinity are managed under the LVFO RMP (1998) and its amendments. The RMP focused management on handling land transfers, recovery of desert tortoise populations, the appropriate locations for mineral extraction, management of off-road recreation, and when to pursue special designations such as ACECs and utility corridors. Since 1998 the planning area has undergone significant population growth and undeveloped lands are targeted for renewable energy development. This has led to new planning and resource management needs to cope with new uses of and demands on the public lands. To account for these changes the BLM has revised the RMP by plan amendments, maintenance actions, and several new statutes. In an effort to have an RMP that fully addresses current and projected land use and resource conditions, the BLM began the process of formally updating the RMP in 2010. This update is not expected to be complete until 2015. The proposed Project is one of the several priority projects selected by the DOI to help fulfill their mandate to develop renewable energy projects on public lands. As such, it was anticipated that a ROD will be made on this Project before the full LVFO RMP revision is complete, in the interim the proposed plan amendments being approved in connection with the Project will ensure that it is consistent with the LVFO RMP, as amended.

X. Relationship to Other Plans, Policies, and Programs

The selected alternative must comply with various Federal laws, statutes, regulations, and Executive Orders. The FLPMA mandates that the BLM manage public lands on the basis of multiple use and sustained yield (43 U.S.C. § 1701(a)(7)). To implement the selected alternative, the Project proponent must acquire applicable Federal, state, county, and local permits and other approvals, as necessary. Applicable or potentially applicable approvals (permits, licenses, compliance, or reviews) are listed in Table 1.6 of the Final SEIS/PRMPA.

e. Solar Programmatic EIS for Solar Energy Development in Six Southwestern States

The BLM has prepared a Programmatic EIS for Solar Energy Development in Six Southwestern States (Solar PEIS) (FES 12-24; DOE/EIS-0403), whose 2012 ROD identifies the Ivanpah Valley, where the Silver State Solar South Project is proposed, as an exclusion zone for large-scale renewable energy development. In the development of the Programmatic EIS and ROD, however, the BLM determined that it would continue processing pending solar energy applications that meet due diligence and siting requirements under existing land use plans and other policies and procedures that the BLM has adopted or might adopt. The BLM defines "pending" applications as any applications (regardless of place in line) filed within proposed variance and/or exclusion areas before the publication of the Supplement to the Draft Solar PEIS (October 28, 2011), and any applications filed within proposed Solar Energy Zones before June 30, 2009. Only "new" applications, not pending applications such as for the Silver State Solar South Project, are subject to the planning decisions and program elements adopted by the Solar PEIS ROD.

The DOI and the BLM have nevertheless reviewed the Solar PEIS and ROD in making this decision. In the Solar PEIS and ROD, DOI and the BLM considered the potential impacts of solar energy development on desert tortoise connectivity habitat when deciding to exclude solar development proposed by new applications in the Ivanpah Valley. In deciding to authorize the Silver State Solar South Project, DOI and the BLM have determined that the modifications to the proposed project, measures contained in the FSEIS/PRMPA and BA, and the reasonable and prudent measures in the biological opinion significantly minimize and/or mitigate environmental damage and adequately protect resources, including desert tortoise habitat connectivity. .

f. **County and Local Plans**

State and local plans were considered during the development of the Draft and Final SEIS/PRMPA. Applicable plans are listed in Chapter 1.4 in the 2010 Final EIS, and referenced in the Final SEIS/PRMPA. As noted below, the Governor's office did not identify any inconsistencies with State or local plans, policies or programs. However, the CCDOA has expressed concerns that the ACEC identified in the BLM's Preferred Alternative is incompatible with the future development of the Southern Nevada Supplemental Airport. To address CCDOA's concerns, the ACEC management prescriptions were revised to allow for the consideration of CCDOA-proposed ROWs within the ACEC. Specifically, the management prescriptions were revised to read as follows: "Rights-of-way for construction and operation of the Southern Nevada Supplemental Airport and associated facilities are allowed, subject to an approved Airport Final Environmental Impact Statement and Record of Decision and subject to compliance with the Endangered Species Act."

g. **Endangered Species Act**

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 (16 U.S.C. Section 1531 et seq.). It also requires consultation with the FWS in making that determination. The BLM complied with this mandate by initiating consultation with the FWS and preparing a biological assessment.

On November 16, 2012, the FWS submitted a public comment memorandum on the Draft SEIS/PRMPA recommending the BLM select the No-Action alternative to avoid reducing the width of the existing desert tortoise corridor and, if that was not possible, FWS asked the BLM to minimize impacts to the linkage corridor by creating and selecting a new alternative that would protect a corridor of undisturbed desert tortoise habitat between the Silver State North project and the Lucy Gray Mountains and that this corridor should be wide enough to accommodate multiple desert tortoise ranges. The FWS public comment memorandum included a map showing the footprint of the Silver State South combined alternatives, along with a line that depicted a 1.4-mile distance of suitable habitat from the Lucy Gray Mountains.

The FWS memorandum stated, "If this new alternative is selected, we ask BLM and the Applicant to commit to specific mitigation actions that would help offset a reduction in this linkage. These actions may include: (1) funding genetic and disease testing and removing the fence at the long-term translocation site to increase connectivity in the Ivanpah Valley; (2) funding culvert construction under roads in Ivanpah Valley to connect populations on either side of Interstate 15; and (3) funding recovery actions identified by the desert tortoise recovery 5-year action plan." Additionally, FWS asked the BLM and the applicant commit to specific monitoring studies to help FWS understand the impacts to population demographics (age and sex ratios) and genetic stability of the desert tortoise population as a result of the project and for other projects in the Ivanpah Valley, such as funding a genomic study that looks at fine-grained genetic relationships to reveal patterns of movement and connectivity in the Ivanpah Valley. This memo summarized the FWS's comments within the NEPA process and did not reflect an analysis under section 7(a)(2) of the Endangered Species Act.

In response to the FWS's comment memorandum and other concerns about potential impacts to desert tortoise habitat and jurisdictional waters, the Applicant developed iterations of a revised project layout which were reviewed by FWS, BLM and USACE and refined based on agency feedback. Under the modified project proposal, which became the BLM Preferred Alternative following discussions between the Applicant, FWS, BLM, and USACE, the connectivity corridor between the project footprint and the Lucy Gray Mountains would be approximately 1.39 miles wide at its narrowest point (FWS 2012). 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 (FWS 2012). This remaining corridor would be wider and shorter the corridors formed by Alternatives B, C, or D. In addition, Phase III of the project would be eliminated, avoiding impacts to a number of desert tortoises and preserving high quality desert tortoise habitat to the south of the linkage. The FWS currently assesses the viability of linkages based on the ability of those linkages to accommodate a desert tortoise's entire life history (lifetime utilization area). Because an individual desert tortoise may use up to 1.5 square miles of habitat throughout its life, the FWS estimates that a linkage would need to be at least 1.4 miles wide to accommodate a single, circular home range (FWS 2011). In general, linkages may require that multiple home ranges be accommodated to function optimally, although no information is available on linkage size or configuration required to maintain connectivity between desert tortoise populations (FWS 2012).

In addition to decreasing the project size to widen the linkage corridor, the Applicant and BLM proposed mitigation actions identified in the FWS's November 16, 2012 comment memorandum

to help offset the impacts to the linkage. These actions include providing funding for: 1) a disease and genetic assessment of desert tortoises within the Large-Scale Translocation Site to determine whether the fence around the Large-Scale Translocation Site can be removed or realigned to improve connectivity; 2) if removal of the fence is determined to be infeasible due to the assessment of tortoise health, funding to fence Highway 93; 3) restoration of habitat near the site of the Silver State South Project; 4) law enforcement personnel to ensure that recreational users follow the proposed management actions within the new area of critical environmental concern; and 5) a U.S. Geological Survey (USGS) study to monitor regional desert tortoise populations for changes in demographic and genetic stability and the viability of the linkage.

Movement studies are currently ongoing within and adjacent to the ROW Application Area with the goal of assessing desert tortoise movement through high-elevation passes in the Lucy Gray and McCullough mountains. These studies are also intended to further evaluate home range sizes within the immediate vicinity of the ROW application area prior to construction of the project. Following construction, ongoing monitoring of translocated desert tortoises would occur, as would studies intended to assess the status of desert tortoises within the remaining corridor east of the project area and the Ivanpah Valley would occur (Ironwood Consulting 2012).

Additionally, the Applicant has agreed to fund a program, developed by the USGS and the BLM, to monitor regional desert tortoise populations for changes in demographic and genetic stability. 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. 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.

If the Silver State South Project degrades connectivity between the northern and southern portions of Ivanpah Valley, monitoring by the USGS should be able to detect any such change, and the long generation time of desert tortoises and re-initiation requirements of section 7(a)(2) would enable the BLM to undertake corrective actions on the ground to bolster connectivity and for the BLM and FWS 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 (FWS 2012).

On March 4, 2013, the FWS sent a memorandum requesting the batching of two requests for formal consultation under ESA Section 7: First Solar's Stateline Solar Farm Project received on January 4, 2013, and Silver State Solar South Project received on February 11, 2013. At issue for ESA Section 7 consultation are the effects of the proposed actions on the federally threatened desert tortoise (*Gopherus agassizzi*). The FWS reasoned due to 1) proximity of the projects, 2) timing of the consultations, 3) similarity between the effects of the projects, and 4) 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 the FWS accepted a BA for each of the two projects.

Formal Consultation began on March 12, 2013, and BLM received a final BO on September 30, 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 Stateline Solar Project. The BO included two project-specific incidental take statements with applicable Terms and Conditions to ensure clarity in agency and applicant responsibility. Consultation with the FWS, including the development of minimization measures, was substantially complete prior to the release of the Final SEIS/PRMPA. The FWS issued an errata for the BO on December 6, 2013.

In its BO, the FWS stated that the 1.39 mile wide corridor would likely accommodate a single lifetime desert tortoise utilization area throughout the length of the corridor and 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. As a result, the FWS concluded that the Project was not likely to jeopardize the continued existence of the desert tortoise because:

1) The FWS does 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 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, 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; and

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 BLM and the Applicant will fund and implement numerous measures to enhance connectivity and secure desert tortoises populations in the surrounding area, the USGS will monitor demographic and genetic stability, and the BLM will be required to re-initiate formal consultation if monitoring detects loss of stability. The long generation time of desert tortoises will allow the BLM to take remedial actions if the USGS detects degradation of demographic or genetic instability.

With respect to the overall impact to desert tortoises in the area of the Project, the BO concluded that the designation of an ACEC in Nevada and expansion of the Ivanpah Desert Wildlife Management Area (DWMA) in California and 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, the 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.

h. Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act of 1918 (MBTA)

The Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d) provides for the protection of bald and golden eagles by prohibiting, except under certain specified conditions, disturbance or harm that rises to the level of take. The MBTA provides protection for 1,026 bird species. The MBTA makes it unlawful to pursue, hunt, take, capture, kill, or sell most birds listed under the act.

The Final SEIS/PRMPA describes how the Project area provides habitat for cover, breeding, foraging, and/or traveling for various avian species, and that the project authorization could diminish their habitat and create a risk of mortality of adults due to collision. Due to the potential presence of golden eagles, raptors, and bat species within the Project area, the BLM required the proponent to develop a Bird and Bat Conservation Strategy (BBCS), which is included as **Appendix C** of this ROD, with the goal of reducing the potential risks for avian and bat mortality resulting from construction and operation of the Project. The BBCS provides a summary of current biological conditions and describes conservation measures intended to avoid, minimize, and mitigate potential impacts to bird and bat species, which may include state and/or federally designated special status species. The BBCS corresponds to Mitigation Measure (MM) BIO-9 found in the FSEIS/PRMPA (BLM 2013b), and includes the following objectives:

- Identify baseline conditions for bird and bat species currently present at the Project site;

- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project site;

- Specify steps that should be taken to avoid, minimize, and mitigate any potential adverse effects on these species, including necessary permits to collect bird and bat carcasses for data collection and research; and

- Detail long-term monitoring and reporting goals, including collection and reporting of bird and bat carcasses, including applicable approved protocols that would be used for any surveys and/or monitoring conducted.

The BBCS also includes a proposed post-construction Avian Mortality Monitoring Plan. Post construction avian mortality monitoring and instances of avian mortality reported on site will be used to monitor the effectiveness of mitigation measures that are intended to reduce project risks

to birds and bats. 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 California Desert Conservation Area (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, the BBCS includes avian mortality monitoring that will provide additional data for the BLM and FWS 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.

i. U.S. Army Corps of Engineers (USACE) Section 404 Permit

On May 20, 2013, the USACE issued a Jurisdictional Determination (JD) finding that all of the ephemeral drainages that drain to Roach Dry Lake, including the ROW application area, are non-jurisdictional under Section 404 of the Clean Water Act. With the exception of a small, 524 linear foot portion of jurisdictional drainage (which will be avoided by the Applicant), a Section 404 permit will not be required for the discharge of dredged or fill material associated with the Silver State Solar South Project. The USACE's formal responses and determinations are contained as separate letters in Appendix F of the Final SEIS/PRMPA.

j. Section 106 of the National Historic Preservation Act (NHPA)

In accordance with Section 106 of the NHPA, Federal agencies are required to consider the effects of the agencies' undertakings on properties listed in or eligible for the National Register of Historic Places (NRHP). Eligible properties can include a diversity of archaeological, historical, and traditional cultural resources.

Within the ROW application area, 23 prehistoric and/or historic cultural sites were recorded and evaluated as to whether they were eligible for listing on the NRHP. The BLM and the Nevada State Historic Preservation Office (SHPO) both concurred, based on the four National Register criteria for evaluation, that eight sites are eligible properties, including three prehistoric sites that are eligible under Criterion *d*, four historical period sites eligible under Criteria *a* and *c*, and one historical period site that is eligible under Criterion *a* and *d*.

The Nevada SHPO has concurred that the proposed Project will not pose an adverse effect to identified historic properties (SHPO, August 13, 2013). However, if any buried and previously unidentified resources are located during project activities, the SHPO recommends that all work in the vicinity of the find cease and their office be contacted for additional consultation per 36 CFR 800.13.b.3.

XI. Consistency and Consultation Review

k. 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 U.S.C.§ 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 § 161 0.3-2(e), require a 60-day period for Governor's consistency review. The purpose of the review is to identify inconsistencies of the proposed plan amendment with State and local plans, programs, and policies. On September 20, 2013, the BLM initiated the period of Governor's Consistency Review for the Final SEIS/PRMPA in accordance with FLPMA. No inconsistencies were identified by the Governor's office.

l. Cooperating Agencies

Cooperating agency status provides a formal framework for governmental agencies to engage in active collaboration with a Federal agency to implement the requirements of NEPA (42 U.S.C. 4321, et seq.). Federal and state agencies and local and tribal governments may qualify as cooperating agencies because of "jurisdiction by law or special expertise" (40 CFR 1501.6 and 1508.5).

On November 23, 2011, the BLM Southern Nevada District Office sent an invitation to 30 Federal, state, and local entities to be cooperating agencies for the Silver State Solar South SEIS/PRMPA and the Hidden Hills Transmission Project EIS. This letter requested agencies to indicate via written letter if they were interested in becoming a cooperating agency for either of the two projects. The USEPA, CCDOA, NPS (on behalf of Mojave National Preserve), NDOW, and USACE accepted cooperating agency status. The City of North Las Vegas, USGS, FWS, and the ACHP declined cooperating agency status.

m. Native American Consultation

Federal agencies are required to conduct government-to-government consultation with federally recognized and other Native American tribal groups in accordance with several authorities including, but not limited to, NEPA, the NHPA, the American Indian Religious Freedom Act, Executive Order 13175, and Executive Order 13007.

Pursuant to the regulations, on August 16, 2011 the BLM mailed letters to three representatives of the Las Vegas Paiute Tribe, three representatives of the Moapa Band of Paiutes, two representatives of the Chemehuevi Indian Tribe, two representatives of the Fort Mojave Indian Tribe, two representatives of the Colorado River Indian Tribes, and one member of the non-federally recognized Pahrump Paiute. The tribes were invited to share information or any cultural concerns regarding the proposed Project area.

Through in-person meetings and telephone conversations with the Las Vegas Paiute Tribe, the Chemehuevi Indian Tribe, and the Fort Mojave Indian Tribe, no concerns have been expressed for the proposed Project. The Moapa Band of Paiutes tribe and the Pahrump Paiute tribe raised a concern regarding how the tortoise habitat and the potential use of groundwater within the Project would be affected. Appendix A and B includes a host of measures, terms and conditions designed to monitor and mitigate impacts to tortoise habitat and groundwater. These concerns were addressed through the development of the BLM's Preferred Alternative and designation of the ACEC. The layout has been designed to address concerns associated with desert tortoise connectivity corridor characteristics and impacts to jurisdictional water of the U.S., and continues to minimize impacts to recreational areas in the Jean Lake/Roach Lake SRMA. The smaller Project footprint provides and would result in fewer acres being disturbed or alternated; less water needed for construction and dust control; and less change in groundwater recharge. The Colorado River Indian Tribes stated on September 6, 2012, that they would send a response to the BLM stating what their concerns might be but a response was not received. There are no known sites of religious or ceremonial importance to the tribes within the Area of Potential Effect for the Project.

XII. Agency and Public Involvement

n. Scoping

In compliance with NEPA, the BLM published a Notice of Intent to prepare an EIS on September 1, 2011, in the Federal Register (Vol. 76, No. 170, page 54483-54484). Publication of the NOI began a 60-day scoping period that ended October 31, 2011. The BLM established a website with Project information describing the various methods for providing public comment on the Project, including an e-mail address where comments could be sent electronically. In addition, a public scoping notice was prepared and mailed to inform the public about the scoping process for the preparation of the SEIS/PRMPA and the scheduled scoping meetings. The notice was mailed to Federal, state, and local agencies; elected officials; Native American tribes; special interest groups and organizations; and the general public. The distribution list included 1,071 notices, and was compiled from a list of individuals, organizations, and agencies who had expressed interest in other BLM LVFO projects.

The BLM held three public scoping meetings to identify issues and concerns regarding the proposed Project. Meetings were held on September 27, 28, and 29, 2011 in Primm, Las Vegas, and Jean, respectively. These scoping meetings provided an opportunity for the public to learn about the proposed Project and to provide comments.

Two hundred eight (208) comments were received during the scoping comment period. A summary of these comments is provided in the Scoping Summary Report in Appendix C of the Final SEIS/PRMPA. Comments received during the scoping process were addressed in the analysis of impacts in the Draft SEIS/PRMPA.

o. Draft SEIS/PRMPA Public Comment Period

The USEPA and the BLM published a Notice of Availability (NOA) for public and agency review and comment of the Silver State Solar South Project Draft SEIS/PRMPA on October 12, 2012 and October 15, 2012, respectively, in the Federal Register (Vol. 77, No. 198, page 62235 and Vol 77. 199, page 62525). The 90-day comment period ended January 11, 2013. The BLM received oral testimony at three public meetings held on December 5, 6, and 7, 2012, in Primm, Las Vegas, and Jean, respectively.

Three hundred eighty (380) comments (letters and oral testimony) were received. The BLM reviewed all comments received on the Draft SEIS/PRMPA and developed responses to all substantive comments based on guidance found in the CEQ regulations (40 CFR 1503.4). As a result of this review, the Final SEIS/PRMPA was modified to supplement and improve the analysis. The responses to substantive comments are provided in Appendix D in the Final SEIS/PRMPA.

p. **Final SEIS/PRMPA**

The NOA for the Final SEIS/PRMPA was published in the Federal Register on September 20, 2013. Due to a Federal government shutdown between October 1 – 16, 2013 the BLM extended the protest period, which was scheduled to close on October 21, by 16 days to November 6, 2013. The BLM did not provide for a separate comment period on the Final SEIS/PRMPA during the protest. The BLM nevertheless received 10 letters purporting to be comments on the Final SEIS/PRMPA. While there was no comment period on the Final SEIS/PRMPA, the BLM considered the comments to the extent practicable and provides responses to substantive comments in **Appendix D** of this ROD. Based on its review, the BLM determined that they do not raise any significant new circumstances or information relevant to environmental concerns associated with the Project. Therefore no changes to the proposed decision were determined warranted.

q. **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 Silver State Solar South Project and who has an interest that is or may be adversely affected by the planning decision may protest approval of the proposed LVFO RMP amendment contained in the Final SEIS/PRMPA within 30 days from date the USEPA publishes the NOA of the Final SEIS/PRMPA in the Federal Register.

Twelve formal protest letters were filed with BLM. In general, protesters were not in support of the proposed amendment 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 SEIS/PRMPA. Therefore, all protests were denied, and no changes were made to the Departmental decision as a result of the protests. Detailed information on protests may be

found online at the following location: BLM Washington Office website: http://www.blm.gov/wo/stlen/prog/planning/protestresolution.html

XIII. Decision Rationale

These decisions fulfill BLM's 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. The stipulations in the grant ensure that authorization of the Silver State Solar South Project will protect environmental resources and comply with environmental standards. These decisions reflect careful balancing of many competing public interests in managing public lands. These decisions are based on comprehensive environmental analysis and full public involvement. During the scoping process and following the publication of the Draft SEIS/PRMPA, members of the public submitted comments that enhanced the BLM's consideration of many environmental issues relevant to this project. The DOI and the BLM have determined that all practicable mitigation measures contained in the Final SEIS/PRMPA and the BO, which avoid or minimize environmental harm, have been adopted.

The BLM has determined that the analysis contained in the Final SEIS/PRMPA is adequate for the purposes of reaching an informed decision regarding the ROW application and LVFO RMP amendments. This ROD reflects careful consideration of the information generated during the environmental review process for the Silver State Solar South Project, and it further reflects resolution of the issues by the BLM and the DOI through such process. This ROD applies only to the BLM-administered lands and to the BLM's decision on the Silver State Solar South Project and Las Vegas Field Office Resource Management Plan Amendments. Other agencies are responsible for issuing their own permits and applicable authorizations for the Project.

XIV. Errata

The BLM has made clarifications and minor editorial changes to the Final SEIS/PRMPA that have been incorporated in this ROD. An errata for the Final SEIS/PRMPA is included as **Appendix E** of this ROD. The errata includes minor edits to clarify language and to include known costs for desert tortoise mitigation measures. To the extent that such clarifications affect a mitigation measure, **Appendix A** of this ROD, contains the final language.

XV. Final Agency Action

r. Land Use Plan Decisions

It is the decision of the BLM to approve the Proposed Plan Amendment to the Las Vegas Field Office Resource Management Plan (LVFO RMP) to remove the SRMA designation within the ROW area to be granted for the Silver State Solar South Project. It is also the decision of the BLM to approve the Proposed Amendment to the LVFO RMP to change the VRM Class designation within the ROW grant from VRM Class III to VRM Class IV. It is also the decision of the BLM to approve the Proposed Amendment to the LVFO RMP to designate a 31,859 acre ACEC. An amendment to an approved resource management plan is to be approved by the State Director only after resolution of any protests by the BLM Director (43 CFR 1610.5-1, 1610.5-2, 1610.5-5). The decision on the protests by the BLM Director is the final decision for the Department (43 CFR 1610.5 2).

I have resolved all protests (or they have been withdrawn) 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.

I hereby approve the above-described plan amendments. This approval is effective on the date this Record of Decision is signed.

Approved By:

Neil Kornze
Principal Deputy Director
Bureau of Land Management

2/14/14
Date

s. Right-of-Way Authorization

It is my decision to approve ROW grants to Silver State Solar Power South, 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. This decision is effective on the date this Record of Decision is signed.

Approved By:

Neil Kornze
Principal Deputy Director
Bureau of Land Management

2/14/14
Date

t. **Secretarial Approval**

I hereby approve this decision. My approval of this decision 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 Part 4. Any challenge to this decision, including the BLM Authorized Officer's issuance of the right-of-way as directed by this decision, must be brought in Federal District Court.

Approved by:

Feb 14, 2014

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

Date

Appendix A: Mitigation Measures

Table 2-3. Applicant-Proposed Measures

The following measures have been proposed and committed to by the Applicant as design features of the proposed Project. They would be implemented as warranted by site and resource conditions for any of the action alternatives.

APM-1 EROSION CONTROL
Soil stabilization measures will be used to prevent soil being detached by stormwater runoff. The Applicant will employ Best Management Practice (BMPs) to protect the soil surface by covering or binding soil particles. The Project will incorporate erosion-control measures required by regulatory agency permits and contract documents as well as other measures selected by the contractor, upon BLM approval. Site-specific BMPs will be designed by the contractor, and associated figures are to be included in the final Project Storm Water Pollution Prevention Plan (SWPPP).

Erosion Control Measures
At a minimum, the Project will implement the following practices for temporary and final erosion control:

Year-round:
- Monitor the weather using National Weather Service reports to track conditions and alert crews to the onset of rainfall events.
- Preserve existing vegetation where required and when feasible. Conduct clearing and grading only in areas necessary for Project activities and equipment traffic. Install temporary fencing prior to construction along the boundaries of the construction zone to clearly mark this zone, preventing vehicles or personnel from straying onto adjacent offsite habitat.
- Sequence construction activities with the installation of erosion control and sediment control measures. Arrange the construction schedule as much as practicable to leave existing vegetation undisturbed until immediately prior to grading.
- Protect slopes susceptible to erosion by installing controls such as seed-free hay bales, fiber rolls, and gravel bags.
- Stabilize non-active areas as soon as feasible after construction is complete and no later than 14 days after construction in that portion of the site has temporarily or permanently ceased. Reapply as necessary to maintain effectiveness.
- Place covers over stockpiles prior to forecasted storm events and during windy conditions. Place sediment controls (fiber rolls or gravel bags) around the perimeter of stockpiled materials year-round. Excess sand and gravel will be stockpiled for BLM material sale.
- Maintain sufficient erosion control materials on site to allow implementation in conformance with General Permit requirements and as described in the SWPPP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.
- Promptly repair and reapply controls according to BMPs in areas for which erosion is evident.

During the rainy season:
- Implement temporary erosion control measures such as fiber rolls, straw bales, geotextiles and mats, and gravel bags at regular intervals throughout the defined rainy season and as needed determined by site conditions.
- Inspect and stabilize disturbed areas with temporary or permanent erosion control measures before rain events.

During the non-rainy season:
Conduct construction activities that will have an impact on waters of the United States during the dry season to the extent feasible to minimize erosion.
A combination of the following erosion controls may be used at the site:
- Scheduling of activities to avoid times of erosion susceptibility
- Preservation of existing vegetation
- Mulch and hydraulic mulch
- Straw mulch
- Geotextiles and mats
- Earth dikes and drainage swales
- Velocity dissipation devices
- Slope drains

Table 2-3. Applicant-Proposed Measures (Continued)

Streambank stabilization
BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion controls will be adjusted accordingly to control storm water runoff at the downgrade perimeter.

Sediment Control Measures
Sediment controls are intended to complement and enhance selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. The Project will incorporate sediment control measures required by regulatory agency permits and contract documents as well as other measures selected by the contractor. The Project will implement the following practices for temporary sediment control:

Year-round:
- The installation of detention ponds to control all storm water flow off site. The ponds will be designed to control sediment transport off site, and will be enclosed within desert tortoise fencing. Sediment will be removed from the ponds periodically and transported off site to a designated fill area.
- Maintain the following temporary sediment control materials onsite: silt fence materials, gravel bags for linear barriers, and fiber rolls in sufficient quantities throughout the Project site to implement temporary sediment controls in the event of predicted rain and to respond to failures or emergencies, in conformance with General Permit requirements and as described in the SWPPP. Install gravel filter berms at the base of slopes adjacent to delineated sensitive areas. Native onsite stones/rocks will be used in construction of gravel filter berms or check dams.
- Install gravel filter berms along the boundaries of delineated sensitive areas, if any, within the boundaries of the Project site or areas that receive runoff from the Project site. Native onsite stones/rocks will be used in construction of gravel filter berms or check dams.

During the rainy season:
Implement temporary sediment controls at the draining perimeter of disturbed soil areas, at the toe of slopes, and at outfall areas.

During the non-rainy season:
Implement temporary sediment controls such as hay bales, fiber rolls, or gravel bags at the draining perimeter of disturbed soil areas. A combination of the following sediment controls may be used at the site:
- Silt fence
- Sediment basin
- Sediment trap
- Check dam
- Fiber rolls
- Gravel bag berm
- Street sweeping and vacuuming

BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, sedimentation controls will be adjusted accordingly to control storm water runoff at the downgrade perimeter.

APM-2 EXCAVATION/GRADING
Prior to trench excavation, the area to be trenched will be graded and organic matter removed. Organic matter will be mulched and re-deposited within the site fill except under foundations and in trenches. Trench excavation will be performed with conventional trenching equipment. Excavated soil to be used as backfill will be maintained adjacent to the trench. Excessive soils may be balanced on site or transported to an offsite disposal facility. Sand slurry may also be used in the backfill, if the slurry composition is approved in advance by BLM. Excavated soil to be used as backfill will not be removed from the Project site. Temporary sheeting or bracing shall be used as necessary to support trench side walls in areas where soils are soft or collapsible. For trench work not conducted by SCE, the trench itself will be first backfilled with 3 to 4 inches of sand to provide suitable bedding for installed conductors, and then 3 to 4 inches of sand will be deposited on top of installed conductors. The remaining backfill will be composed of the native excavated soils or slurry and soils to be compacted to a density determined appropriate based on detailed geotechnical study findings and design requirements. During the backfill, underground utility

Table 2-3. Applicant-Proposed Measures (Continued)

marking tape will be installed at an appropriate depth below grade to indicate the type of conductors installed beneath. SCE is not proposing to install any direct buried cable systems excluding ground conductor. Excavation work performed by SCE would typically be used to install a conduit system. Native soil, slurry, and/or encasement would be used to backfill the trench. Where native soil would be utilized, compaction would be performed at a minimum of 90 percent of standard proctor density.
APM-3 AIR / DUST CONTROL The Applicant would control dust to comply with Clark County dust control requirements. The proposed Project would implement the following practices for fugitive dust and wind erosion control: • Minimize grading and vegetation removal, and limit surface disturbance during construction to the time just before PV module support structure installation; • Limit vehicular speeds on non-paved roads; • Apply water to disturbed soil areas of the proposed Project site to control dust and maintain optimum moisture levels for compaction, as needed. Apply the water using water trucks. Minimize water application rates as necessary to prevent runoff and ponding; • During windy conditions (forecast or actual wind conditions of approximately 25 miles per hour or greater), apply dust control to haul roads to adequately control wind erosion. Cover exposed, stockpiled, material areas; • Suspend excavation and grading during periods of high winds; and • Cover all trucks hauling soil and other loose material or maintain at least 2 feet of freeboard.
APM-4 SWPPP The Project design and plans will include BMPs to mitigate potential soil erosion caused by construction and operation of the Project. SWPPPs will be developed to assist with the management and protection of water resources throughout construction and the life of the Project.
APM-5 SPCC PLAN The Applicant would prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with Federal regulations to protect the environment from spills of petroleum products.
APM-6 HEALTH AND SAFETY PROGRAM The Applicant will require that all employees and contractors adhere to appropriate health and safety plans and emergency response plans. All construction and operation contractors will be required by the Applicant to operate under a health and safety program that is approved by the Applicant and that meets industry standards. All contractors will be required to maintain and carry health and safety materials including the Material Safety Data Sheets of hazardous materials used on site.
APM-7 EMERGENCY RESPONSE PLAN An emergency response plan will be prepared for the Project. The plan will contain a section that presents the results of a comprehensive facility hazard analysis and, for each identified hazard, a response plan. Emergencies may include brush or equipment fires, transformer oil leaks or spills, attempted acts of sabotage, and airplane crashes. The emergency response plan will assign roles and actions for onsite personnel and responders and will designate assembly areas and response actions.
APM-8 WASTE MANAGEMENT PLAN The Applicant would prepare a Waste Management Plan that would describe the storage, transportation, and handling of wastes and would emphasize the recycling of wastes, where possible, and would identify the specific landfills that would receive wastes that could not be recycled. Construction wastes will be managed in accordance with the Resource Conservation and Recovery Act (42 USC 6901, et seq. and RCRA's implementing regulations at 40 CFR 260, et seq.) and other applicable state and local regulations.
APM-9 NOXIOUS WEED CONTROL PLAN The Applicant would prepare and submit a Noxious Weed Control Plan to the BLM for review and approval before BLM issuance of a Notice to Proceed. The following are Project-specific measures that the Applicant would implement to control noxious weeds: • **Noxious Weed Risk Assessment Form.** This form provides information about the types of weed surveys to be

Table 2-3. Applicant-Proposed Measures (Continued)

conducted and weed treatment and prevention method schedules appropriate for the types of noxious weeds likely to be present. This form identifies and evaluates the level of noxious weed management necessary.

- **Pesticide Use Proposal.** The Applicant shall prepare, submit, obtain, and maintain a herbicide use proposal for the proposed Project. The Applicant would coordinate weed control activities with the BLM Weed Coordinator, particularly regarding proposed herbicide treatments. Pesticide Application Reports will be provided annually, or on an agreed upon interval, to the BLM Weed Coordinator.
- **Weed Management Plan.** Before ground-disturbing activities begin, the Applicant would prepare a site-specific Weed Management Plan. The plan would identify potential existing weed infestations at the proposed Project site and along the Project-associated linear facilities and would prescribe treatment.
- **Weed Infestation Prevention.** The Applicant would limit ground disturbance to the minimum necessary to safely construct and operate the proposed Project. The Applicant would avoid creating soil conditions that promote weed germination and establishment.
- **Equipment Inspection/Cleaning Sites.** The Applicant would establish equipment inspection/ cleaning sites to check for and potentially remove weed seeds, plant parts, or mud and dirt from vehicles. Project-related equipment and machinery would be required to arrive on-site in a clean condition. However, if necessary, Project-related equipment and machinery would be cleaned using compressed air or water to remove mud, dirt, and plant parts before moving into the Project site. Additional inspection and potential cleaning will be undertaken for relatively weed-free areas if identified during pre-construction surveys. Seeds and plant parts would be collected, bagged, and deposited in dumpsters destined for local landfills, when practical.

The following measures would be implemented to prevent infestations of noxious weeds at the proposed Project site and to control any potential infestations that may occur during Project construction and operation:

- Project construction workers would inspect, remove, and dispose of weed seed and plant parts found on their clothing and personal equipment, bag the product, and dispose of in a dumpster for deposit in a local landfill;
- Certified weed-free hay bales would be used for erosion control and to contain vehicle station wash water;
- Periodic monitoring of the construction site would be conducted to check for noxious weed infestations; and
- Areas subject to construction, such as the transmission ROW, would be rehabilitated and revegetated in accordance with the Rehabilitation Plan.

APM-10: SITE REHABILITATION PLAN AND FACILITY DECOMMISSIONING PLAN

In order to ensure that the permanent closure of the facility does not have an adverse effect, a Facility Decommissioning Plan would be developed at least 6 months prior to commencement of site closure activities. The Facility Decommissioning Plan would be developed in coordination with the BLM, with input from other agencies as appropriate. The Facility Decommissioning Plan would address future land use plans, removal of hazardous materials, impacts and mitigation associated with closure activities, schedule of closure activities, equipment to remain on the site, and conformance of the plan with applicable regulatory requirements and resource plans. The Facility Decommissioning Plan would be consistent with requirements and goals set in the Site Rehabilitation Plan. The activities involved in the facility closure would depend on the expected future use of the site. Certain facility equipment may be utilized for future uses of the site, such the O&M building, electrical transmission lines, and roads. Therefore, the extent of site closure activities would be determined at the time of the closure, in accordance with the Facility Decommissioning Plan. Closure activities may include:

- Removal of solar panels and supports;
- Removal of foundations;
- Removal of underground facilities to a depth of at least 2 feet below the ground surface;
- Removal of inverters and transformers;
- Removal of the substation;
- Disposal of chemicals and hazardous waste;
- Draining of transformers and disposal of dielectric oils (if transformers cannot be resold);
- Demolition and removal of the O&M building and removal of building foundations;
- Removal of on-site wooden transmission poles and conductors;
- Removal of 220kv/230kv steel transmission structures and conductors, and removal of foundations to a depth of at least 2 feet below the ground surface;
- Closure and abandonment of water wells and the septic tank;
- Removal of site fencing;

Table 2-3. Applicant-Proposed Measures (Continued)

- Regrading and restoration of original site contours; and
- Revegetation of areas disturbed by closure activities in accordance with the Site Rehabilitation Plan.

APM-11 AERONAUTICAL CONSIDERATIONS
Because of the proximity to the proposed Southern Nevada Supplemental Airport, the Applicant would file Notices of Proposed Construction or Alternation (Form 7460s) with the Federal Aviation Administration (FAA) prior to Project construction. The FAA review process will identify any aviation-related lighting requirements.

APM-12 VEGETATION TRIMMING
Except where excavation and grading is proposed, vegetation will be trimmed to an average height of not more than 12 inches. In these areas, the root systems of existing vegetation will be left in place to provide soil stability.

APM-13 CULTURAL
If archaeological properties are found to be eligible for National Register of Historic Places (NRHP) listing, the BLM will assess the potential adverse impact of the Project and the Applicant would prepare a plan to mitigate any potentially adverse impacts in consultation with BLM and Nevada SHPO. The Applicant shall be responsible for the costs to mitigate the discovery and any associated costs that may relate to curation.

APM- 14 ENVIRONMENTAL CLEARANCE
Initial site mobilization activities in each construction section would include environmental clearance in which site activities are reviewed and approved for compliance with resource protection plans and approved construction-compliance documents. Environmental clearance activities would:

- Be performed in each of the proposed Project construction sections as they are constructed;
- First be obtained for the site access roads, construction water storage pond and O&M area. Subsequent clearances would be obtained for each of the remaining major tasks;
- Delineate and mark the boundaries of each construction area during each phase of environmental clearance;
- Would use professional biologists to meet cactus salvage requirements, survey and relocate/translocate desert tortoise, and perform other sensitive species removal and mitigation;
- Install security and tortoise fencing around the perimeter of each construction area to prevent the reintroduction of sensitive species to the area; and
- Occur only during weather conditions permitted for the activity.

APM–15 GENERAL DESIGN AND CONSTRUCTION STANDARDS
The proposed Project would be designed in accordance with federal, state, local, and industrial code or standards.

APM- 16 ESTABLISH A PLANT NURSERY DURING CLEARING OF THE PROJECT SITE.
The proposed Project would establish a plant nursery on site during clearing as necessary in order to store salvage plants, including cactus and yucca that are protected under Nevada state law (Nevada Revised Statutes [NRS] 527.060-120 and Nevada Administrative Code [NAC] 527). As determined necessary, before clearing, field crews would salvage cacti and yucca to meet requirements established by the State. As determined by the BLM, plants would be made available for commercial and public use.

APM-17 PESTICIDE USE PROPOSAL

- Use of pesticides, insecticides, rodenticides, and herbicides (generally referred to here as pesticides) shall comply with all applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses within limitations imposed by the Secretary of the Interior. Prior to the use of the pesticides the Applicant shall obtain from the Authorized Officer, written approval of a Pesticide Use Proposal Plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, locations of storage and disposal of containers, and any other information deemed necessary by the Authorized Officer.
- Only those chemicals (pesticides) listed on the BLM approved label list are authorized for use on public lands. A Pesticide Use Proposal must be submitted for each chemical used, and it cannot be used until approval has been obtained in writing from the Authorized Officer. The proposal needs to identify any surfactants or dyes used in the spraying operation. Applicator(s) of chemicals used must have completed pesticide certification training and have a current up to date Certified Pesticide Applicator's License. Pesticide application records for the areas and acres treated must be submitted to the Authorized Officer each year. This includes the following:
    - Brand or Product name
    - EPA registration number

Table 2-3. Applicant-Proposed Measures (Continued)

- Total amount applied (use rate #A.I./acre)
- Date of application
- Location of application
- Size of area treated
- Method of treatment (air/ground)
- Name of applicator
- Certification number and dates
- Costs to treatment
- Amount of surfactants or dyes used in spraying operation

The record information must be recorded no later than 14 calendar days following the pesticide application and must be maintained for ten years.

Table 2-4. Proposed Mitigation Measures

Air Quality and Climate (Section 4.1)

Mitigation will be in accordance with the Project's dust control permit and Clark County regulations and BMPs.

Noise (Section 4.2)

MM NOI-1: Conduct Construction Activities during Daytime Hours. The Applicant shall conduct construction activity only during daytime hours while within 1,000 feet of the Desert Oasis apartment complex. Construction activities (including truck deliveries, pile driving, and vibration equipment use) shall be restricted to the least noise-sensitive times of day—weekday daytime hours between 7:00 a.m. and 10:00 p.m., within 1,000 feet of nearby residential uses ;

MM NOI-2: Turn Off Idling Equipment. Construction personnel shall turn off idling equipment when not in use.

MM NOI-3: Notify Adjacent Residences. The Applicant shall notify adjacent residents in advance of construction work through public mailings and signs directed toward residents, landowners, and recreational users within one mile of the site prior to construction. The notice shall state specifically where and when construction activities will occur in the area. The Applicant shall also provide a communication line or procedures to enable individuals to contact the contractor in the event that construction noise levels affect them.

MM NOI-4: Install Acoustic Barriers. The Applicant shall install acoustic barriers around stationary construction noise sources as necessary to maintain a noise level not to exceed 85 decibels (dBA) at the property boundary closest to the nearest residence.

MM NOI-5: Proper Maintenance and Working Order of Equipment and Vehicles. Construction equipment shall be maintained per manufacturers' recommendations. The Applicant shall ensure that all equipment is adequately muffled and maintained, to include:

- Use of noise controls on standard construction equipment and shielding on impact tools;
- Use of broadband noise backup alarms on mobile equipment; and
- Installation of mufflers on exhaust stacks of all diesel, gasoline and natural gas-powered engines.

MM NOI-6: Construction Equipment Muffled. The Applicant shall provide adequately muffled construction equipment.

MM NOI-7: Ensure Proper Installation of Transformer Equipment. The Applicant shall ensure proper installation of transformer equipment by:

- Installing transformers within enclosures;
- Using sound-dampening pads between each transformer and the mounting surface;
- Using flexible conduit couplings between each transformer and the associated wiring system; and
- Mounting the transformers on surfaces with a large mass to avoid amplifying the sound.

This measure would not apply to transformers installed by SCE related to the Primm Substation as those would not be high voltage (less than 50 kV) and would thus not require the sound reduction methods described.

Geology, Topography and Geologic Hazards (Section 4.3)

MM GEO-1. Inspections After Geologic Events. To minimize or avoid potential hazards from earthquakes and other geologic events, the Applicant shall have inspections performed by a BLM-approved appropriate professional (e.g., geologist, geophysicist, geologic engineer, or structural engineer) following geologic events in the vicinity of the proposed Project site. The appropriate professional shall perform the appropriate inspection and make recommendations to ensure that hazards are minimized for the next comparable or larger event. The Applicant shall implement the recommended corrective actions.

MM GEO-2. Applicant's Insurance Coverage. The Applicant shall acquire the appropriate insurance coverage to address potential off-site damage to structures or injury to people by facility structures that are moved off-site by a geologic event such as an earthquake or flash flood event.

Soil Resources (Section 4.4)

MM SOILS-1: Ensure Soils are Free From Contaminants. The Applicant shall ensure that imported soils are free from contaminants before use on the site. At the request of the BLM, soils shall be tested to ensure that hazardous materials are not present within the imported fill.

Table 2-4. Proposed Mitigation Measures (Continued)

MM SOILS-2: Ensure Soils are of the Same Soil Type. The Applicant shall ensure that imported soils are consistent in texture and drainage characteristics to existing on-site soils before use on the site. At the request of the BLM, soils shall be tested to ensure they are of the same soil type as pre-construction soils.

MM SOILS-3: Cryptobiotic Soil Mitigation Study Funding. The Applicant shall provide $50,000 in funding for a BLM study to analyze effective ways to mitigate the loss of cryptobiotic soils.

Water Resources/ Hydrology (Section 4.5)

MM WATER-1: Groundwater Monitoring Plan. The Applicant shall develop and implement a Groundwater Monitoring Plan during Project construction and operations. The plan shall include metering of Project wells and monthly reports to LVVWD and quarterly water use reports to the BLM and State Engineer. The Plan will include monthly collection of the following data from the Project wells and the Primadonna Well 4 during construction when significant water use is occurring, but not operation when such use will be minimal: (i) ground water production measurements; (ii) static water levels measurements; and (iii) water quality testing consisting of TDS measurements. Primadonna shall receive copies of all reports concurrently with the filing of such reports in accordance with the monitoring plan. The Applicant shall develop a mitigation plan in coordination with Primadonna and acceptable to the BLM in the event the Project pumping degrades water quality in Primadonna Well to the degree that Primadonna is unable to deliver potable water. The parties will cooperate to develop a baseline water quality standard in Well 4 prior to the pumping of the Project wells.

MM WATER-2: Operational Phase Erosion and Sedimentation Control Measures. The Applicant shall develop and implement erosion and sedimentation control measures to be used to minimize impacts during the life of the Project. At a minimum, this plan shall include:

- Soil stabilization measures to offset loss in vegetation;
- Biannual and post-storm monitoring of erosion and sedimentation;
- Annual monitoring of the surface of Ivanpah Dry Lake and Roach Dry Lake to assess effects of sedimentation;
- Monitoring at Roach Dry Lake will be conducted in a manner that will not interfere with the Southern Nevada Supplemental Airport; and
- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site. Any changes must be approved by the BLM.

MM WATER-3:Flood Risk Control Measures. The Applicant shall develop and implement flood risk control measures to minimize impacts during the life of the Project. These measures shall include, as appropriate, adhering to the recommendations presented in the Applicant's Initial Site Drainage Plan for the project proposed in the 2010 Final EIS (BLM 2010). At a minimum, this plan shall include:

- PV panels will be installed to remain a minimum of 6 inches above the high water mark, based on flood depth estimates;
- Steel post foundations (8 to 12 feet in depth) in flood-prone areas would be designed to withstand a minimum of 1.5 feet of scour; and
- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient or excessive or if flooding proves to be destructive. Any changes must be approved by the BLM.
- Ensure construction facilities do not cause inadvertent flooding (e.g., ensure temporary roads do not block drainage outlets).

MM WATER-4:Storm Water Monitoring and Response plan. The Applicant shall develop and implement a storm water monitoring and response plan to minimize impacts from flood damage during the life of the Project. At a minimum, this plan shall include:

- Visual surveys of all structures for scour following major storm events;
- Visual surveys of fencing to check for damage and/or debris;
- Cleanup of broken equipment if failures occur;
- Inspection and cleanup of downstream areas if debris is transported off site;
- Adaptive management of flood protection and erosion actions if the monitoring plan reveals routine damage to Project structures due to flooding. Any changes must be approved by the BLM.

MM WATER-5:Drainage Crossing Design. The Applicant will actively seek to avoid placement of infrastructure in drainages and commit to the use of existing natural washes, with adequate buffers, to the greatest extent

Table 2-4. Proposed Mitigation Measures (Continued)

practicable. If drainages cannot be avoided by infrastructure placement, then the Applicant shall design drainage crossings to accommodate estimated peak flows and ensure that natural volume capacity can be maintained throughout construction and upon post-construction restoration. This measure is necessary to minimize erosion and degradation to which drainages are subject.

Biological Resources (Section 4.6)

MM BIO-1. Preconstruction Surveys. Preconstruction surveys shall be coordinated by the Applicant and conducted by qualified botanists. Areas to be surveyed shall include mowing areas, brush clearing areas, and ground disturbance areas within habitat deemed suitable for sensitive species. These surveys shall be conducted for the presence of special status plants and noxious weeds to prevent direct loss of plants and to prevent the spread of weeds.

MM BIO-2. Best Management Practices. Crews will be directed by the Applicant to use BLM-approved BMPs, where applicable. These measures will be identified by the Applicant and approved by BLM prior to construction and incorporated into the construction operations.

MM BIO-3. Biological Monitors. Biological monitors shall be assigned by the Applicant to the proposed Project in areas of sensitive biological resources. The monitors shall be responsible for ensuring that impacts on special status species would be avoided to the fullest extent possible. Where appropriate, monitors shall flag the boundaries of areas where activities would need to be restricted to protect native plants or special status species. Those restricted areas shall be monitored to ensure their protection during construction.

MM BIO-4. Facility Siting. Final site layout and spur road locations shall be adjusted by the Applicant to avoid sensitive biological resources to the greatest extent feasible, and shall remain with the Project ROW area.

MM BIO-5. Yellow Twotone Beardtongue Measures. If yellow twotone beardtongue are identified within the Project site, specific mitigation measures to protect the yellow twotone beardtongue shall be developed by the Applicant through agency coordination and included in the restoration plan. Mitigation may include seed collection, nursery development, transplantation of individuals, and/or sponsorship of the plant into the Center for Plant Conservation National Collection of Endangered Plants at Missouri Botanical Garden.

MM BIO-6. Cactus and Yucca Salvage Plan. The Applicant shall salvage and/or purchase, as directed by BLM, all cactus and yucca plants from temporary and permanent impact areas within the right of way lease/grant. The salvage requirements will be described in the Project revegetation plan and will be approved by the BLM botanist prior to construction.

MM BIO-7. Worker Environmental Awareness Program. A Worker Environmental Awareness Program (WEAP) shall be prepared by the Applicant or their contractor. All construction crews and contractors shall participate in WEAP training prior to starting work on the proposed Project. The WEAP training shall include a review of the special status species and other sensitive resources that could exist in the Project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel shall be maintained.

MM BIO-8. Migratory Birds and Raptors Impacts Reduction Measures. To reduce impacts on migratory birds and raptors, the following will be done:

The Applicant shall fund biological monitors to monitor and enforce disturbance buffers around all active bird nests (for raptors and species protected by the Migratory Bird Treaty Act) found in the Project area during construction. The general bird breeding season for this area is late February to early July. BLM will coordinate with NDOW prior to biological monitoring to ensure communication and details of monitoring are approved.

- For all bird species, biologists shall survey within the proposed Project area. Because there are no standardized disturbance buffers for active non-raptor bird nests, the Applicant shall consult with the appropriate agencies (BLM, USFWS, and NDOW) when required by the approved Bird and Bat Conservation Strategy.
- Active bird nests shall not be moved during breeding season, unless the Project is expressly permitted to do so by the USFWS, BLM, and NDOW.
- All active nests and disturbance or harm to active nests shall be reported within 24 hours of detection to the USFWS, BLM, and NDOW. Work shall be halted if it is determined by the biological monitor that active nests are being disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.

Table 2-4. Proposed Mitigation Measures (Continued)

- All measures should be tailored for the local environment, and actions specific to ravens and other potential avian predators of desert tortoise and wildlife shall be addressed as well.

MM BIO-9. Bird and Bat Conservation Strategy. Due to the presence of golden eagles, other migratory birds, and bat species within the Project area, a Bird and Bat Conservation Strategy shall be developed with the goal of reducing the potential risks for avian and bat mortality resulting from construction and operation of the Project. The objectives of this Strategy would be to:

- Identify baseline conditions for avian and bat species currently present at the Project site;
- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project site, including bird mortality associated with potential attraction to PV panels;
- Specify steps that should be taken to avoid, minimize, and mitigate any potential adverse effects on these species, including necessary permits to collect bird carcasses for data collection and research; and
- Detail long-term monitoring and reporting goals, including collection and reporting of bird carcasses.

Applicable approved protocols would be used for any surveys and/or monitoring conducted. Golden eagle surveys would be conducted where necessary, according to methods specified in the Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols (Pagel et al. 2010).

MM BIO-10. Avian Protection. All transmission and subtransmission towers and poles will be designed to be avian-safe in accordance with the "Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006" (Avian Power Line Interaction Committee 2006) and "Reducing Avian Collisions with Power Lines: State of the Art in 2012" (APLIC 2012). Additionally, a post-construction bird study shall be conducted by the Applicant with review by BLM to monitor for incidents of bird strikes and electrocutions during the operation of the proposed Project. The scope and protocol of post-construction monitoring and reporting of bird mortality will be determined from future consultation with the USFWS.

MM BIO-11. Western Burrowing Owl Measures. To reduce impacts on the western burrowing owl, the following will be done:

- A qualified biologist will conduct preconstruction surveys for western burrowing owl not more than 30 days prior to construction within suitable habitat, and prior to breeding season (February 1 through August 31). All areas within 250 feet of the proposed Project area will be surveyed per Arizona Burrowing Owl Working Group 2009 burrowing owl guidance.
- If an active nest is identified, there will be no construction activities within 250 feet of the nest to prevent disturbance until the chicks have fledged, as determined by a qualified biologist.
- The occurrence and location of any western burrowing owl will be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. Within 24 hours of all incidents of disturbance or harm to burrowing owls, the authorized biologist will report such incidents to the appropriate resource agencies (USFWS, BLM, and NDOW).

MM BIO-12. Gila Monster and Chuckwalla Measures. The following measures are the current NDOW construction site protocols for the Gila monster (NDOW 2012), and are also applicable for the chuckwalla. Through the WEAP, works and other Project personnel should know how to: (1) identify and distinguish Gila monsters from other lizards such as chuckwallas and banded geckos; (2) report any sightings of Gila monsters (in Nevada) to the biological monitor for notification to NDOW; (3) be alerted to the consequences of a bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.

- Live Gila monsters found in harm's way on the construction site shall be captured and then detained in a cool, shaded environment (<85 degrees Fahrenheit) by the proposed Project biologist or equivalent personnel until a NDOW biologist can arrive for documentation purposes. Despite the fact that a Gila monster is venomous and can deliver a serious bite, its relatively slow gait allows for it to be easily coaxed or lifted into an open bucket or box, carefully using a long-handled instrument such as a shovel or snake hook. A clean 5-gallon plastic bucket with a secure, vented lid or something similar may be used for safe containment. Additionally, written information identifying the capture location, date, time, and circumstances (e.g., biological survey or construction) and habitat description (e.g., vegetation, slope, aspect, and substrate) will also be provided to NDOW.
- Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. If a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses are not covered by NDOW. However, NDOW

Table 2-4. Proposed Mitigation Measures (Continued)

shall be immediately notified during normal business hours. If an animal is killed or found dead, the carcass shall be immediately frozen and transferred to NDOW with a completed written description of the discovery and circumstances, habitat, and mapped location.

- Should NDOW's assistance be delayed, biological or equivalent acting personnel on the site may be requested to remove and release the Gila monster out of harm's way. Should NDOW not be immediately available to respond for photo-documentation, a digital camera shall be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The images shall be provided to NDOW and include the following information: (1) encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale; and (3) a clear, overhead close-up of the head.

MM BIO-13. Reduced Night Lighting. The Applicant and its contractors shall reduce night lighting in the proposed Project area and the surrounding non-developed areas to avoid unnecessary visual disturbance to wildlife. Night lighting during construction, operations, and maintenance shall be reduced in the proposed Project area and the surrounding non-developed areas using directed lighting, shielding methods, and or/reduced lumen intensity. The Applicant shall indicate anticipated measures to resource agencies for approval prior to construction.

MM BIO-14. Cover Steep-Walled Trenches or Excavations during Construction. To prevent entrapment of wildlife, all steep-walled trenches, auger holes, or other excavations shall be covered at the end of each day. Fencing shall be maintained around the covered excavations at night. For open trenches, earthen escape ramps shall be maintained at intervals of no greater than 0.25 miles. An Applicant-funded biological monitor shall inspect all trenches, auger holes, or other excavations a minimum of twice per day and also immediately prior to back-filling. Any wildlife found shall be safely removed and relocated out of harm's way. For safety reasons, biological monitors will, under no circumstance, enter open excavations. Tools such as a pool net may be used to retrieve wildlife, as necessary.

MM BIO-15. American Badger and Desert Kit Fox Impacts Reduction Measures. To reduce impacts to American badger and desert kit fox, the following shall be done:

- The qualified biological monitor shall be notified if badgers or foxes are observed within the proposed Project area during construction activities. Work shall be immediately stopped in the area if the biologists find occupied burrows within 100 feet of construction activities during preconstruction surveys. Notification of these sightings shall be provided within 24 hours to appropriate agencies (BLM, USFWS, and NDOW).
- Use of passive and active relocation techniques (if necessary) shall be developed, implemented and reviewed in coordination with NDOW.

MM BIO-16. Desert Bighorn Sheep Measures. Although not anticipated, if desert bighorn sheep are identified on or immediately adjacent to the Project site, the Applicant shall consult with the BLM, USFWS, and NDOW regarding conservation measures to avoid impacts on desert bighorn sheep during construction. Avoidance and minimization measures could include such elements as preconstruction surveys, biological monitoring, and timing construction activities to avoid bighorn sheep active seasons.

MM BIO-17. Desert Tortoise Measures. The BLM and USFWS completed Section 7 Consultation under the ESA. The Biological Opinion (BO) includes information such as the translocation location(s) and stipulations associated with that activity. The measures provided in the BO are provided below.

- *Monitoring Program*. The Applicant shall fund monitoring studies analyzing demographic and genetic connectivity home range and distribution of tortoises in the area surrounding the Project area encompassing a 13,000-acre research area in the Ivanpah Valley in both California and Nevada ($3,500,000.00).
- *Exclusion Fencing*. Prior to initiation of clearance surveys, desert tortoise exclusion fencing shall be constructed in accordance with the provisions of the Biological Opinion and BLM and USFWS guidelines.
- *Effects of Dust Palliatives*. The Applicant shall fund a study to understand the effects of dust palliatives on the health of desert tortoises ($100,000).
- *Desert Tortoise Monitoring.* During construction of linear features (transmission lines, fencing, and access roads) or until the desert tortoise exclusion fencing is complete, all construction activities shall be conducted under the observation of Applicant-funded USFWS-approved desert tortoise biologists. These biologists shall meet all requirements of the USFWS and shall monitor all ground-disturbing activities associated with fence installation or that are conducted prior to completion of the tortoise exclusion fencing.
  In addition, after initial fencing and clearance, an Applicant-funded biological monitor shall be available during all ground-disturbing activities. The biologist shall be available to ensure the conditions of the Biological

Table 2-4. Proposed Mitigation Measures (Continued)

Opinion are being met, including worker education guidelines, avoidance and minimization measures, and construction monitoring requirements.

- *ACEC Restoration and Protection.* The Applicant shall contribute funds for restoration of 400 acres of roads and disturbed area within the proposed ACEC ($400,000), and funding for BLM law enforcement within the proposed ACEC ($350,000).
- *Pre-construction Clearance Surveys.* It is anticipated that the Project area would be fenced in segments of approximately 700 acres to facilitate efficient and thorough clearance surveys. Clearance surveys shall be conducted per the USFWS Desert Tortoise Field Manual and current translocation guidance (USFWS 2009 and 2011). All tortoise burrows shall be excavated and eggs and tortoises translocated to the translocation area to be determined through agency consultation. Two complete passes in the fenced segment shall be completed without a desert tortoise being found before construction may commence within that area.
- *Translocation Plan.* A Desert Tortoise Translocation Plan shall be prepared for the Project. The purpose of the Plan is to describe the process of translocation and minimize mortality of desert tortoises. Injured tortoises shall be transported to a rehabilitation facility approved by the USFWS and NDOW. Recently killed tortoises found shall be salvaged and transported to a veterinary pathologist familiar with desert tortoise and approved by the USFWS and NDOW. Procedures for salvaging and transport shall follow the Guidelines for the Field Evaluation of Desert Tortoise Health and Disease (Berry and Christopher 2001). Detailed health assessment on all live tortoises shall be conducted prior to translocation per current USFWS guidance by individuals approved and permitted by the USFWS to conduct such assessments. Any individual tortoise that exhibits clinical signs of upper respiratory tract disease (URTD) shall be transported to the Desert Tortoise Conservation Center near Las Vegas, Nevada for further evaluation. The Applicant shall fund a study to determine the suitability (health and genetics) of the tortoise population in the LSTS site to determine if restoring connectivity would meet USFWS recovery objectives ($200,000).
- *Avoidance during Operation and Maintenance.* During the operation phase of the Project, all applicable desert tortoise protection measures identified under construction shall be implemented. This may include the need for a biological monitor outside the fenced facility during activities involving ground disturbance, annual WEAP refresher, and actions to take if a tortoise is encountered. The monitor shall be on site during all Project maintenance activities to ensure compliance with the desert tortoise measures included in the Biological Opinion. The monitor would have the authority to halt all non-emergency activities that are in violation of the measures. Work shall proceed only after hazards to desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by an USFWS-authorized biologist. A compliance report would be submitted to the BLM annually.
- *Compensatory Mitigation.* To compensate for desert tortoise habitat loss, the Applicant and SCE shall pay the standard remuneration fees of $824 per acre of disturbance for their respective disturbances to the BLM to partially offset the potential adverse effects of the Project. The exact acreage amounts and corresponding payment will be based on final design of the Project components as approved by BLM. Fees would be collected following guidance in BLM's August 17, 2010, instruction memorandum (NV-2011-079) as listed in the Biological Opinion for the Silver State Solar Project and a separate Work Breakdown Structure (WBS) code would be established for these funds to accomplish on-site mitigation. Initial on-site mitigation would be to evaluate the health and genetics of the desert tortoises located within the LSTS to determine if the LSTS fence can be partially removed to allow the tortoises to move throughout the Ivanpah Valley. This evaluation would be coordinated with the USFWS and the Desert Tortoise Recovery Office. If the analysis proves feasible, the BLM in consultation with the Clark County Department of Aviation, the Nevada Department of Transportation, and the Union Pacific Railroad, will initiate separate NEPA analysis to evaluate the impacts to reconfiguring the current LSTS. LSTS reconfiguration could include installation of additional fencing on highways, culverts under Hwy 161 and eventually removing parts of the existing tortoise fence, removing cattle guards and working with the Railroad to repair underpasses to allow for tortoise movement. This would remove an identified linkage corridor pinch point on the west side of the Ivanpah Valley. If initial testing results or subsequent adaptive management strategies indicate that removal or reconfiguration of the LSTS perimeter fence is feasible, the Applicant will fund removal or reconfiguration of the perimeter fence as appropriate in consultation with the USFWS ($700,000.00). If testing indicates that improving connectivity through the LSTS is not feasible for genetic, disease, or other reasons, the Applicant shall fund BLM efforts to fence portions of Highway 93 to reduce the mortality of desert tortoises. Additional mitigation would be used for restoration and law enforcement for three years to help protect the newly restored areas. Any remaining funds would be used

Table 2-4. Proposed Mitigation Measures (Continued)

for management actions expected to provide a benefit to the desert tortoise over time. Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species current status and trend, and preserving distinct population attributes (USFWS 2010).
Cultural Resources (Section 4.7) MM CULT-1. Protection of Cultural Resources. In the event that cultural materials, including human remains, are discovered during Project activities, they shall be protected by all Project personnel and construction crew members. The Proponent shall 1) notify the BLM authorized contracting officer and archaeologist immediately; 2) cease all construction activities within a 100 meter radius buffer area; and 3) ensure protection of the discovery from further damage or vandalism until a BLM authorized archaeologist evaluates the nature of the materials. The BLM will develop mitigation procedures following consultations with the SHPO and culturally affiliated Indian tribes. The Applicant is responsible for all costs associated with consultations as well as the stabilization, treatment, reporting, curation, and/or reburial of discoveries.
Paleontological Resources (Section 4.8) MM PALEO-1. Paleontological Mitigation. Results of the data inventory and impact assessment confirm that the sediments present within the boundaries of the proposed Project area have a low potential to contain significant paleontological resources. Mitigation measures shall be implemented if significant subsurface paleontological resources are identified during construction. The BLM requires the following stipulation: The Proponent shall immediately notify the BLM authorized officer of any paleontological resources discovered as a result of operations under this authorization. The Proponent shall suspend all activities in the vicinity of such discovery until notified to proceed by the authorized officer, and shall protect the locality from damage or looting. The authorized officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 5 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the authorized officer after consulting with the Proponent. The Proponent is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures, including museum curation. The Proponent may not be required to suspend operations if activities can avoid further impacts to a discovered locality or be continued elsewhere.
Lands and Realty (Section 4.9) MM LANDS-1. Ensure Compatibility with Airport Projects. The Applicant shall work closely with the Clark County Department of Aviation to ensure that all planning, construction, and operation remains compatible with airport projects and future airport operations.
Special Management Areas (Section 4.10) *No mitigation required.*
Recreation (Section 4.11) MM REC-1 Signage Plan for Trail Identification. In order to reduce new, unauthorized OHV trails due to the restriction of existing trails on the Project footprint, informational signs shall be placed by the Applicant in the areas surrounding the Project. The sign locations and designs will be determined by BLM to direct the public to the appropriate access to the Lucy Gray Mountains and will be identified in the traffic management plan. MM REC-2 Use of Project Access Road Outside of the Perimeter Fence. In order to maintain public access, the proponent shall allow access to the Lucy Gray Mountains through the use of their Project access road, located outside of the Project fence. This road will be open to the general public for dispersed use and access to the Lucy Gray Mountains. This access would also be available to organized competitive OHV races, if the races have obtained necessary permits and are approved.
Visual Resources (Section 4.12) MM VIS-1 Reduce Visual Contrast. The following selective mitigation measures shall be implemented by the Applicant to reduce visual contrast: • Solar field access ways shall be offset at appropriate intervals to minimize the appearance of straight lines

Table 2-4. Proposed Mitigation Measures (Continued)

MM VIS-1 Reduce Visual Contrast. The following selective mitigation measures shall be implemented by the Applicant to reduce visual contrast:

- Solar field access ways shall be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.
- An experimental treatment with Permeon or a similar type of contrast-reducing product of the portions of the Project drainage control basins that are visible from Key Observation Points (KOPs). Treatment shall be conducted in test plots, with efficacy determined by the BLM. Depending on the outcome of the experimental treatment, Applicant shall treat the remaining portions of the drainage control basins visible from KOPs, according to BLM guidance.
- The exterior of the inverter boxes and the exterior of the O&M building, walls or fences surrounding switchyard/ substation facilities, PCS stations, and lighting fixtures and poles, will be factory treated with a non-specular dull finish or using the BLM-standard environmental color Shadow Gray or Covert Green to minimize contrast with the existing landscape. If a fixed-tilt design is chosen, the PV panel mounting clips shall be treated with a non-specular dull finish or using the BLM-standard environmental color Shadow Gray or Covert Green. Whatever finish is chosen shall be used consistently for all structures to be color treated, not including transmission towers and fencing. The fence and weather station towers will be a non-specular dull finish to be approved by BLM prior to procurement and installation. Steel transmission or distribution towers or poles will be color treated of the rust exterior type (Corten or similar) if feasible, or shall use a dull galvanized finish consistent with the existing Ivanpah Eldorado Transmission Project. Other panel support structures (i.e., posts, tables), temporary water tanks and other temporary construction support facilities, will not be color treated.
- A Revegetation Plan shall be prepared and implemented to revegetate areas temporarily disturbed by construction including access roads that are not needed for operation, with a focus on softening harsh lines associated with clearings.
- Where possible, use drive and crush access during construction and operation to avoid soil disturbance and need for revegetation.
- The perimeter road shall be located at a variable distance from the perimeter fence to allow for feathering of the footprint and selective vegetation removal, with the intent to result in an organic or irregular line but shall not result in more disturbance than the original engineered design. Revegetation shall be delayed until after the post-Project drainage is evident and revisions to the drainage design, if necessary, have been made. With BLM approval, Applicant may re-plant salvaged native vegetation in such a way as to screen Project structures.
- If a fire break is not required and topographic and vegetation conditions allow, till and roll techniques would not be used in the following locations:
    - Construction area for the perimeter fence
    - Construction area for the desert tortoise exclusion fence

  Instead, vegetation would be cut to a height of 6 inches prior to fence construction.

Transportation/ Motorized Vehicle Access (Section 4.13)

MM TRAN-1. Traffic Management Plan. The Applicant shall produce a Traffic Management Plan that identifies BMPs to minimize construction-related traffic impacts. Specifically, the BMPs shall ensure an adequate flow of traffic in both directions by providing sufficient signage to alert drivers of construction zones, notifying emergency responders prior to construction, conducting community outreach, and control traffic around impacted intersections. The Traffic Management Plan shall include the following:

- Schedule deliveries of materials for off-peak hours to reduce effects during periods of peak traffic;
- Truck traffic shall be phased throughout construction;
- Truck traffic shall use designated truck routes when arriving to and departing from the proposed work sites;
- The Applicant shall encourage the construction workforce to carpool, rideshare or vanpool;
- Information on available local and regional programs shall be made available to the workforce through bulletin board postings and training programs;
- Signs and public notices regarding construction work shall be distributed 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;

Table 2-4. Proposed Mitigation Measures (Continued)

Management Plan and will be open to the general public for dispersed use and access to the Lucy Gray Mountains. This access would also be available to organized competitive OHV races, if the races have obtained necessary permits and are approved.

MM TRAN-2. Repair Damaged Streets. Before construction, the Applicant, a BLM representative, and a local representative shall document the condition of the access route, noting any pre-construction damage. After construction, any damage to public roads shall be repaired to pre-construction condition as determined by the local representative.

Health and Safety/ Hazardous Materials (Section 4.14)

MM HAZ-1. Hazardous Materials Handling Management. The Applicant shall implement a Hazardous Materials Handling Management Program or incorporate within their other program the items outlined below. Hazardous materials used and stored onsite for the Proposed Action activities shall be managed according to the specifications outlined below, in accordance with Federal, State and local laws and regulations:

- Hazardous Materials Handling Program. A Project-specific hazardous materials management program shall be developed before beginning construction. The program shall outline proper hazardous materials use, storage, and disposal requirements. The program shall identify types of hazardous materials to be used during construction activities. All personnel shall be provided with Project-specific training. This program shall be developed to ensure that all hazardous materials are handled in a safe and environmentally sound manner. Employees handling hazardous materials will receive hazardous materials training and will be trained in: hazardous waste procedures; spill contingencies; waste minimization procedures; and treatment, storage, and disposal facility training in accordance with OSHA Hazard Communication.
- Transport of Hazardous materials. Hazardous materials that will be transported by truck include fuel (e.g., diesel fuel, propane and gasoline), and oils and lubricants for equipment. Containers used to store hazardous materials shall be properly labeled and kept in good condition. Written procedures for the transport of hazardous materials shall be established in accordance with U.S. Department of Transportation (USDOT), and NDOT regulations. A qualified transporter shall be selected to comply with federal and state transportation regulations.
- Fueling and Maintenance of Construction Equipment: Written procedures for fueling and maintenance of construction equipment shall be prepared prior to construction. Vehicles and equipment shall be refueled on site or by tanker trucks. Procedures shall include the use of drop cloths made of plastic, drip pans, and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling stations shall be located in designated areas where absorbent pads and trays will be available. The fuel tanks shall also contain a lined area to ensure that accidental spills do not occur. Drip pans or other collection devices shall be placed under the equipment at night to capture drips or spills. Fuel and tank transfer equipment shall be inspected daily for potential leakage or failures. Hazardous materials such as paints, adhesives and solvents, shall be kept in an approved locker or storage cabinet.

MM HAZ-2: Solar PV Cell Recycling. The Applicant shall either return solar panel products to the original manufacturer or send them to a certified recycling facility after the solar PV cells are decommissioned. Solar panel material recycling and end-of-life disposal shall be done in compliance with the federal, state, and local regulations.

MM HAZ-3: Characterize Potentially Contaminated Soil/Groundwater. To ensure that workers, the public, and wildlife are not exposed to potential contaminants, if soil is unearthed that is discolored or has an odor, work shall be stopped in that area. The soil shall then be sampled and characterized prior to further site excavation activities in the area with discolored or odorous soils. If the soil is found to be contaminated based on federal or state regulations, then the Applicant shall implement the appropriate and relevant procedures to properly characterize, contain, and dispose of the contaminated material. If groundwater is encountered that has an odor or is discolored, it shall be sampled, characterized, addressed, and disposed of according to state and federal regulations.

MM HAZ-4: Adherence of the Health and Safety Program with 29 CFR, Part 1910. The Applicant shall ensure that all health and safety and emergency plans to be required for employees and contractors during construction, operations, and decommissioning of the Proposed Action comply with the Occupational Safety and Health Standards provided in federal regulation 29 CFR, Part 1910, as well as with applicable state and local occupational health and safety regulations.

MM HAZ-5. Construction Fire Prevention Measures. The following fire prevention measures shall be implemented

Table 2-4. Proposed Mitigation Measures (Continued)

by the Applicant or its contractor during Project construction. • Maintain a list of all relevant fire fighting authorities near the Project site. The closest resources to respond to a wildland fire threatening the community of Primm would come from Clark County Fire Department Station 78 in Goodsprings; • Have and maintain available fire suppression equipment in all construction areas, including but not limited to: water trucks, potable water pumps, and chemical fire extinguishers. Ensure an adequate supply of fire extinguishers for welding and brushing crews; • Include mechanisms for fire suppression in all heavy equipment, including fire extinguishers and, as applicable, spark arresters or turbo-charging (which eliminates sparks in exhaust); • Remove any flammable wastes generated during construction on a regular basis; • Vegetation clearing shall be accomplished in a manner that reduces vegetation and does not create a fire hazard; • Store all flammable materials used at the construction site; • Allow smoking only in designated smoking areas; and • Require all work crews to park vehicles away from flammable vegetation, such as dry grass and brush. At the end of each workday, heavy equipment should be parked over mineral soil, asphalt, or concrete, where available, to reduce the chance of fire.

Appendix B: 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
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.

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.

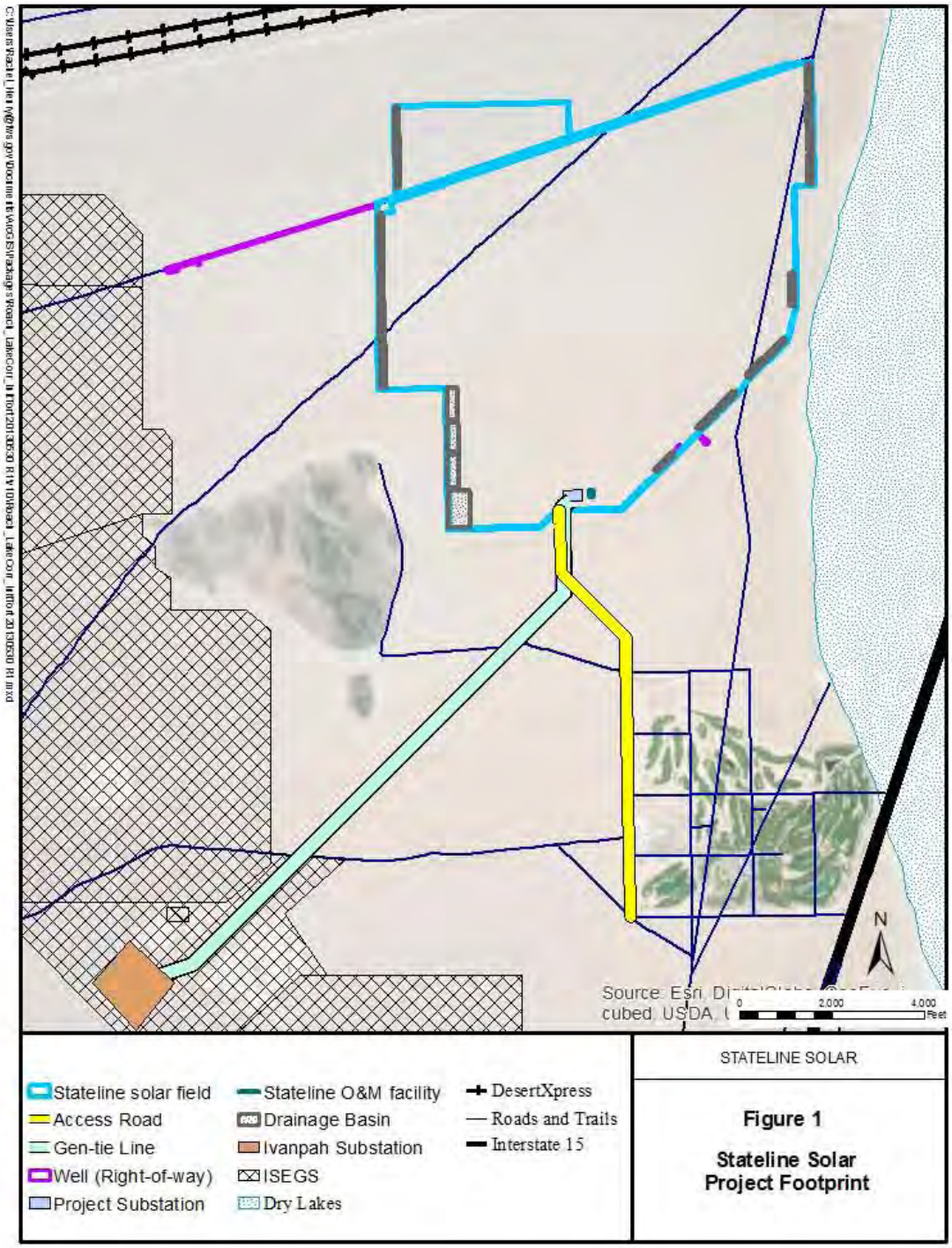
Features Common to Both Stateline and Silver State South

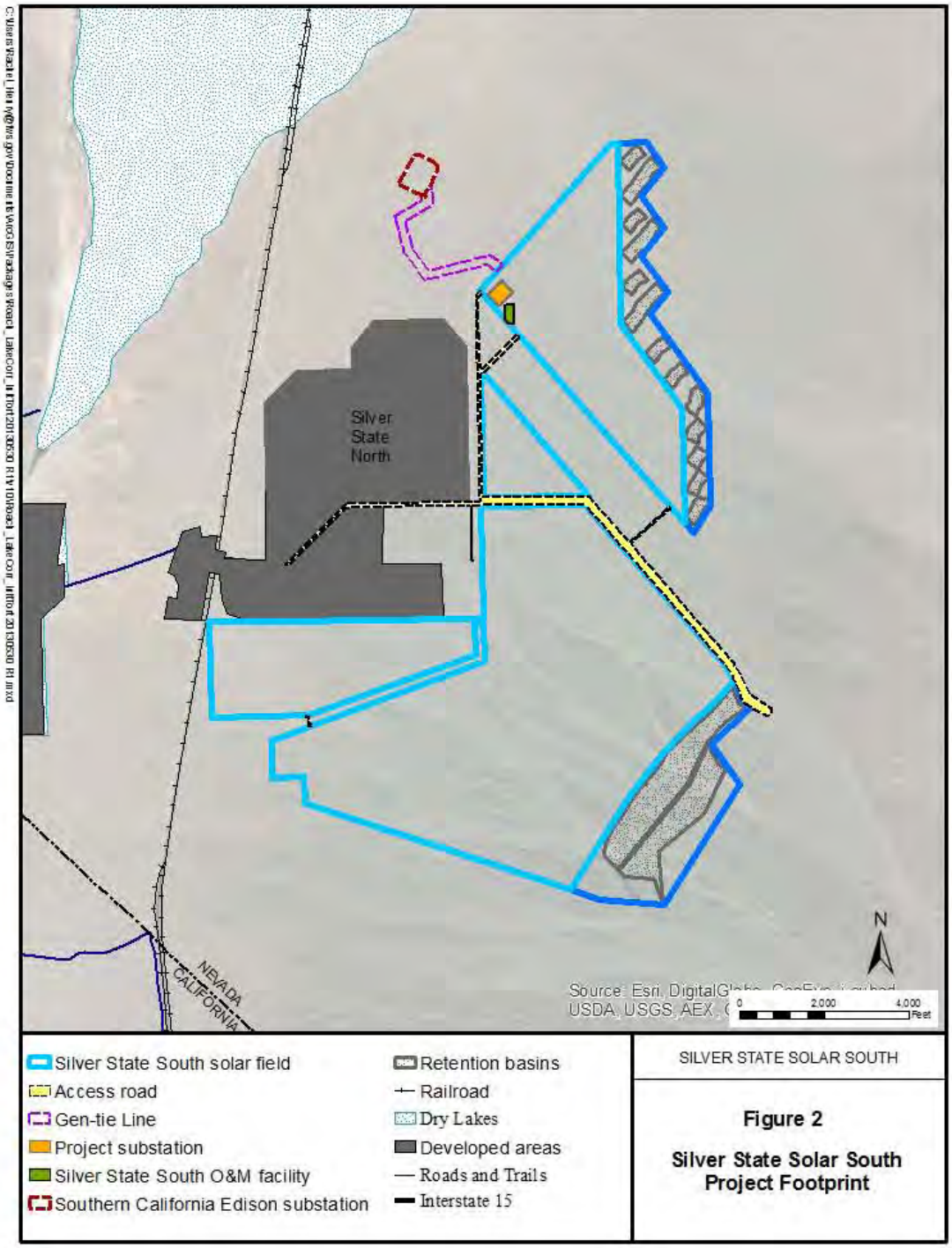
Prior to commencement of the construction process, the Applicants will conduct environmental clearance surveys along with the installation of desert tortoise fencing. Project construction would take place in two general phases: construction mobilization, which includes preconstruction surveys, construction 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.


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
N
0
2,000
4,000
Feet
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, G
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.

<u>Monitoring of Translocated Desert Tortoises</u>

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.

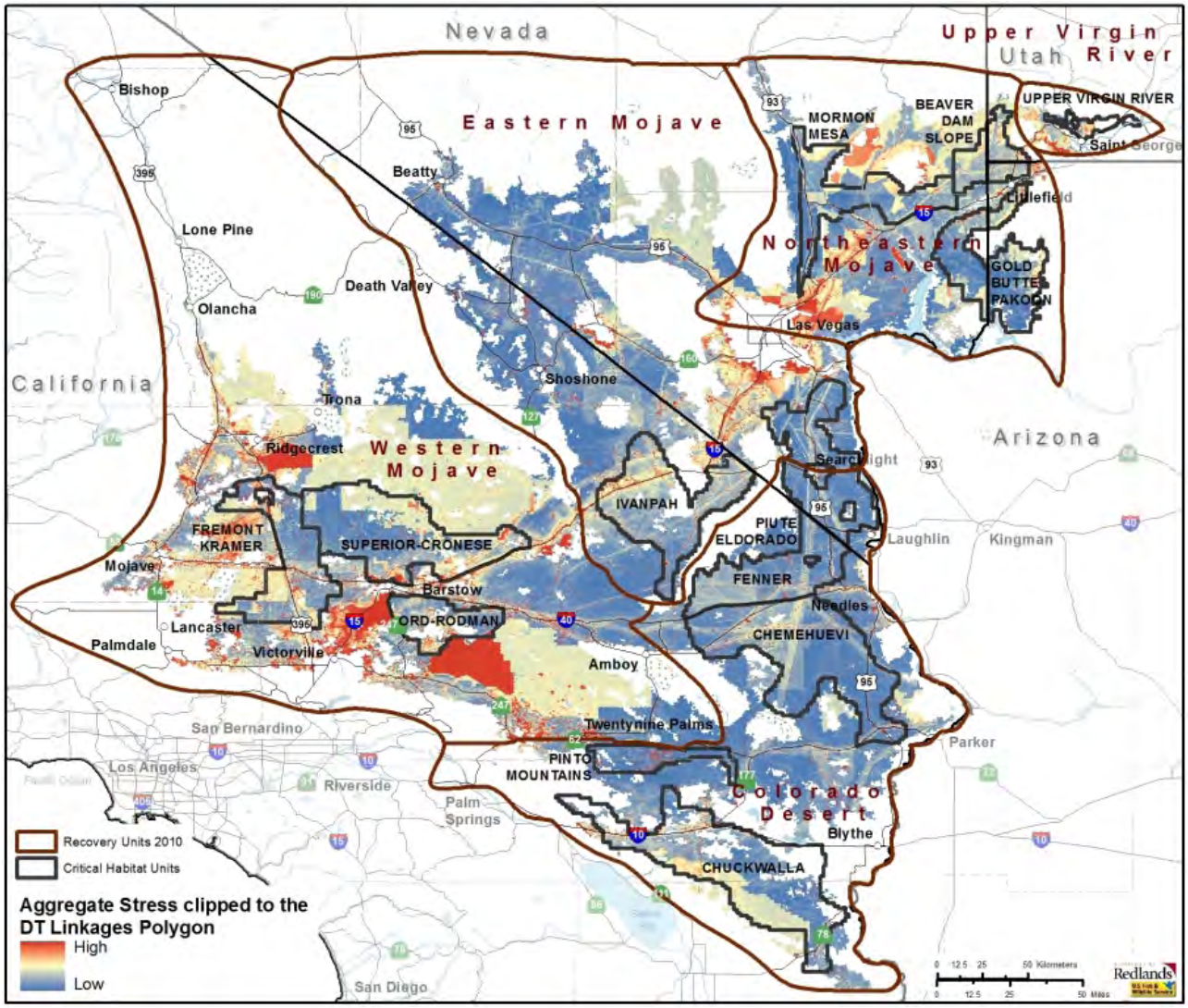
To begin integrating anthropogenic activities and the variable risk levels they bring to different parts of the Mojave and Colorado deserts, the Service completed an extensive review of the threats known to affect desert tortoises at the time of their listing and updated that information with more current 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).

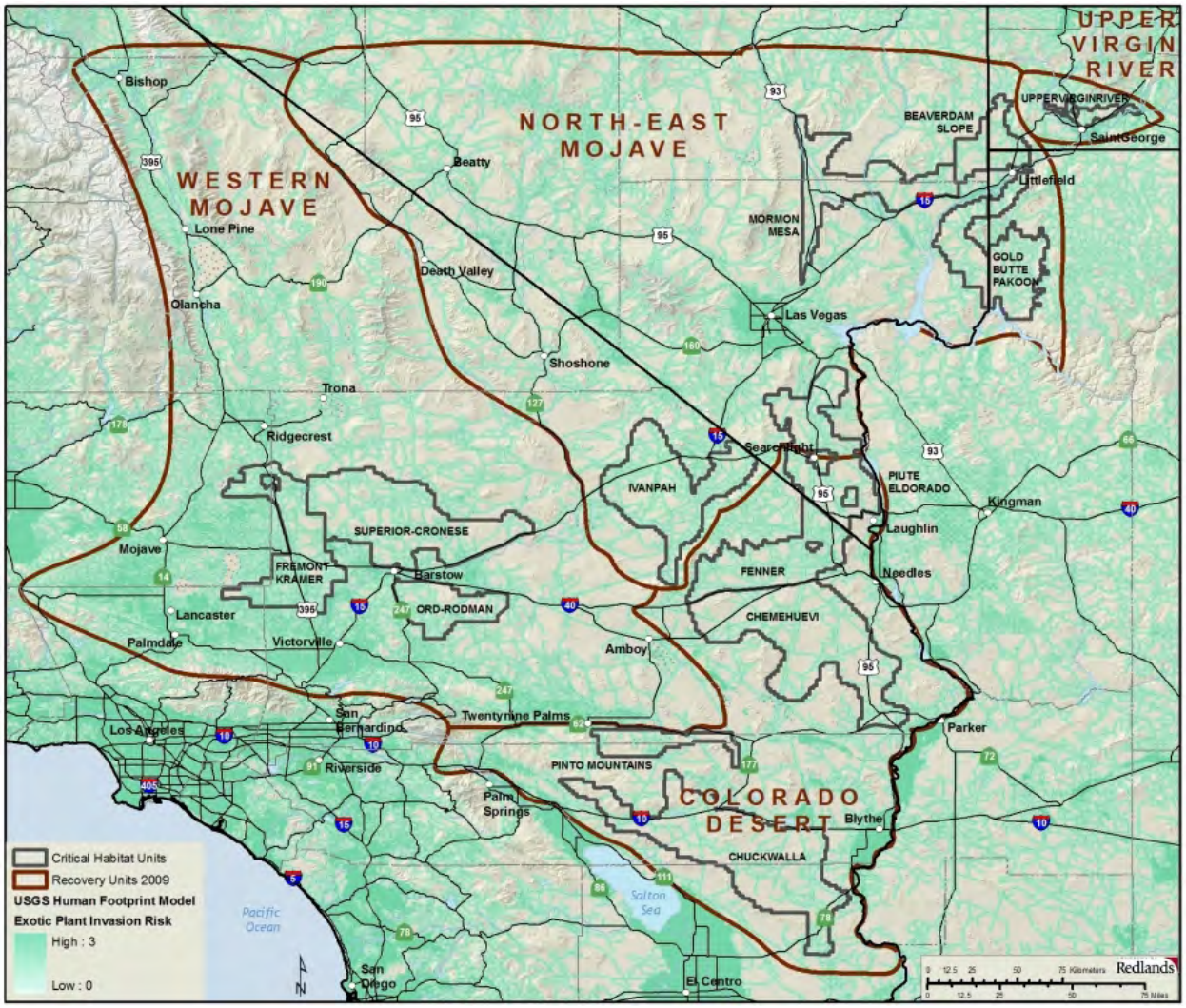
In addition to the biological opinions issued for solar development within the range of the desert tortoise, the Service (2012c) also issued a biological opinion to the Department of the Army for the use of additional training lands at Fort Irwin. As part of this proposed action, the Army removed approximately 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."

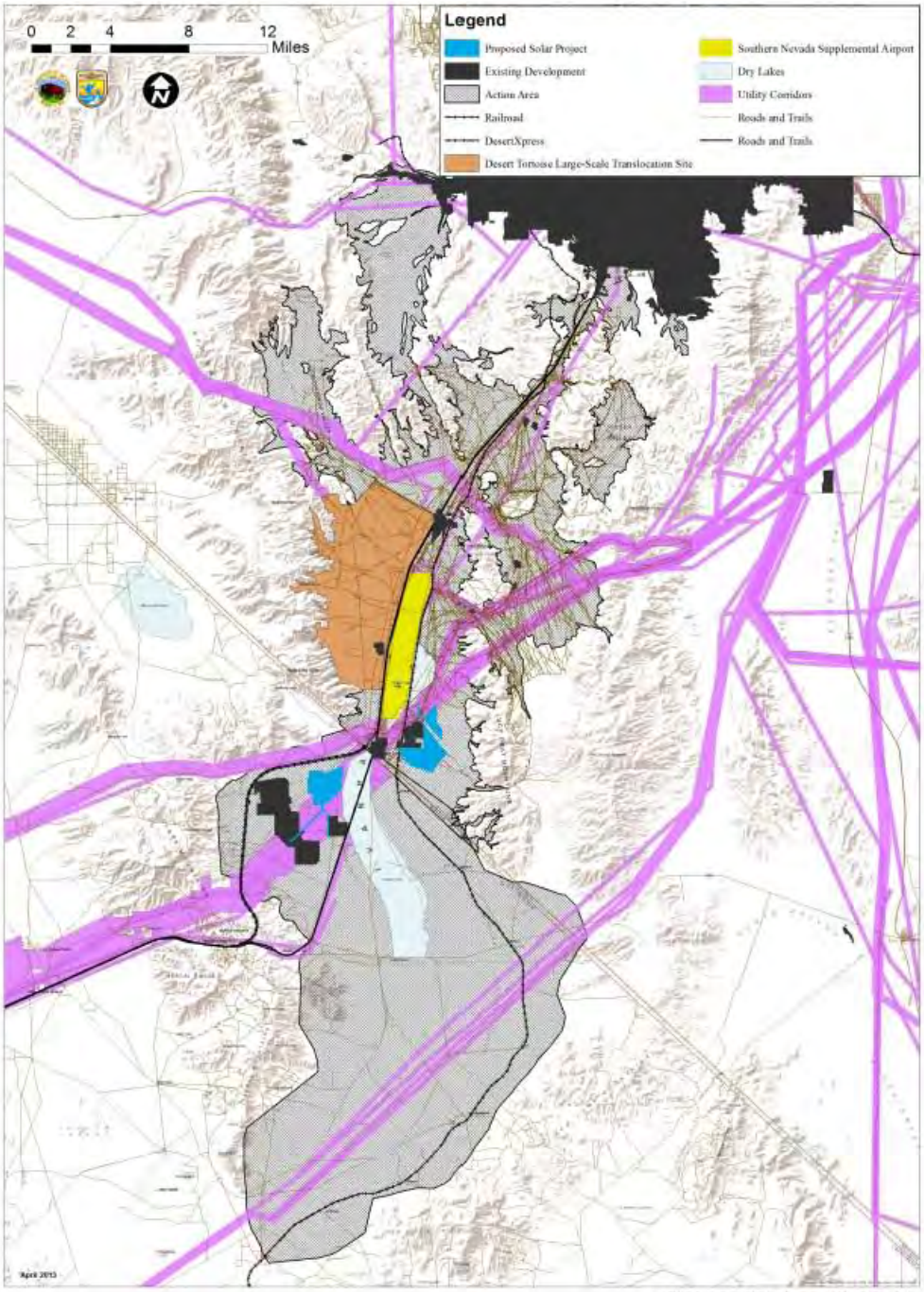
In conclusion, we have used the 5-year review (Service 2010d), revised recovery plan (Service 2011b), and additional information that has become available since these publications to review the reproduction, numbers, and distribution of the desert tortoise. The reproductive capacity of the desert tortoise 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.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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.

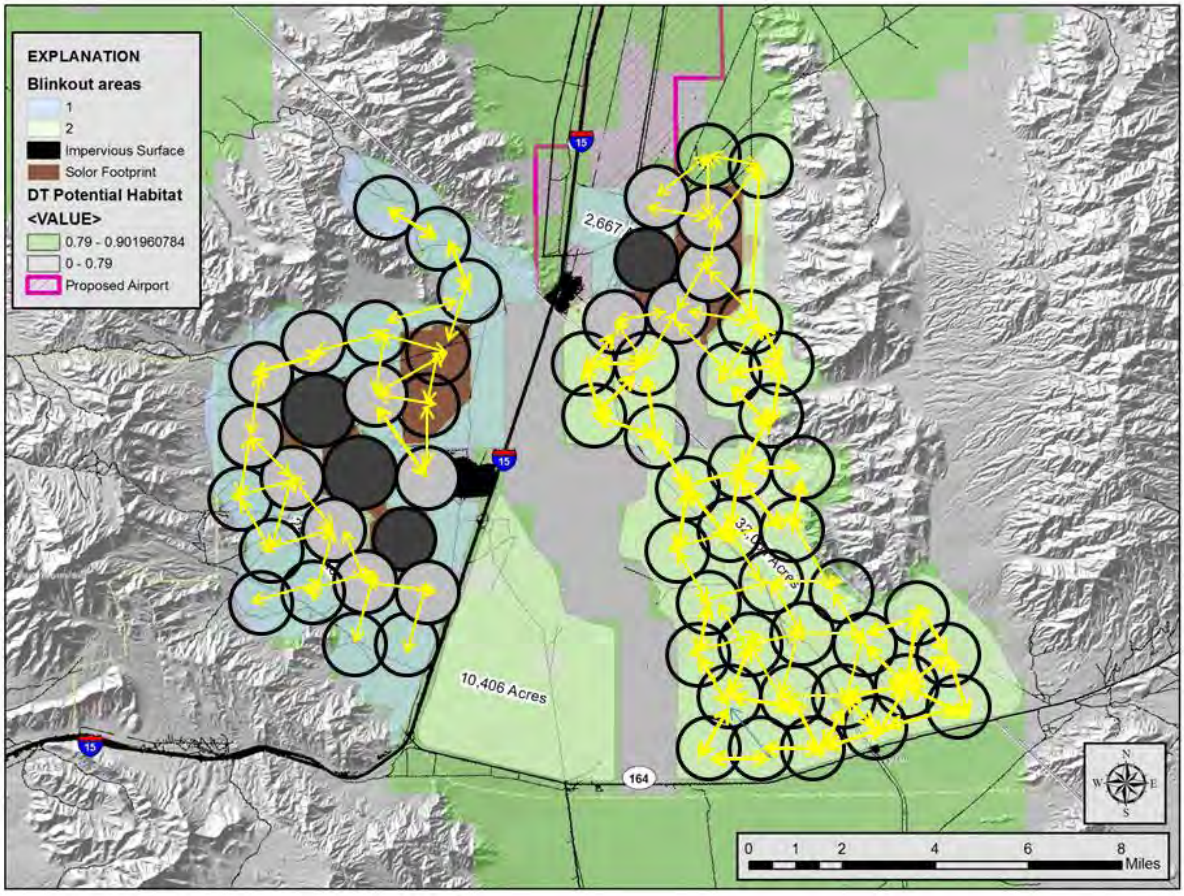
To define the area required to maintain populations within the linkages, we considered desert tortoise home range size, resource availability, and the magnitude of edge effects. Turner et al. (1981 in Berry 1986) documented home ranges of desert tortoises in the Ivanpah Valley to be as large as 220 acres. 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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Appendix C: Bird and Bat Conservation Strategy

BIRD AND BAT CONSERVATION PLAN
SILVER STATE SOLAR POWER SOUTH
BLM CASE FILE NUMBERS: NVN-089530, NVN-085801
CLARK COUNTY, NEVADA

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LIST OF ACRONYMS

ABPP	Avian and Bat Protection Plan
ACEC	Area of Critical Environmental Concern
AMMP	Avian Mortality and Monitoring Plan
Applicant	Silver State Solar Power South, LLC
BBCM	Bird and Bat Conservation Measure
BBCS	Bird and Bat Conservation Strategy
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMAP	Bird Monitoring and Avoidance Plan
BMP	Best Management Practice
CHU	Critical Habitat Unit
DSEIS	Draft Supplemental Environmental Impact Statement
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
FSEIS	Final Supplemental Environmental Impact Statement
IBA	Important Bird Area
FCR	Field Contact Representative
Ironwood	Ironwood Consulting, Inc.
MBTA	Migratory Bird Treaty Act
MM	Mitigation Measure
MSHCP	Multiple Species Habitat Conservation Plan
MWAC	Megawatt Alternating Current
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NNHP	Nevada Natural Heritage Program
NRS	Nevada Revised Statutes
O&M	Operations and Maintenance
PDF	Project Design Features
Project	Silver State Solar Power South
PV	Photovoltaic
RMM	Raven Management Measure
RMP	Raven Management Plan
ROD	Record of Decision
ROW	Right-of-way
SCE	Southern California Edison
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
UTM	Universal Transverse Mercator
WRI	Wildlife Research Institute

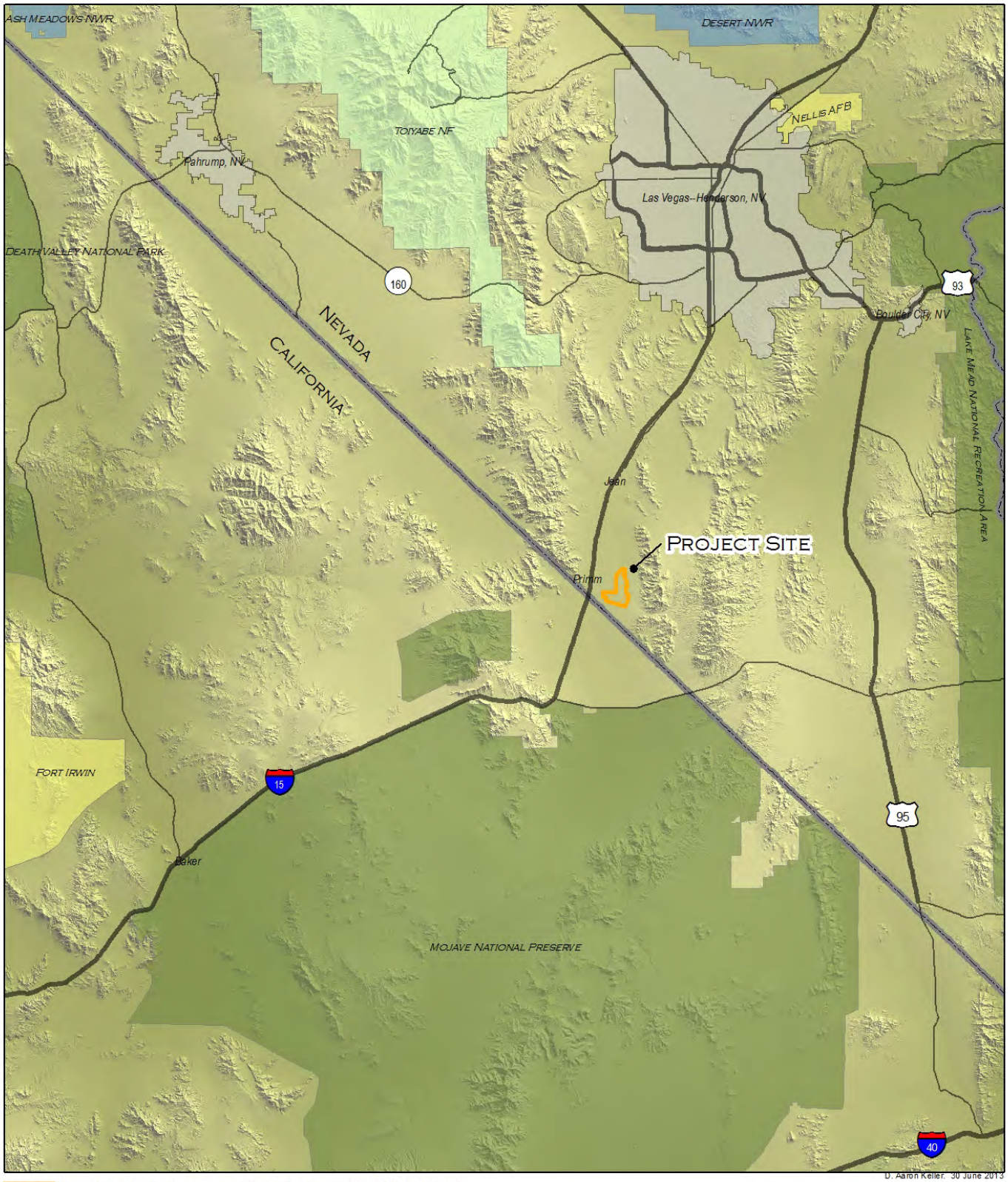
1.0 INTRODUCTION

Silver State Solar Power South, LLC (Silver State Solar Power South or Applicant) has requested a right-of-way (ROW) grant from the Bureau of Land Management (BLM) to construct, operate, maintain, and decommission a 2,427-acre photovoltaic (PV) solar generating facility referred to as the Silver State Solar South Project (Project) (Case File # NVN-085801). This Bird and Bat Conservation Strategy (BBCS) is intended to address potential impacts to birds and bats during the construction, operations, and maintenance (O&M) phases of the Project. For the purposes of this document, O&M is defined as the phase of the project beginning after construction activities across the site have been completed. The BLM is the lead agency under the National Environmental Policy Act (NEPA), and the Final Supplemental Environmental Impact Statement (FSEIS, BLM 2013b) associated with the Project analyzes various alternatives for Project configuration. This BBCS addresses potential impacts to avian and bat resources for an alternative presented in response to comments from the public and agencies on the Draft SEIS (DSEIS, BLM 2012a), and is referred to the Revised Project (hereinafter the "Project" or "Proposed Action"), as set forth as the BLM "Preferred Alternative" in the FSEIS.

1.1 PROJECT DESCRIPTION

The Project is located in unincorporated Clark County, NV, near the interstate boundary of California and Nevada, east of Primm, NV, and immediately adjacent to the existing 50 MW Silver State Solar North facility (Figure 1). The Project site can be found on the Roach and Desert 7.5-Minute U.S. Geological Survey (USGS) topographic quadrangles. The site is located on entirely on BLM-administered lands and outside the boundaries of existing BLM Areas of Critical Concern (ACEC), Desert Wildlife Management Areas (DWMA), BLM wilderness areas, U.S. Fish and Wildlife Service (USFWS) designated critical habitat units (CHU) for desert tortoise, and National Audubon Society Important Bird Areas (IBA). These nearest of these management designations to the Project is the Stateline Wilderness Area, located approximately 6.1km to the west of the Project boundary.

The current Project components include solar PV arrays on fixed-tilt mounting systems within the primary generating facility area, five 30-foot tall meteorological monitoring towers, a construction lay-down yard, perimeter security roads and fencing, external drainage features, and access roads. These components will be constructed and owned by the Applicant. Additional Project components, including a switchyard and related facilities (loop-in lines, telecommunications site, microwave site, fiber optic installation and separate access road) will be constructed, owned, and operated by Southern California Edison (SCE). A detailed Project description is included in the Plan of Development (CH2MHill 2011) and the FSEIS. Table 1 provides acreages for permanent and temporary disturbances related to the project components.



D. Aaron Keller, 30 June 2013

Silver State Solar South
State Boundary
Primary Road
Secondary Road
Urban Area
Non-BLM Federal Lands
Department of Defense
USFWS
USFS
NPS

N

0 5 10 20 30 Miles
1:750,000
1 in = 12 miles

FIGURE 1 - REGIONAL SETTING

SILVER STATE SOLAR SOUTH | CLARK COUNTY, NEVADA

Table 1. Disturbance acreage for the Silver State Solar South facility components.

Facility Component	Temporary	Permanent
Silver State Solar South Components		
Generating Facility Components and laydown yard	28	1,898
External Drainage Features	0	374
External Access Roads	0	65
Gen-Tie Line	7	21
Subtotal Silver State Solar South		*2,393*
SCE Components		
SCE new road/tower buffers and material and equipment staging areas	4	2
SCE Primm Switchyard, new access roads, and telecom site	0	28
Subtotal SCE		*34*
Total		**2,427**

1.2 PURPOSE

U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW) currently recommends the development of a project-specific BBCS, formerly called the Avian and Bat Protection Plan (ABPP), for all renewable energy projects that may impact bird and bat resources. The BBCS provides a summary of current biological conditions and describes conservation measures intended to avoid, minimize, and mitigate potential impacts to bird and bat species, which may include state and/or federally designated special status species. This BBCS corresponds to Mitigation Measure (MM) BIO-9 found in the FSEIS (BLM 2013b), and includes the following objectives:

- Identify baseline conditions for bird and bat species currently present at the Project site;
- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project site;
- Specify steps that should be taken to avoid, minimize, and mitigate any potential adverse effects on these species, including necessary permits to collect bird and bat carcasses for data collection and research; and
- Detail long-term monitoring and reporting goals, including collection and reporting of bird and bat carcasses, including applicable approved protocols that would be used for any surveys and/or monitoring conducted.

1.3 REGULATORY FRAMEWORK

Several federal and state laws and regulations, including NEPA, the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and Nevada State Codes, provide the foundation for the development and enforcement of the BBCS. This document represents a comprehensive plan to meet the requirements of these regulatory mechanisms as they apply to birds and bats in the Project Area.

1.3.1 National Environmental Policy Act

Under NEPA (42 U.S.C. §§ 4321-4370h), federal agencies are required to prepare an environmental impact statement (EIS) for any major federal action significantly affecting the quality of the human environment. An EIS must include an examination of the environmental impacts of a proposed project, a reasonable range of alternatives for a project, and other related matters. The environmental impacts of the Project have been addressed by the FSEIS (BLM 2013b). This BBCS corresponds to Mitigation Measure BIO-9 contained in the FSEIS requiring a strategy to reduce the potential risks for avian and bat resources from the construction and operation of the Project.

1.3.2 Migratory Bird Treaty Act

The MBTA (16 U.S.C. §§ 703, *et seq*.), passed by the U.S. Congress and signed into law in 1918, makes it unlawful to "pursue, hunt, take, capture or kill; attempt to take capture or kill; possess; offer to or sell, barter, purchase, or deliver; or cause to be shipped, exported, imported, transported, or received any native migratory bird, part, nest, egg, or product." The MBTA, enforced by USFWS, protects all MBTA-listed migratory birds within the United States, which includes over 1000 species. In the continental U.S., native non-covered species generally belong to the Order Galliformes. Common non-native species not protect by the MBTA include rock pigeon (*Columba liva*), Eurasion collared-doves (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), and house sparrow (*Passer domesticus*) (USFWS 2005). The MBTA does not provide any mechanism for incidental take; therefore, action agencies (such as BLM) must coordinate with USFWS to avoid, minimize, and mitigate potential project-related impacts to covered species.

1.3.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d) of 1940 prohibits the take, defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," of any bald eagle (*Halieetus leucocephalus*) or golden eagle (*Aquila chrysaetos*) or the parts, nests, or eggs of such birds without prior authorization. Although bald eagles were removed from the Endangered Species Act in 2007, bald and golden eagles are protected under BGEPA and MBTA. Through recent regulation (50 C.F.R. § 22.26), the USFWS can authorize take of bald and golden eagles when the take is associated with, but not the purpose of, an otherwise lawful activity and cannot practicably be avoided. The USFWS has issued Eagle Conservation Plan Guidance (USFWS 2013) for land-based wind energy projects to help project proponents avoid unanticipated take of bald and golden eagles and comply with the BGEPA.

Although the guidelines were developed for land based wind energy projects, certain components of eagle surveys and monitoring are applicable to other renewable energy projects, including PV solar plants, and have been incorporated into this BBCS.

1.3.4 Nevada State Codes

Nevada Revised Statutes (NRS) Section 503 prohibits the take, defined as "kill, capture, shoot, trap, catch, wound, possess, collect, seine, snare or net, and every attempt to do so", of protected species. Section 503.093 states that protected species include wildlife species that are classified as sensitive, threatened or endangered by the Nevada Department of Wildlife (NDOW) and that an appropriate license, permit or authorization is required to hunt, take or possess protected wildlife (NRS 501.105, 501.181). NRS 503.030 and NRS 503.050 provide a list of currently protects bat and bird species within the state of Nevada. Protected species with potential to occur within the Project are listed in Table 1 in Section 2.1.

1.4. CORPORATE POLICY AND COORDINATION

Silver State Solar Power South maintains a commitment to work cooperatively with federal and state agencies regarding the protection of migratory birds and bats. The Applicant recognizes the importance of coordination with agency personnel at BLM, USFWS, and NDOW so that all parties understand the scope of the Project and can discuss facilities and features that may require specific attention for bird and bat species. The Applicant and their consultants have been working in coordination with federal and state agency personnel regarding necessary wildlife surveys and siting considerations to ensure that all parties understood the scope of the Project and potential issues could be identified early in the planning process.

1.5 KEY PERSONNEL RESPONSIBILITIES AND DUTIES

Four key positions—Lead Avian Biologist (Avian Lead), Lead Bat Biologist (Bat Lead), Avian Biologists, and Biological Monitors —will be responsible for the implementation of the BBCS.

1.5.1 Lead Avian Biologist

The Applicant will assign an Avian Lead to the Project. The Avian Lead will be responsible for overseeing the implementation of the BBCS and ensuring all monitoring and reporting requirements are met. The Applicant shall submit the resume of the proposed Avian Lead to the BLM for approval in consultation with the NDOW and USFWS. The Applicant shall also designate alternate Avian Leads with the same qualifications as the Avian Lead, to be approved by the BLM and USFWS.

The Avian Lead and alternate Avian Leads will have the following minimum qualifications:

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

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the BLM, the proposed Avian Lead, and alternate Avian Leads have the appropriate training and background to effectively implement the BBCS. The Applicant shall ensure that the Avian Lead performs the activities specified in the BBCS.

1.5.2 Lead Bat Biologist

The Applicant will assign Bat Lead to the Project. The Bat Lead will be responsible for overseeing the implementation of the portions of the BBCS addressing bat conservation and ensuring all bat-related monitoring and reporting requirements are met. The Applicant shall submit the resume of the proposed Bat Lead to the BLM for approval in consultation with the NDOW and USFWS. The proposed Bat Lead must have at least one year of experience with bat resources in the Mojave Desert; demonstrate proficiency at current bat survey and monitoring techniques; and possess at least a bachelor's degree in biological sciences, zoology, botany, ecology, or a related field and three years of experience in field biology or current certification of a nationally recognized biological society.

1.5.3 Avian Biologists

The Applicant will designate qualified Avian Biologists to the Project. Avian Biologists will be responsible for conducting field work required by the conservation measures included in the BBCS. Field tasks will include general avian point counts, nest surveys, raptor migration surveys, golden eagle surveys, burrowing owl surveys, and avian mortality surveys. The resume of all proposed Avian Biologists will be submitted to the BLM for approval. Avian Biologists will have the following qualifications:

- A bachelor's degree in biological sciences, zoology, botany, ecology, or a related field;
- Three years of experience in field biology with an emphasis on avian ecology; and
- At least one year of field experience with avian research and/or monitoring in the Mojave Desert.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the BLM that the proposed Avian Biologists have the appropriate training and background to effectively implement the BBCS. The Avian Lead shall ensure that the Avian Biologists perform the activities specified in the BBCS and may assist the Avian Lead in the field as needed.

1.5.4 Biological Monitors

The Applicant will designate Biological Monitors to the Project. The Biological Monitors will be responsible for recording daily observations of sensitive avian species on the Project site and vicinity, as well as instances of avian or bat mortality. The Biological Monitors may assist the Avian Biologists, under supervision of the Avian Biologists or Avian Lead, with certain avian-related field tasks. The resumes of proposed Biological Monitors will be submitted to the BLM for approval.

2.0 EXISTING CONDITIONS

Existing bird conditions were determined by the collective results of all avian related surveys conducted on the Project Site and surrounding areas, incidental observations of special status species recorded during other biological surveys, and will be further informed by continuing pre-construction surveys to be conducted in the fall of 2013 and seasonally until construction begins. No bat surveys have been performed on the project site to date. Existing bat conditions were informed by habitat surveys and acoustic monitoring performing on the Stateline Solar Farm Study Area within 6 miles of the Project Site by Patricia Brown, Ph.D. (Brown-Berry Biological Consulting) during the spring of 2010 and 2011 (Brown 2012). Additionally, bat occurrence data from the Searchlight Wind Energy Project (Tetra Tech Inc. 2012), located approximately 32 miles southeast of the Project Site, were used to help determine possible bat species occurrences in similar habitat within the region.

The baseline avian surveys were conducted within the 2,427-acre Project Site, as defined by the *BLM Preferred Alternative* in the FSEIS (BLM 2013b), and a larger area surrounding the Project Site which includes approximately 9,930 acres of land extending east into the base of the Lucy Gray Mountains and north along the edge of Roach Dry Lake (Figure 2). This larger area encompassing the Project Site and additional surrounding land will hereafter be referred to as the Study Area. These data will provide the basis for before and after control impact studies and aim to provide an understanding of (1) the occurrence of species of birds and bats that utilize the Project Site, (2) temporal variation of these species' presence and abundance within potential risk zones, (3) estimated range of bird and bat mortality resulting from the Project, (4) nesting raptors on or within three miles of the Project, and (5) nesting golden eagles within ten miles of the Project.

2.1 LITERATURE REVIEW AND INITIAL SITE ASSESSMENT

Existing information of avian resources in the vicinity of the Project Site was reviewed prior to the development of this BBCS. Information sources included the Nevada Natural Heritage Program (NNHP), the Clark County Multiple Species Habitat Conservation Plan (MSHCP, CCDCP 2000), and several documents pertaining to other active projects and planned projects occurring in the Ivanpah Valley (BLM 2010a, BLM 2010b, BLM 2012a, BLM 2012b, Ironwood 2012). Habitat assessments and field-based evaluations determining the potential for special status species occurrences were made during site visits between 2010 and 2013.

The review of existing information and literature pertaining to bird habitat and special status species occurrences on the Project Site, combined with field-based habitat evaluations on the potential for special status avian species occurrence, revealed 13 avian species with at least some potential to occur on the Project Site. Table 2 presents of list of these special status species and their potential for occurrence on site. Species were considered special status if they are currently afforded protected or special conservation status with at least one of the following agencies: USFWS, BLM, or NDOW.

Table 2. Special status bird species and known occurrences at Silver State Solar South, 2011-2013.

Scientific Name	Common Name	Status	Occurrence within Study Area
Aquila chrysaetos	golden eagle	BLM: Sensitive IUCN: LC	**Present – Resident** Nesting habitat absent within Project alternatives, but 5 historical abandoned nests and one active (2013) nest located within 5mile buffer. Foraging habitat present.
Asio otus	long-eared owl	BLM: Sensitive IUCN: LC	**Present—Possible Resident** One individual observed adjacent to site during non-breeding season. No observations of breeding individuals.
Athene cunicularia	western burrowing owl	BLM: Sensitive IUCN: LC USFWS:BCC	**Present – Likely Resident** Four observation of burrowing with owl sign during surveys. May be present throughout year. Nesting habitat present.
Buteo regalis	ferruginous hawk	BLM: Sensitive IUCN: LC USFWS:BCC	**Not observed – Low Potential** Nesting habitat absent. May use site vicinity for overwintering.
Buteo swainsoni	Swainson's hawk	BLM: Sensitive IUCN: LC USFWS:BCC	**Not observed—Likely Migrant** Not observed on site, but two individuals were observed in migration approximately 5 miles west of the site in 2011. Nesting habitat absent. May be present (foraging) during summer and fall during migration.
Charadrius alexandrinus nivosus	western snowy plover	BLM: Sensitive ESA: Threatened USFWS:BCC	**Not observed – Low Potential** May be a rare migrant to Ivanpah Dry Lake during winter months.
Falco mexicanus	prairie falcon	BLM: Sensitive IUCN: LC USFWS:BCC	**Present – Foraging** One individual observed on site. Foraging habitat present. Nesting substrate present in the Project Site in the form of transmission towers.
Falco peregrinus anatum	peregrine falcon	BLM: Sensitive NDOW: SE USFWS:BCC	**Present – Migration** Known to be present in area during migration from 4 observations made approximately 5 miles southwest of site. Known to be present and breeding in the area year-round in the South Spring Mountains and MuCullough Mountains. Nesting habitat absent from site. Nesting habitat absent from site.
Lanius ludovicianus	loggerhead shrike	BLM: Sensitive NDOW: SS IUCN: NT USFWS:BCC	**Present –Resident** Individuals have been observed on the Project Site throughout the year. Common on site.
Phainopepla nitans	phainopepla	BLM: Sensitive IUCN:LC	**Present—Resident** Observed on site during breeding season. Nesting habitat present.
Spizella breweri	Brewer's sparrow	BLM:Sensitive NDOW: SS IUCN: LC	**Present—Resident** Observed on the Project Site.
Toxostoma bendirei	Bendire's thrasher	BLM: Sensitive IUCN: VU USFWS:BCC	**Not observed - Moderate Potential** Nesting habitat present.
Toxostoma crissale	crissal thrasher	BLM: Sensitive IUCN: LC USFWS:BCC	**Present—Possible resident** One individual has been observed on the site, mid-March 2013.
Toxostoma lecontei	Le Conte's thrasher	BLM: Sensitive IUCN: LC USFWS:BCC	**Present –Resident** Individuals have been observed on the Project Site throughout the year. Nesting habitat present.

NDOW- Nevada Department of Wildlife
SE – State Endangered
SS – State Sensitive
USFWS - Fish and Wildlife Service
BCC - Birds of Conservation Concern

IUCN - International Union for Conservation of Nature
LC – Least Concern
NT – Near Threatened
VU – Vulnerable

Bald eagle (*Haliaeetus leucocepahlus*) was excluded from list of potential special status species because essential features of breeding, migratory, and wintering bald eagle habitat are absent from the Project Site. Bald eagles require open bodies of water with access to fish prey during both the breeding season and winter (Buehler 2000). There are records of Bald Eagle occurrences (eBird 2013) along the Colorado River approximately 35 miles east of the Project Site. There is a very low probability that a vagrant individual could be seen in the vicinity of the Project Site. No information on occurrences of bald eagle in the Ivanpah Valley was found during the literature review for the assessment of baseline conditions.

2.1.1 Vegetation Commuities

An initial site assessment conducted during site visits in spring 2011 provided information on habitat and vegetation communities (Ironwood 2011). The Study Area (defined below in Section 2.2) supports three vegetation alliances that are based on the Nevada Natural Heritage Program classification: *Larrea tridentata-Ambrosia dumosa* Shrubland, *Yucca schidigera-Larrea tridentata-Ambrosia dumosa* Shrubland, and *Atriplex polycarpa* Shrubland. Over 150 species of plants were identified within Study Area during the surveys.

Larrea tridentata-Ambrosia dumosa Shrubland is dominated by creosote bush (*Larrea tridentata*) and burro brush (*Ambrosia dumosa).* This alliance is most prevalent within the Study Area and primarily occurs in the mid-elevation range. Additional plant species characteristic of these alliances include Death Valley ephedra (*Ephedra funerea*), littleleaf ratany (*Krameria erecta*), California buckwheat (*Eriogonum fasciculatum*), beavertail cactus (*Cylindropuntia basilaris*), and golden cholla (*Cylindropuntia echinocarpa*).

Yucca schidigera-Larrea tridentata-Ambrosia dumosa Shrubland is dominated by creosote bush, burro brush and Mojave yucca (*Yucca schidigera*). This alliance occurs higher in the alluvial fan within soils that contain higher proportion of gravel and rocks. Plant diversity and cacti/yucca density is higher in these regions as compared to the *Larrea tridentata-Ambrosia dumosa* Shrubland and provides greater avian habitat structure complexity than the other two vegetation communities found on the Study Area.

Atriplex polycarpa Shrubland occurs at the lowest elevation range within the Study Area along the edges of Roach Lake where soils are relatively fine. This alliance is dominated by allscale (*Atriplex polycarpa*) and contains other shrubs including creosote bush, burro brush and big galleta (*Pleuraphis rigida).* The lower height and reduced complexity of vegetation structure in this alliance potentially supports reduced avian diversity.

2.2 BASELINE SURVEYS AND METHODS

Focused avian surveys and general wildlife surveys have been conducted on the Project Site and surrounding area from 2010 to 2013. Data collected during avian point counts, burrowing owl (*Athene cunicularia*) surveys, golden eagle aerial surveys, ground-based golden eagle nest monitoring, and golden eagle point counts provide information on baseline avian conditions at the Project Site and surrounding area. Additionally, incidental observations of special status bird species were recorded

during these surveys and other biological surveys conducted on the Project Site. Bat resources and baseline conditions have been inferred from existing data in the vicinity of the project site and from a bat survey and habitat assessment performed within 5 miles of the Project Site. Table 3 provides a list of all focused avian and bat surveys performed on the Project Site and surrounding area to date.

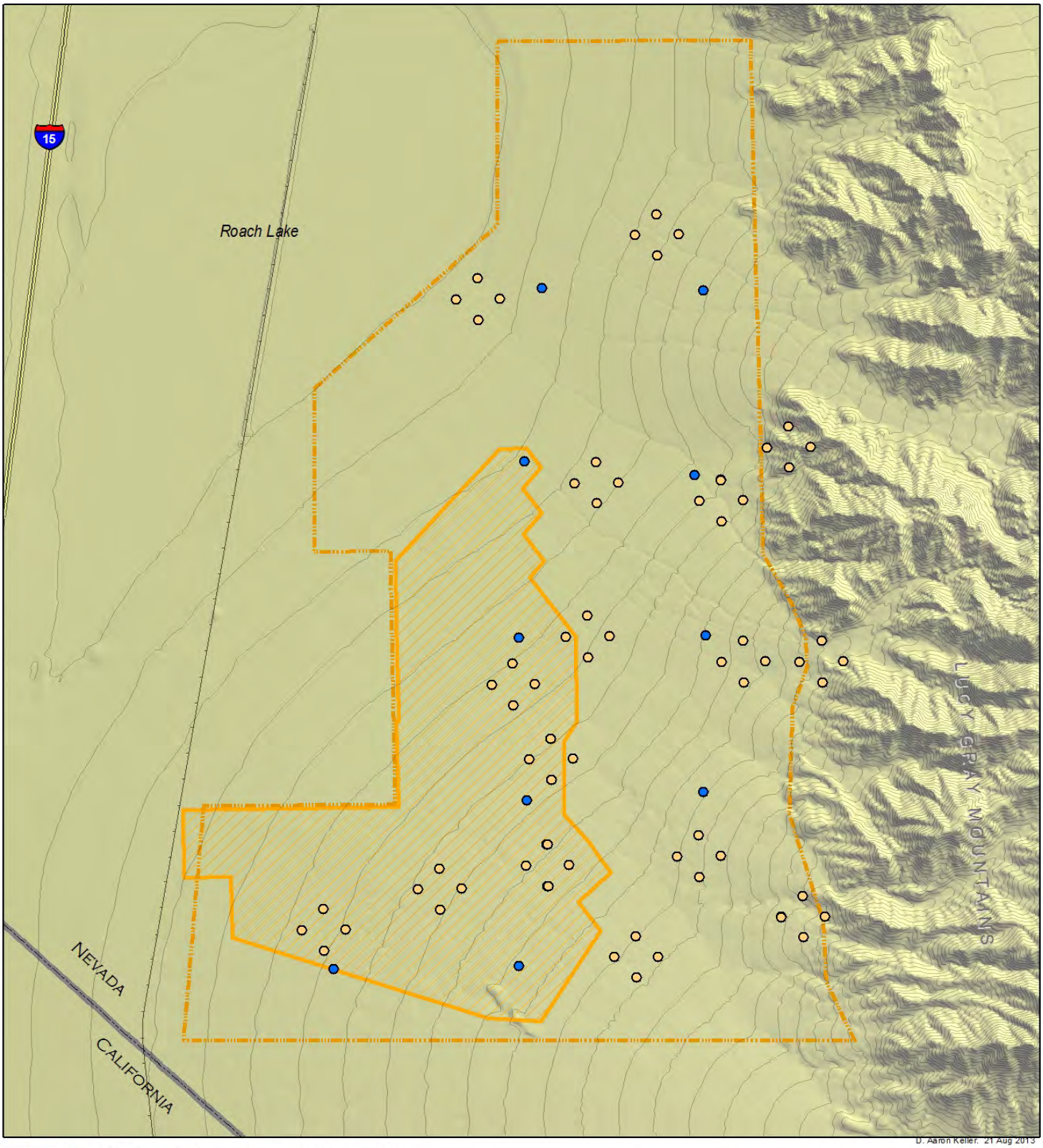
Table 3. List of avian-related biological surveys performed at Silver State Solar South, 2010-2013.

Survey	Dates	Coverage	Description
Avian Point Counts	2012 (Spring, Fall) 2013 (Winter, Spring)	64 sampling points in Study Area (Figure 2).	Surveys conducted once per season
Golden Eagle Aerial Surveys	2010 (May, June)	Project Site and 10-mile buffer	Helicopter survey following USFWS Protocol (USFWS 2010)
Golden Eagle Point Counts	2012 (Winter, Spring, Fall), 2013 (Winter, Spring)	10 survey points in Study Area	30 minute counts, 800-m radius
Common Raven Point Counts	2012, 2013 (Winter, Spring, Fall), 2013 (Winter, Spring)	10 survey points	10 minute counts, 800-m radius. Results provided in Silver State Solar South Raven Management Plan (Ironwood 2013)
Golden Eagle Nest Monitoring	2013 (Throughout breeding season)	5 known nests in 5-mi buffer	Ground-based nest monitoring following USFWS Protocol (USFWS 2010)
Burrowing Owl Surveys	2011 (Spring) 2012 (Spring, Fall)	Full coverage of Project Site	Performed concurrent with USFWS protocol desert tortoise surveys, 10-m transect spacing.
Incidental Observation	2011, 2012, 2013 (Throughout)	Throughout Study Area	Special status bird species observations were recorded during the course of other biological surveys

2.2.1 Avian Point Counts

Point counts were conducted in the spring and fall of 2012, winter of 2012-2013, and spring of 2013 by qualified ornithologists using a modified point count methodology as described in *Monitoring Bird Populations by Point Counts* (Ralph et al. 1995). Once per season, point counts were surveyed at 16 randomly placed locations throughout the Study Area.

At each of these points, four separate sampling stations were established, spaced 200 meters in the cardinal directions from point center, for a total point count sample size of 64. Throughout the planning process for the Project, changes in the project boundary have resulted in changes to the distribution of sampling points falling inside and outside the footprint. Currently, there are 20 sampling stations within the Project Site and 44 sampling stations outside of the Project Site within the greater Study Area.



Silver State Solar South ROW
Study Area
State Boundary
Railroad
Contour (50 ft)
General Avian Point Count
Raven Point Count

0 0.5 1 2 Miles
1:47,000
1 in = 0.75 miles

N

Figure 2 - Point Count Locations, 2012-2013

Silver State Solar South | Clark County, Nevada

Point counts were performed during the hours of peak morning bird activity (i.e., between sunrise and 4 hours following sunrise) and during mild weather conditions (i.e., avoiding extreme temperatures, rain and high wind events). Each sampling station was visited 10 minutes, and the survey period was divided into three survey periods consisting of the first three minutes, minutes 3 to 5, and minutes 5 to 10 in order to provide data necessary for the development of detectability measures and to correct for observer bias when necessary. Observers also recorded distance to detected bird, necessary information for the development of density estimates.

Point count data were used to develop distance models in Program DISTANCE (Thomas et al. 2010) estimating total bird density on the site by season. Density estimates were also developed for individual species with sufficient numbers of detections. Shannon's diversity indices (Hunter 1990) were calculated for the study area (all points) by season and throughout the year.

Distance Model Development

Distance sampling provides a way of estimating density when a full inventory of items within an area is not feasible. During an avian point count, a tally of all detected birds within an area and distances of each bird from the observer is recorded. Some basic assumptions of the nature of area to be sample are as follows:

- Objects to be measured are distributed according to some stochastic process with the parameter D (number/unit area)
- Sampling points (or lines when using line transects) are distributed randomly throughout the study area

A key concept in distance sampling is the detection function, g(y), or the probability of detecting an object given its distance from a line or point. The first assumption of the detection function is that objects at distance 0 are detected 100% of the time (g(0) = 1). The second assumption is that objects are detected and distance recorded at their initial location (i.e. the location of the bird when first seen rather than where it lands after being disturbed). The final assumption is that the distances are accurately measured. During a survey, the number of objects detected, *n*, is a function of the total density of those objects as well as the probability of being detected $\widehat{P_a}$. In an ideal world, *n*, would be related only to the actual density (D). However, actual density ($\widehat{D}$) is estimated by the following equation,

$$\widehat{D} = \frac{n}{(\hat{P}_a k \pi w^2)}$$

where k is the number of points and w is the sampling radius. The unconditional probability $\widehat{P_a}$ of an object being detected is a function of the detection function at each distance r given by the equation

$$\widehat{P_a} = \int_0^w \frac{2\pi r g(r) dr}{\pi w^2}$$

The sample of distance measurements is used to obtain the detection function, which is necessary to develop a good estimate a density. Program DISTANCE allows estimating the shape of the detection function. Models are chosen based on model robustness, shape criterion, efficiency (low variance), and have adequate goodness of fit based on actual data. In program DISTANCE, the user can select from several "key functions" which are starting points for models of g(y). The program offers four key function choices, uniform, half-normal, hazard-rate, and negative exponential. Generally the key functions are selected by looking at histograms of the data. To adjust the key function, series expansions can be added to the models (cosine, simple polynomial, and hermite polynomial). In general, several models are run for a set of data and various tests are used to determine the best model for the given data. Akaike's Information Criteria (AIC) is a method for model selection that takes into consideration fit of the data using maximum likelihood estimates as well as model simplicity (the principal of parsimony). In a group of models based on the same data, the one with the lowest AIC value is generally the best choice.

2.2.2 Burrowing Owl Surveys

A preliminary habitat assessment conducted in 2011 concluded that suitable wintering and breeding habitat for burrowing owl was present throughout the Project Site and greater Study Area. To confirm the presence of burrowing owls on the Project Site, biologists performed burrowing owl surveys following established guidelines for survey intensity and coverage (CA Burrowing Owl Consortium 1998, CDFG 2012) during the spring of 2011 and the spring and fall of 2012. The entire Study Area encompassing the Project Site was surveyed from April 4th to May 27th, 2011. The eastern portions of the Study Area between the Project Site and the base of the Lucy Gray Mountains were surveyed again from April 3rd to May 18th, 2012, and the southern half of the Project Site was resurveyed from September 19th to October 18th, 2012. The burrowing owl surveys were conducted concurrently with desert tortoise surveys using pedestrian transects spaced no greater than 10 meters apart. All burrowing owl sign, including presence of individuals, feathers, tracks, white wash, pellets, and suitable burrows suitable were recorded during the survey. Incidental observations of burrowing owls and sign were recorded during other biological surveys performed on the site from 2011 to 2013.

2.2.3 Golden Eagle Aerial Surveys

Aerial surveys to assess golden eagle occupancy and productivity were conducted in 2010 by the Wildlife Research Institute (WRI) following USFWS Golden Eagle Inventory and Monitoring Protocol (USFWS 2010). These surveys were conducted for the adjacent Stateline Solar Farm Project, but coverage overlapped the majority of a 10-mile buffer zone around the Project Site. Additional subsequent aerial surveys were not conducted specific to the Silver State Solar South Site because existing BLM helicopter survey data covering the 10-mile buffer area was made available for 2012 (Larry LaPre, pers. comm., September 2013)

WRI conducted helicopter surveys on the Project Site and vicinity on May 7 and 8, 2010 (Phase 1) and June 14, 2010 (Phase 2). Helicopter survey teams consisted of two golden eagle biologists and a

helicopter pilot. Phase 1 aerial transects covered habitats likely to support golden eagle nesting, with in flight transect modifications made in response to terrain. Phase 1 surveys were conducted in an effort to confirm reproductive activity and ensure mountainous areas with intricate canyons were thoroughly investigated. Phase 2 surveys were focused on revisiting potentially active territories identified during Phase 1 surveys. During both Phase 1 and Phase 2 aerial transects, nest sites and other location-specific data were recorded using hand-held Global Positioning Satellite (GPS) units, with supplemental field notes documenting species and corresponding to each recorded waypoint. A total of 32 person-hours were logged during the Phase 1 survey with an additional 17 person-hours logged during Phase 2 surveys.

During both Phase 1 and Phase 2 surveys, two optically-stabilized zoom cameras were used to capture high-resolution, wide-angle and close-up, digital photographs of active and inactive golden eagle nests, other raptor nests, and significant wildlife species. Collected digital images were used to confirm species identification, nest condition, nest activity, nest occupation, and nest arrangement (WRI 2010). An active nest was defined as supporting evidence of new material having been added during the season and typically included the use of yucca, grasses and mosses in the construction of a bowl, used for incubation. An active nest may or may not have been occupied by a golden eagle (e.g., an incubating female or a young bird) at the time of survey. An occupied nest was defined an active nest in which an adult or young golden eagle, or a new egg, has been observed during the survey.

2.2.4 Ground-based Golden Eagle Nest Monitoring

To supplement the aerial surveys conducted in 2010, qualified avian biologists conducted ground based nest searches for Golden Eagle nests in March of 2011, 2012, and 2013 following USFWS protocols (USFWS 2010). Potential nesting habitat was searched within 5 miles of the Project Site. The breeding status of each nest was determined from behavioral observations made from observation points no closer than 300 meters from the nests providing an unobstructed view from which eagle activity could be observed with binoculars or a spotting scope. All bird observations made during these surveys were recorded. During 2011 and 2012, active nests were not monitored throughout the breeding season in order to minimize disturbance to nesting eagles. In 2013, based on consultation with the BLM, nest observations were made throughout the breeding season to determine nest fate.

2.2.5 Golden Eagle Point Counts

Golden eagle point counts were conducted at 10 locations on the Project Site and surrounding areas (Figure 2) in order to acquire baseline golden eagle occurrence data. The 10 point count locations were systematically placed across the vicinity of the Project site on a grid with 1-mile square grid cells. Based on the current proposed footprint of the project, 4 golden eagle point counts fell within the boundaries of the Project Site and 6 point counts fell outside the boundaries within the larger Study Area. Four rounds of surveys were conducted: October 2012, January/early February 2013, March 2013, and April 2013. All bird species within 800 meters of the center point were recorded during an observation period of 30 minutes. Eagle flight activity located more than 175 meters above ground was recorded, but

separated from other data. Approximate flight paths and heights of eagles plus notes on general behavior and activity were recorded. Behavior noted during each 1-minute interval was recorded as either soaring flight, flapping-gliding, kiting-hovering, stooping or diving at prey, stooping or diving in an agonistic context with other eagles or other bird species, being mobbed, undulating/territorial flight, or perched. All observations of foraging were documented and referenced on a map or by Universal Transverse Mercator (UTM) coordinates.

In an effort to develop an index of common raven (*Corvus corax*) occurrence, observations of ravens were also recorded during golden eagle exposure counts. Immediately before or after the golden eagle exposure count, a 10-minute observation period was conducted at the same location and only common ravens were recorded. Results of common raven point counts and detailed description of raven related baseline conditions at the Project Site is contained in the Draft Silver State Solar South Raven Management Plan (Ironwood Consulting 2013).

In accordance with the most recent USFWS Eagle Conservation Plan Guidance (USFWS 2013), future golden eagle survey efforts will include long-sit (5 hour) resident and migratory surveys as described in Section 5.2.3.

2.2.6 Incidental Observations of Special Status Species and Nests

Biologists conducting various biological surveys have been reporting incidental detections of sensitive bird species throughout the Study Area since 2011. During all biological survey efforts, bird species (including special status species and nests) were identified and/or tallied on standardized data forms (Ironwood Consulting 2012). The locations of special status species and nests were recorded. NDOW provided data on historical golden eagle nest locations and presence of other special status species within the project vicinity.

2.2.7 Bat Resources

Focused bat surveys have not been conducted on the Project Site to date. However, bat surveys and habitat assessments were performed on the Stateline Solar Farm Study Area 5 miles to the southwest of the Project Site by Patricia Brown, Ph.D. (Brown-Berry Biological Consulting) during the spring of 2010 and 2011 (Brown 2012). Due to the close proximity of the Stateline Solar Farm Study Area to the Project Site and similarities in habitat features, data from the Stateline bat surveys and existing data reported in the Silver State Solar South DSEIS (BLM 2012a) were used to inform existing bat conditions on the Project Site.

On May 14, 2010, Dr. Brown performed an assessment of potential bat habitat on the nearby Stateline Solar Farm project site. General areas that may serve as potential roosts and foraging sites were identified. Acoustic monitoring was conducted on July 28 and 29, 2010 and from May 14 to 16, 2011 to determine which bat species utilize the Study Area. Ultrasonic detectors (i.e., Anabat II and 1A) recorded echolocation signals overnight in thirteen locations in different areas of the Stateline Project Site to

identify bat species and document general activity levels. Roost surveys were conducted at rock shelters and mines in the mountains adjacent to the Stateline Project during the day and at night for evidence of bats and guano.

In addition to the Stateline bat data, bat occurrence data from the Searchlight Wind Energy Project (Tetra Tech Inc. 2012), located approximately 32 miles southeast of the Project Site, were used to help identify bat species with some possibility of presence on the Project Site. Bat occurrence data from the Searchligh Wind Energy Project were based on year-round acoustic monitoring from April 2008 to April 2010 at 8 stations dispersed across approximately 400 acres: 6 stations at meterological towers (each station recorded acoustic data at 2 m above ground and 40-50 m above ground) and 2 stations at two mine sites known to provide roosting habitat (Tetra Tech Inc. 2012). Data from Searchlight Wind Energy Project could not be used to infer bat occurrence at the Project Site because of the distance between the sites (approx. 32 miles) and habitat differences between the two locations (Searchlight Wind Energy Project site contains greater topographic variation and more rocky habitats than Silver State Solar South). However, the Searchlight bat data was used to supplement the list of possible bat species occurrences inferred from data collected at the Stateline Project 6 miles from the Project Site.

2.4 BASELINE SURVEY RESULTS

2.4.1 Avian Point Counts

A total of 49 bird species were detected during avian point counts across all seasons surveyed during 2012 and 2013. Appendix A contains a list of all bird species observed on the site, including those detected during avian point counts. 796 total detections were recorded during the point counts. Two special status species—loggerhead shrike and crissal thrasher—were observed during the point counts. The five most common species across all seasons were black-throated sparrow (*n*=139), common raven (*n*=90), house finch (*n*=66), horned lark (*n*=43), and rock wren (*n*=42).

Avian point count data were analyzed with the goal of developing metrics which may be used to describe current conditions and serve as a baseline to which future data may be compared. The following metrics were developed using methods described in Section 2.2.1:

- Total birds per survey per point by season;
- Total species/point by season;
- Bird density Study Area, species combined, within and across seasons;
- For species with sufficient sample sizes, individual species densities across the Study Area; and
- Shannon's index (H') for species diversity across the Study Area.

Table 4 presents total birds per point and species per point with associated 95% confidence intervals.

Table 4. Total species per point and detections per point per survey at Silver State Solar South Study Area, 2012-2013.

Survey	Species/ Point	95% CI Lower Limit	95% CI Upper Limit	Birds/Point/ Survey	95% CI Lower Limit	95% CI Upper Limit
All Seasons Combined	4.77	4.21	5.33	2.84	3.17	2.51
Fall	1.98	1.65	2.31	2.20	1.82	2.58
Spring	3.24	2.82	3.66	4.53	3.89	5.17
Winter	2.17	1.68	2.66	2.17	1.68	2.66

CI- Confidence Interval

Table 5 provides estimates of bird density within the Study Area and for 5 species with sufficient sample sizes—house finch, horned lark, black-throated sparrow, common raven, and rock wren. These estimates are based on best-fit distance models developed in Program DISTANCE (Thomas et al. 2010). The model name refers to the name of the key function used in the model. Distance modeling assumes that the detection function is uniform for all objects detected. This assumption can be problematic for bird surveys. It is unreasonable to expect that all bird species are detected with equal probability, therefore estimates of total bird densities may not be as accurate as estimates of individual species. For these analyses the Hazard-rate key function was the best fit for the data. An initial inspection of the data histograms showed evidence of heaping of distance measurements; that is, recorded distances often fell into round numbers such as 20 meters or 40 meters. There were also detection spikes at further intervals. Data were clumped into intervals compensate for heaping and were truncated at the 90th percentile of distance measurements. The Hazard-rate model with no series expansions performed the best for estimates of all birds lumped together while the half-normal key function with cosine expansion was generally the best model for individual species estimates (except in the case of Black-throated Sparrow in which the Hazard model with hermite polynomial expansion was chosen). The histogram of the detections of Black-throated Sparrow was problematic for model fitting as there were numerous spikes in the data.

Table 5. Bird density model estimates. Silver State Solar South Study Area, 2012-2013.

Data Group	Density (birds/ha)	CI Lower Limit	CI Upper Limit	Model Name
All Year (all species, *n*=582*)*	2.3	1.8	2.9	Hazard-Hermite
Fall (all species, *n*=186)	2.6	1.5	4.2	Hazard
Spring (all species, *n*=395)	2.1	1.5	2.8	Hazard
Winter (all species, *n*=211)	2.7	1.6	4.4	Hazard-Hermite
Black-throated sparrow (*n*=139)	1.14	0.66	1.95	Hazard-Hermite
House finch (*n*=73)	0.45	0.34	0.6	Half Normal Cosine
Horned lark (*n=66*)	0.42	0.28	0.62	Half Normal Cosine
Common raven (*n*=90)	0.004	0.002	0.006	Half Normal Cosine
Rock wren (*n=42*)	0.07	0.04	0.11	Half Normal Cosine

CI- Confidence Interval

The Shannon diversity index (H') for the Study Area was 2.97 across all surveyed seasons, 2.78 during spring surveys, 2.46 during winter surveys, and 2.44 during fall surveys. The smaller H' value for the fall season combined with the slighter greater mean species per point observed in the fall indicate that species are less evenly distributed across the Study Area during the fall season.

As part of this initial analysis of point count data, a power analysis was performed to determine the study's ability to detect changes in detections per point and overall avian density in future years. Statistical power can be summarized as the probability that a statistical test will reject the null hypothesis when the null hypothesis is false and there is, in fact, a difference between population means (Zar 1999). The power analyses were conducted using the following parameters: 1)an alpha-level of 0.05; 2) the observed standard error in the dataset; 3) two different sample size scenarios with our current sampling effort and a doubled sampling effort; and 4) desired detectable effect sizes of 0.5 bird per ha and 1 bird per survey per point. Table 6 presents the results of these power analyses.

Table 6. Power analyses of point count data, Silver State Solar South Study Area, 2012-2013

Statistic	Sample size (*n*)	Desired Effect Size	α	Power (1-β)
Overall bird density	537	1 bird/ha	0.05	0.74
Overall bird density	1074	1 bird/ha	0.05	0.96
Detections/survey/point (Overall)	64	1 bird/survey/point	0.05	1.00
Detections/survey/point (Overall)	128	1 bird/survey/point	0.05	1.00
Detections/survey/point (Spring)	64	1 bird/survey/point	0.05	0.99
Detections/survey/point (Spring)	128	1 bird/survey/point	0.05	1.00
Detections/survey/point (Fall)	64	1 bird/survey/point	0.05	0.70
Detections/survey/point (Fall)	128	1 bird/survey/point	0.05	0.92
Detections/survey/point (Winter)	64	1 bird/survey/point	0.05	0.39
Detections/survey/point (Winter)	128	1 bird/survey/point	0.05	0.62

The power analyses suggest that the current sampling has inadequate statistical power (<0.90) to detect the desired effect sizes for overall bird density, birds per survey per point during the fall, and birds per survey per point during the winter. A doubling of sample size effort would likely provide adequate statistical power for all metrics except birds per survey per point during the winter, when the number of bird detections is lower than other seasons. This larger sample size is necessary to be able to detect statistically and potentially biologically significant changes in bird densities and detections during the construction process and post-construction. It will also provide a better estimate of bird densities and detections that may be used to compare point count data with avian mortality results.

Based on the results of the power analysis described above, an additional 64 point count survey stations will be placed across the Study Area beginning in the fall of 2013 in order to obtain a more robust sample size. The total sample size for future point counts will be 128 points at 32 sampling stations and these points will be randomly placed and stratified by placement inside the Project boundary and

outside the Project boundary. The power analysis indicates that the resulting sample size will be sufficient to detect meaningful changes in overall bird densities. Maintaining the number and location of these sampling stations from baseline through post-contruction is necessary to provide direct comparisons of bird detections and densities among seasons and years.

2.4.2 Burrowing Owl Surveys

During burrowing owl surveys conducted in the spring of 2011, four burrows were observed with burrowing owl pellets, white wash, and feathers. No burrowing owl individuals were observed. These burrows may have been occupied by winter resident owls or may have been active breeding-season burrows at the time of observation.

No burrowing owls or burrowing owl sign were observed during spring 2012 surveys conducted on the northern half of the Project Site. During fall 2012 surveys of the southern portions of the Project Site, 4 burrows with burrowing owl sign were observed. All burrows had whitewash near the entrance and three burrows also had pellets and feathers present, indicating that the burrows were likely active at the time of the survey. No burrowing owl individuals were recorded on the site during the surveys. Figure 3 provides locations of all burrowing owl sign observations along with along special status species occurrences.

No burrowing owls or confirmed active burrows have been observed on site during the breeding season; however, suitable nesting habitat is present on site and burrowing owl is considered a likely year-round occupant of the Study Area.

2.4.3 Golden Eagle Aerial Surveys

Aerial surveys conducted in 2010 did not detect any golden eagles or Golden Eagle nests within Project Site or the nearby Lucy Gray Mountains. However, a total of 7 GOEA nests were observed within 10 miles of the Project Site during subsequent ground based nest-searching efforts from 2011 to 2013 (Table 4, nests within 5 miles of site shown in Figure 4). These nests were monitored from 2011 to 2013 as described in Section 2.4.4. These nests likely correspond with 4 potential territories that were estimated based on the proximity of observed nests to eachother and a qualitative assessment of average golden eagle breeding territory size.

Aerial survey data from March 2012 provided by the BLM (Larry LaPre, pers. comm.) showed one active nest within the 10 mile buffer of the Project Site, corresponding to nest X01GESN-0 found during Ironwood's ground-based nest searching efforts.

2.4.4 Ground-based Golden Eagle Nest Monitoring

A total of 7 GOEA nests within 4 potential territories have been observed during ground-based nest monitoring in the spring of 2011, 2012, and 2013. Table 7 provides a list of these nests and their corresponding labels, territories, and locations.

Table 7. Observed Golden Eagle Nests during Ground-based nest searching, Project Site, 2011-2013.

Territory name	Nest ID	Location Relative to Closest Project Boundary	Breeding Status		
			2011	2012	2013
Jean West	X01GESN-0	14.5 km northwest of northwestern project boundary	Not yet detected	Active (fate unknown)	Not visited
Lucy Gray North	P10GESN-2	3.8 km northeast of northeastern corner of project boundary	Active (fate unknown)	Inactive	Inactive
	X02GESN-0	4.0 km northeast of northeastern corner of project boundary	Not yet observed	Active (fate unknown)	Inactive
Lucy Gray West	P12GESN-0	3.1 km east of eastern project boundary	Inactive, RTHA use	Inactive	Inactive
	X04GESN-0	3.1 km east of eastern project boundary	Not yet detected	Not yet detected	Active (fledged)
Lucy Gray South	P14AGESN-0	8.3 km southeast of southeastern corner of project boundary	Inactive	Inactive	Inactive
	P14BGESN-0	8.3 km southeast of southeastern corner of project boundary	Inactive	Inactive	Inactive

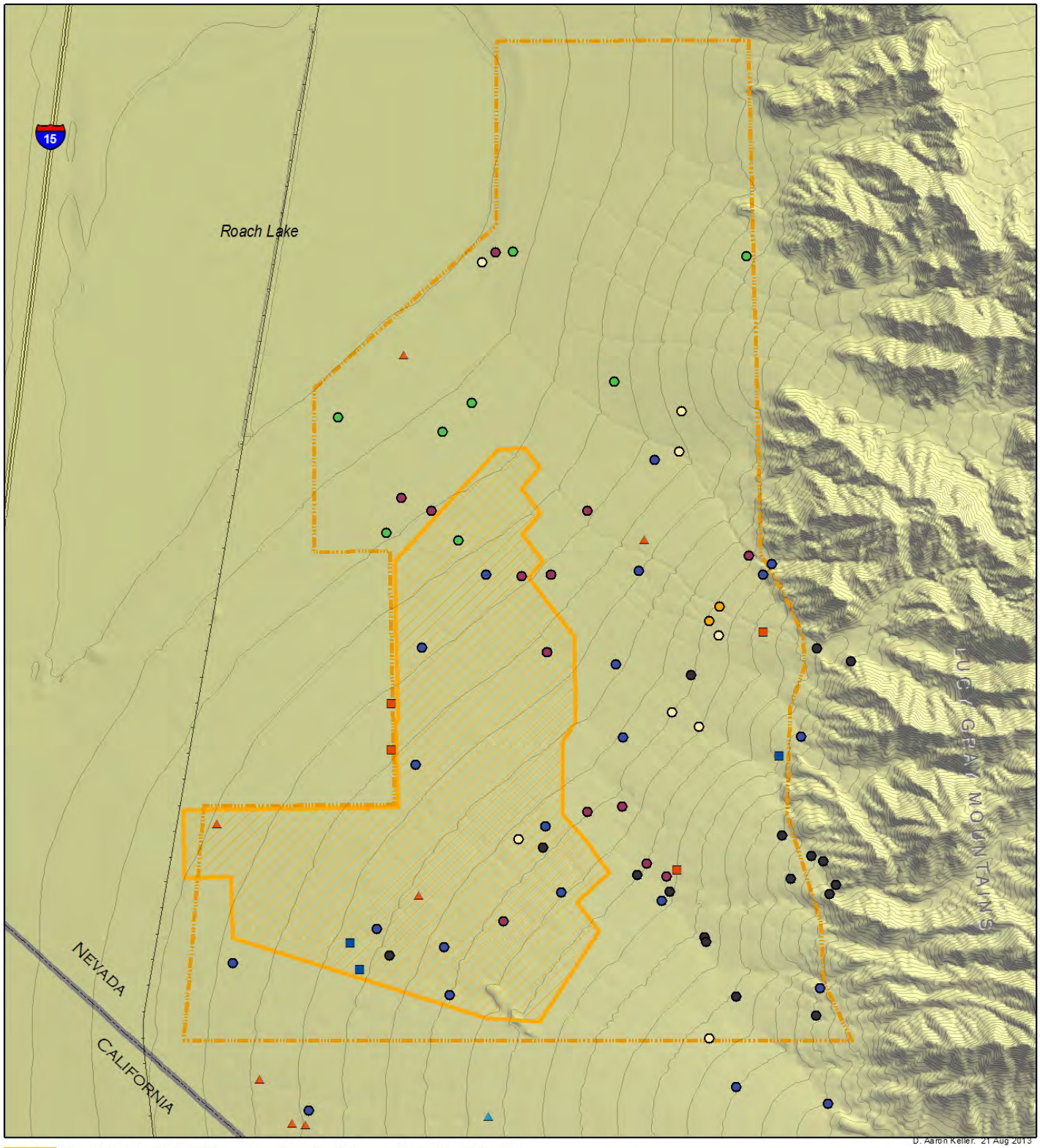
Prior to 2013, nests were only determined as active or inactive early in the breeding season and were not followed in order to minimize disturbance to breeding eagles. In 2013, based on consultation with the BLM, nest observations were made throughout the breeding season to determine nest fate. In 2013, nest X04GESN-0 was observed throughout the breeding season and was determined to have successfully fledged two young. A review of available data indicated no additional information of estimates of production for other potential active nests within a 10-mile radius of the project.

2.4.5 Golden Eagle Point Counts

A total of 12 golden eagles observations were recorded during the four golden eagle point count surveys: six in October 2012, two in late January/early February 2013, four in March 2013, and one in April 2013. Nine of the golden eagle observations involved birds flying at a distance greater than one kilometer from the observer. Two of the detections involved golden eagles within the 800m radius of the point count. Due to the low number of golden eagle detections and an inability to detect meaningful temporal changes in golden eagle occurrences with such a small sample size, this methodology will be abandoned in future survey efforts. The golden eagle point counts will be replaced with a long-sit migration count protocol as described in Section 5.2.3.

2.4.6 Incidental Observations of Special Status Species and Nests

Figure 3 displays locations of all special status species and Figure 4 provides locations of avian nests observed in the Study Area from 2011-2013. Information about occurrences of special status species is included in Table 2 in Section 2.1. Appendix B provides a summary of special status species observations within the Study Area.



Silver State Solar South ROW
Study Area
State Boundary
Railroad
Contour (50 ft)

Burrowing Owl
Long-eared Owl
Golden Eagle
Northern Harrier
Prairie Falcon
Brewer's Sparrow

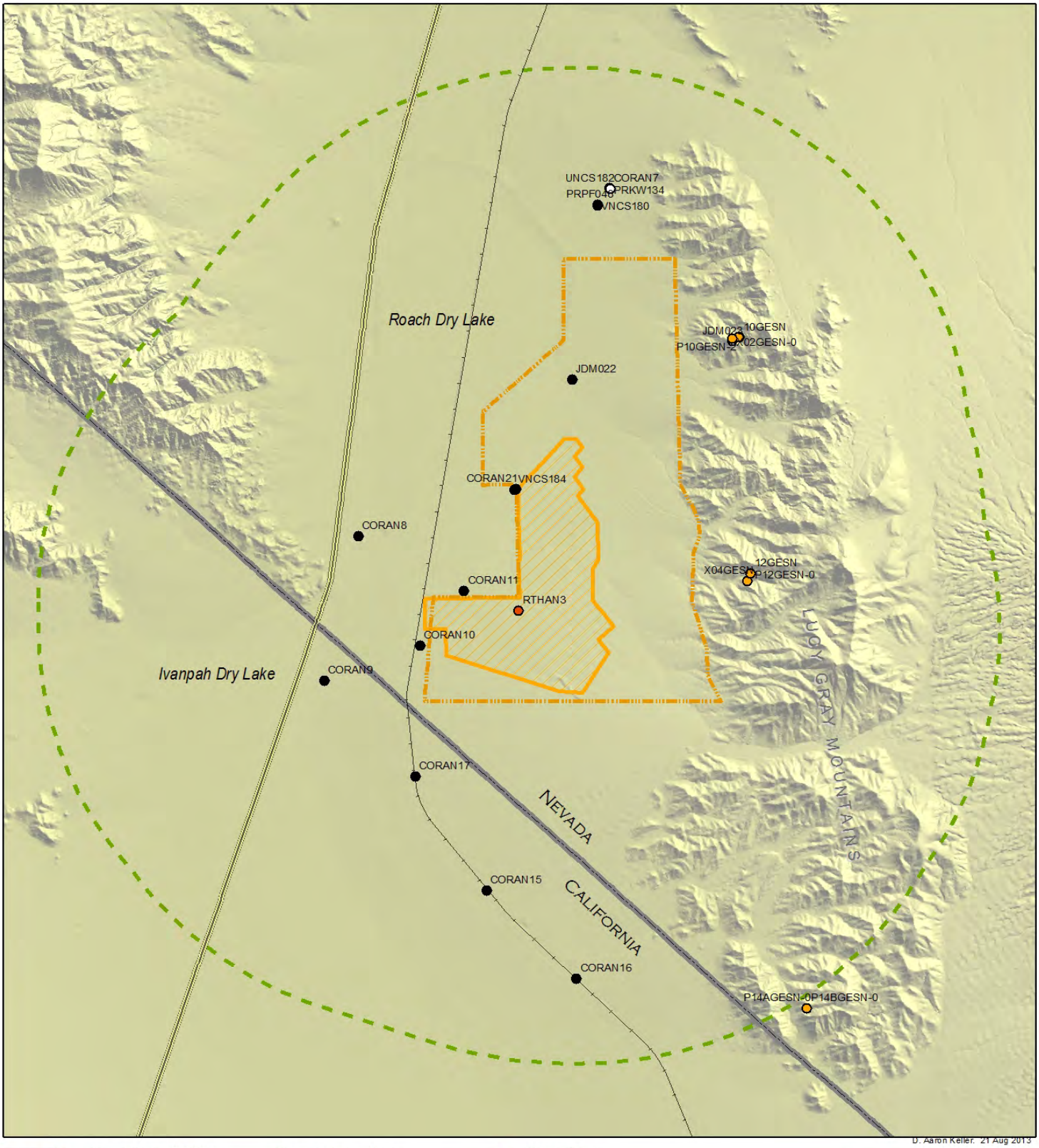
Crissal Thrasher
Le Contes Thrasher
LeConte's Thrasher
Loggerhead Shrike
Phainopepla

0 0.5 1 2 Miles
1:47,000
1 in = 0.75 miles

N

Figure 3 - Special Status Species Locations, 2011-2013

Silver State Solar South | Clark County, Nevada



D. Aaron Keller, 21 Aug 2013

Silver State Solar South ROW
Study Area
5 mile buffer
State Boundary
Railroad
Known Nests
Common Raven
Golden Eagle
Prairie Falcon
Red-tailed Hawk
Unknown Stick Nest

0 1 2 4 Miles
1:110,000
1 in = 1.7 miles

N

Figure 4 - Avian Nest Locations 2011-2013

Silver State Solar South | Clark County, Nevada

2.4.7 Bat Resources

A review of existing data pertaining to the vicinity of the Project Site (Brown 2011) and region (Tetra Tech 2012) revealed 16 bat species with potential to occur within the Project Site (Table 8). Species were included in this list if they had been observed during at least one of the two referenced studies and were determined to have potential for occurrence on the project site. No mines are located within the Project Study Area.

The data reported in Initial Bat Habitat Survey for the First Solar Stateline Solar Farm (Brown 2011) show 8 bat species were detected within or near the Study Area and nine species have the potential to occur. Canyon bats (Parastrellus hesperus), California myotis (Myotis californicus), and Mexican free-tailed bats (Tadarida brasiliensis) were the most common species detected during acoustic surveys (Brown 2011).

Table 8. Potential bat species occurrence on Silver State Solar South.

SPECIES	STATUS		OCCURRENCE
Antrozous pallidus Pallid bat	Federal: BLM: NDOW:	SOSC sensitive SP	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Observed within 5 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Corynorhinus townsendii Townsend's big-eared bat	Federal: BLM: NDOW:	SOSC sensitive SS	Low potential for occurrence. Large cavities for roosting and hibernation not located within Study Area. No observations from referenced studies (Brown 2011, Tetra Tech 2012).
Eptesicus fuscus big brown bat	Federal: BLM: NDOW:	none none none	Some potential to occur on site based on observations year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Eumops perotis californicus greater western mastiff bat	Federal: BLM: NDOW:	SOSC none SS	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Lasiurus blossevillii western red bat	Federal: BLM: NDOW:	none sensitive SS	Potential to ocurr on site during migration. Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Lasiurus cinereus *Hoary bat*	Federal: BLM: NDOW:	none none none	Observed during migration at Primm Valley Golf Course within 4 miles of the site (Brown 2011). Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Lasionycteris noctivagans silver-haired bat	Federal: BLM: NDOW:	none none none	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Macrotus californicus California leaf-nosed bat	Federal: BLM: NDOW:	SOSC none SS	Some potential to occur on site based on observations year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).

SPECIES	STATUS		OCCURRENCE
Myotis californicus California myotis	Federal: BLM: NDOW:	none none none	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Has been detected within 5 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis ciliolabrum western small-footed myotis bat	Federal: BLM: NDOW:	SOSC sensitive none	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Has been detected within 5 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis thysanodes fringed myotis	Federal: BLM: NDOW:	SOSC sensitive SP	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis yumanensis Yuma myotis bat	Federal: BLM: NDOW:	SOSC sensitive none	Moderate potential to occur. Individuals were detected near Primm Valley Golf Course within 4 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Nyctinomops femorosaccus pocketed free-tailed bat	Federal: BLM: NDOW:	none none none	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Nyctinomops macrotis big free-tailed bat	Federal: BLM: NDOW:	SOSC none none	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Parastrellus hesperus western pipistrelle	Federal: BLM: NDOW:	None none none	Some potential to occur on site based on observations year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Tadarida brasiliensis Brazilian free-tailed bat	Federal: BLM: NDOW:	none sensitive SP	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Has been detected within 5 miles of site (Brown 2011)

FWS - U.S. Fish and Wildlife Service
NNHP - Nevada Natural Heritage Program
MSHCP –Clark County Multiple Species Habitat Conservation Plan
Protected - NRS 501

FWS Classification
SOSC- Species of Special Concern

NDOW Classification
SS- State Sensitive
SP- State Protected

3.0 RISK ASSESSMENT

This section outlines the potential risks to bird and bats and supports the implementation of avoidance and minimization measures. Little information is currently available regarding observed impacts of photovoltaic solar energy developments on bird and bat resources. Some components of solar development (overhead lines, transmission lines, project lighting) are common to other types of energy developments, and the mechanisms of bird and bat impacts resulting from those project components may be applicable to solar energy development. Potential risks to birds and bats can be broken into two categories: direct impacts and indirect impacts.

3.1 DIRECT IMPACTS

Direct impacts include disturbances to the landscape which have immediate consequences to resident and migratory bird populations. Some potential direct impacts include:

- Collision risk: buildings, transmission line, solar modules, meteorological tower, or guy lines;
- Electrocution potential;
- Habitat loss; and
- Vehicle and equipment collisions.

3.1.1 Collision risk

Birds and bats have the potential to collide with buildings, transmission and distribution lines, solar modules, meteorological towers, guy lines, chain link fencing, and other similar physical features. The inclusion of avoidance and minimization measures has the potential to decrease the risk of collision. The number of avian collisions is not related to flight frequency, (Rusz et al., 1986) but to blind spots in the vision of the bird, (Martin and Shaw 2010) flight performance (Savereno et al. 1996) or other factors such as density, age, residency status, season flight style and interactions with other birds. For solar modules, a hypothesis posits that birds may mistake the solar panels for a lake and attempt to land. To date there have been no studies to substantiate or refute this hypothesis. Collision rates may increase during the late summer and early fall when immature and inexperienced hatch-year birds undertake the perils of post breeding dispersal and/or migration.

One existing study has examined avian mortality at a solar energy plant near Daggett, CA (McCrary et. Al 1986). The study occurred at Solar One, a solar thermal facility using power tower technology rather than photovoltaic technology. Mortality events were split into two categories: those caused by collision with heliostats (reflective mirrors) and those caused by burns related to reflected sunlight concentrated at “standby points,” the focal points of the heliostat reflectivity. Results from the 1986 study at Solar One found 57 avian fatalities during 40 weekly full-coverage surveys of the site. The 57 fatalities represented an estimate 0.6-0.7% of the “local” avian population.

A contributing factor to avian collision risk is attraction to artificial lighting, especially during migration (Gauthreaux and Belser 2006). Little is known regarding the physiological and behavorial mechanisms governing avian attraction to light (Verheijen 1985), but it has been postulated that birds flighting into light at night lose their ability to discern the horizon and become disoriented (Herbert 1970). Numerous studies have documented avian mortality at lighted tower structures (Gauthreaux and Belser 2006) and examined the effects of different lightening methods on avian behavior and collision-realted mortality (Gauthreaux and Belser 2006, Gauthreaux and Belser 1999).

As described in Section 4.0 and required by Mitigation Measure BIO-13 in the FSEIS (BLM 2013b), the project will use reduced night lighting to minimize light-related avian attraction to the Project Site and surrounding area. Specific lighting measures will be reported to resource agencies for approval prior to construction.

The factors that may influence bats to collide with transmission lines are not well studied or understood (Heritage 2012). In theory, similar collision risks identified above that relate to birds may also apply to bats.

3.1.2 Electrocution potential

The potential for electrocutions depends on the arrangement and spacing of energized and grounded components of poles and towers that are sometimes used for perching, nesting and other activities (APLIC 2012). Research has found that nearly all electrocutions occur on smaller, more tightly spaced residential and commercial electrical distribution lines that are less than 69 kV (APLIC 2012).

All transmission and subtransmission towers and poles will be designed to be avian safe in accordance with the Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006 (APLIC 2012).

3.1.3 Habitat loss and displacement

Clearing and grubbing construction practices would result in habitat loss and displacement of local bird populations as vegetation communities and existing habitats are altered to support Project development. An inherent consequence of development is the loss of habitat that supports bird populations. Altering the landscape through Project development will likely result in the loss of cover, perches, breeding habitat, shelter and foraging sites used by resident species and the loss of perches, roost sites and foraging sites for migratory species.

3.1.4 Human disturbance and vehicle and equipment collisions

Equipment and vehicles could collide with slower-moving species, species in subsurface burrows, and ground-nesting birds resulting in injury or mortality. Some species of birds go into a state of torpor and become immobile during periods of cold weather (Fletcher el al., 2003), increasing the potential for

impacts from vehicles or equipment. For most bird species, direct impacts would be limited to areas within the Project footprint or immediately adjacent to it. Active bird nests in shrubs or near the ground would be vulnerable to crushing during ground-disturbing activities. Studies have also demonstrated vehicle collision risk to bats (Lesinski 2007).

During the construction phase, an increase in vehicle traffic from construction personnel, biologist and other project-related persons, potentially poses an increase risk to birds that inhabit remote desert regions. Birds nesting adjacent to project access roads are more likely to be impacted due to an increase in the number of vehicles using the road.

Loggerhead Shrikes (*Lanius ludovicianus)* have a rapid flight pattern that is low to the ground and are at an increased risk because of this behavior.

Due to a decrease in project personnel, these types of risks will be lessened during the operations and maintenance phase, compared to the construction phase.

3.2 INDIRECT IMPACTS

Indirect impacts include changes to the landscape with unintended and often unforeseen consequences to bird populations. Indirect impacts associated with habitat loss, land alterations and Project development on existing bird populations within the vicinity of the Project are not easily assessed or determined.

Potential indirect impacts include:

- Territory abandonment, nest and roost site abandonment;
- Increase opportunities for predators of special status species; and
- Habitat fragmentation and displacement.

3.2.1 Territory abandonment, nest and roost site abandonment

Most wildlife species are susceptible to visual and noise disturbances caused by the presence of humans and construction equipment. Such disturbances can result in the alteration of species' behavior. Noise and visual disturbance caused by construction and vehicles would have the potential to cause nest abandonment or habitat avoidance directly adjacent to and within the proposed Project footprint. Birds avoiding habitat in the vicinity of the Project area may opt for less suitable habitat which could increase stress on these birds as a result of increased energetic costs. This would also place additional stress on available resources through increased density of birds in off-site areas.

Without the inclusion of avoidance and minimization measures, (see section 4.3 BBCM-10, BBCM-11, BBCM-19, BBCM-20, BBCM-21) nest and roost site disturbances and territory abandonment could occur due to direct nest removal during vegetation removal activities.

3.2.2 Increase opportunities for predators of special status species

The Project may indirectly result in mortality to wildlife through an increased risk of predation. Some predator species such as ravens and coyotes are attracted to human activity. Installation of fencing and transmission towers create additional perching structures from which ravens and raptors may hunt for prey (see Section 4.2). Construction, operation, and maintenance of the Project would result in trash and debris that would further attract species such as ravens and coyotes. To avoid or minimize human impacts a Worker Environmental Awareness Program (WEAP) and trash abatement program will be implemented (see section 4.3: BBCM-12 and BBCM-17). The Projects Raven Management Plan (RMP) will control for potential negative impacts due to the presence of ravens by ensuring that their existence is not subsidized by development of the Project.

3.2.3 Habitat fragmentation and displacement

The displacement and fragmentation of native habitat resulting from the Project may have additional indirect effects on avian population. The habitat loss could cause wildlife to rely more heavily on habitat within the surrounding area for foraging, shelter, and nesting opportunities causing an indirect effect on wildlife inhabiting areas adjacent to the Project area. Wildlife inhabiting adjacent areas could be faced with increased competition as a result of the displaced individuals relocating into their home ranges.

3.3 POTENTIAL IMPACTS TO SPECIAL STATUS SPECIES

The Project area provides habitat for cover, breeding, foraging, and/or traveling for 14 special status bird species (section 2.1, table 2): golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrines anatum*), prairie falcon (*Falco mexicanus*), western burrowing owl (*Athene cunicularia*), loggerhead shrike, (*Lanius ludovicianus*), LeConte's thrasher (*Taxostoma lecontei*), crissal thrasher (*Taxostoma crissale*), Brewer's sparrow (*Spizella brewerii*), long-eared owl (*Asio otus*) and phainopepla (*Phainopepla nitans*). Western burrowing owl (see section 4.3 BBCM-12 and 4.4.3), loggerhead shrike, LeConte's thrasher, phainopepla, and crissal thrasher likely use the Project area for nesting and foraging. Additionally, 10 special status bat species (Table 8) have the potential to occur in the Project area based on studies conducted locally within 6 miles of the Project Site (Brown 2011) and regionally within 32 miles of the Project Site (Tetra Tech 2012).

These sensitive avian species would be vulnerable to loss of nesting or foraging habitat and/or behavioral disruptions due to noise and vibrations during construction. Alteration of foraging behavior during nesting season could result in nest abandonment or malnourished chicks. The implementation of Construction Conservation Measures (section 4.3) is intended to reduce the potential for these types of impacts.

Prairie falcons, Brewer's sparrow, long-eared owl and peregrine falcons would only use the Project area for foraging as there is no suitable nesting habitat present. Temporal detections of Brewer's sparrows, and long-eared owls within the Project boundary indicate that they use the site for roosting and foraging

during migration and as winter residents. Alteration in foraging behavior could result in nest abandonment for local breeders that utilize the site for foraging purposes, or decreased fitness of adults and chicks. Falcons are also susceptible to injury as a result of collision with power lines and transmission structures or from electrocution. The proposed Gen Tie will be built according to APLIC standards (APLIC 2012) and, therefore, is not anticipated to result in adverse impacts to falcons.

Potential golden eagle nesting habitat does not exist within the proposed Project footprint but golden eagles have been documented nesting within 10-miles of the Project. Project development will possibly result in a loss of golden eagle foraging habitat. Eagles require large areas for foraging, whether as dispersed, non-nesting adults or as pairs defending a nest and territory. Human disturbance has been known to result in nest abandonment by eagles; however, the closest documented nest is approximately 3 miles from the proposed footprint (section 2.4.4, table 7, nest X04GESN-0). This nest is situated below a ridge-line on a north-facing cliff face and the Project site is not visible from the nest location, nor is the nest within line-of-sight from the Project. Therefore, there is little likelihood of nest abandonment by golden eagles as a result of the Project. Golden eagles may be susceptible to injury and/or mortality from collision with power lines and transmission structures or electrocution. The project will follow Avian Power Line Interaction Committee (APLIC) guidelines, to reduce this risk through facility design. Based on the distance to the nearest golden eagle nesting habitat (> 2 miles), construction of the proposed Gen Tie will not result in adverse impacts to golden eagles.

The Applicant shall fund avian biologists to monitor and enforce disturbance buffers around all active bird nests (for raptors and species protected by the Migratory Bird Treaty Act) found in the Project area during construction as described in BBCM-11 and Section 4.4. The general bird breeding season for this area is February 15 to August 31. For raptors, specifically, the Applicant shall use the USFWS Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (1999) and coordinate with the BLM to determine appropriate survey areas and disturbance buffers for active nests. For all non-raptor bird species, biologists shall survey within the proposed Project area. Because there are no standardized disturbance buffers for active non-raptor bird nests, the Applicant shall consult with the appropriate agencies (BLM, USFWS, and NDOW) on a case-by-case basis when active nests are found in Project areas, unless directed to do otherwise by all these agencies. These measures will protect local breeding birds, including the sensitive species mentioned above that have the potential to nest within the proposed Project boundary, including: burrowing owl, loggerhead shrike, phainopepla, crissal thrasher and LeConte's thrasher.

Disturbance to avian nests constitute a violation of the MBTA; therefore, active bird nests will not be disturbed or moved during breeding season, unless the Project is expressly permitted to do so by the USFWS.

All active nests and disturbance or harm to active nests shall be reported to: USFWS, BLM, and NDOW. Work shall be halted if it is determined by the biological monitor that active nests are being disturbed by construction activities, until further direction or approval to work is obtained from the Project's Lead Avian Biologist.

3.4 CUMULATIVE IMPACTS

Three additional renewable energy projects are in various phases of development within 10 miles of the Project Site. Silver State Solar North, a 50 MWAC approximately 600-acre photovoltaic generating station immediately adjacent to the west of the Project Site, has completed construction and is currently operating. The approximately 3,670-acre Ivanpah Solar Electric Generating Station (ISEGS) is currently under construction 6 miles to the southwest of the Project Site. A third project, the planned Stateline Solar Farm, is currently undergoing agency permitting review and is projected to occupy 1,685 acres, approximately 4 miles west southwest of the Project Site. Together with the proposed Silver State Solar South Project, recent and planned renewable energy projects in the Ivanpah Valley total approximately 8,382 acres. Silver State Solar South comprises approximately 29% of the cumulative acreage impacts of the four projects. The Ivanpah valley is approximately 165,120 acres in size. The proposed Silver State Solar South Project would occupy approximately 1% of the land area within the Ivanpah Valley and all of the planned renewable energy projects combined would account for approximately 5% of the total land area.

As photovoltaic generating stations with similar project components, Silver State Solar North and the planned Stateline Solar Project both have projected avian and bat impacts similar to the proposed Project. ISEGS is a power tower-style solar thermal generating station and, as such, could present additional direct mortality threats to bird and bat species through the presence of "radiant flux", reflected solar light, broadcast on three power towers associated with the project (BLM 2010b).

3.4 AVIAN RISK REDUCTION MEASURES

Bird and bat conservation measures are described in the following section, "4.0 Bird and Bat Conservation Measures." The Applicant intends to implement the described measures in an effort to reduce the unintentional direct and indirect risks that the development (construction, operaration, maintenace, and decommissioning) of this project could pose to migratory birds and bats. Bird and bat conservation measures include: project siting, facility design, construction conservation measures and the implementation of exclusion zones.

3.5 SUMMARY AND DISCUSSION OF RISK ASSESSMENTS

Through inherent risks and consequences associated with new development, there will possibly be long-term residual effects on local and migratory birds and bats. The loss of habitat including: foraging areas, shelters, perches, and nesting habitat; as well as the other direct and indirect risks described herein are inclusive for the threats identified through the application of baseline studies. Additional threats may be identified through the course of project development and by the application of ongoing survey efforts. Adaptive management measures (section 3.6) will be implemented to address additional and unforeseen threats, identified by the analysis of survey data. Sampling design, including temporal constraints, and existing conditions create limitations to the risk assessment. Many migratory birds and bats move at night and fly at high elevations where they are not detected by sampling measures.

Additionally, conditions on the Project site are much different during the pre-development stage compared to post development.

Risks to the birds and bats will likely vary temporally, with seasonal fluctuations in species composition, abundance, and site use. It is possible that mortality rates will increase during migratory periods, when more birds and bats are present on the site (see Table 4, spring; where the number of birds per point was approximately doubled compared to other seasons). Appendix D contains a list of migratory bird species common within the United States, which have the potential (however slight) to show up on the project over time.

An avian mortality study shall be conducted by the Applicant, with review by BLM, to monitor for incidents of bird strikes during the construction and first 2-3 years post-construction of the proposed Project (BLM 2012a). A proposed post-construction Avian Mortality Monitoring Plan (AMMP) has been included in this BBCS. Post construction avian mortality monitoring and instances of avian mortality reported on site will be used to monitor the effectiveness of mitigation measures that are intended to reduce project risks to birds and bats. 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.

4.0 BIRD AND BAT CONSERVATION MEASURES

4.1 PROJECT SITING

The Applicant has sited the Project to avoid and minimize impacts to bird and bat species where possible. The process of siting of the Project included both macro- and micro-siting considerations. The Project is not within the boundaries of a desingnated critical habitat unit, Area of Critical Environmental Concern, Audubon Society Important Bird Area (IBA), a Western Hemisphere Shorebird Reserve Network, or an area designated by the Convention on Wetlands of International Importance (Ramsar Convention). The East Mojave Peaks IBA is located within the Clark, Kingston and New York Mountain Ranges, approximately 24 air-miles from the Project. These areas support unique avian habitats. The large majority of this IBA is protected within Wilderness Areas. Other macro-siting considerations for the Project components also included the avoidance of:

- *Locations with federally or state listed, or otherwise designated sensitive species, and areas managed for the conservation of listed species* - Project avoids Desert Wildlife Management Areas (DWMAs), CHUs, ACECs, and IBAs and was sighted in the area of lowest known concentration for special status bird and bat species available.
- *Areas frequently used for daily bird and bat movements (i.e., areas between roosting and feeding sites)* - Areas of greater topographic and vegetative diversity (upper alluvial fan adjacent to Lucy Gray Mountains) were avoided to the maximum extent possible.
- *Breeding and wintering eagle use areas* - These areas were identified and avoided for all Project components. Valley floor areas where the Project would be located do not provide wintering or breeding habitat for eagles but may provide foraging habitat for resident golden eagles and other raptor species.
- *Known migration flyways for birds and bats* – No known major migratory flyways have been identified within the Project based on baseline avian data collected to date.
- *Areas near known bat hibernacula, breeding, and maternity/nursery colonies* - The rocky foothills of the Lucy Gray Mountains approximately 1.5 miles east of the Project Site provide ample crevice roosting habitat for several bat species. This area was avoided during site planning and the buffer distance between the eastern edge of the Project and the western edge of the Lucy Gray Mountains was increased to approximately 1.25 miles.
- *Fragmentation of large, contiguous tracts of wildlife habitat* - Many desert special status bird and bat species require large undisturbed areas that are highly sensitive to fragmentation effects. In siting the Project, all areas with greater vegetation structure, density and diversity were avoided or reduced to the extent possible. These areas included the upper alluvial fan that supports greater topographical and vegetative diversity.

These siting considerations are in compliance with MM BIO-4 contained within the Project's FSEIS (BLM 2012a). Micro-siting considerations for the Project components began at the inception of the Project and actively continued as further wildlife surveys were conducted and through informal meetings with the BLM, USFWS and NDOW throughout the Project's planning process. Biological studies indicated that

topographical and vegetative diversity was greater within the rocky terrain of the stabilized alluvial fan, which occurred in the higher elevations (generally above 2,500 feet). This mid-alluvial fan region likely supports more nesting and foraging habitat for both bird and bat species due to plant structure and presence of rock outcrops. Topographic and vegetative diversity lessened near the Ivanpah and Roach Dry Lakes. Siting of the alternatives took these habitat gradients into consideration. The Project has been sited to avoid the upper alluvial fan habitats to the maximum extent feasible and utilized areas of lower diversity near the lakebed. The Project site does not provide habitat for state- or federal-listed listed bird or bat species, but does provide habitat for several State and BLM special-status bird and bat species (Section 2.3). Beyond continuing to refine the boundaries of the solar farm, additional considerations of micro-siting included:

- *Avoiding features that attract raptors (areas supporting tall perching structures including trees, utility poles, etc.)* – By following APLIC guidelines (APLIC 2012), the Applicant has designed features to reduce perching by raptors to the maximum extent practicable.
- *Avoiding features that attract migrant birds (e.g., water sources, riparian vegetation) Minimize the potential for enhancing habitats suitable for raptor prey species such as rodents that would likely attract raptors to the project site* - Project construction and O&M phases will minimize the potential for creating habitats suitable for rodents, such as rock piles, that could attract raptors.

4.2 FACILITY DESIGN

The following bird and bat conservation measures (BBCMs) have been incorporated into the design of Project facilities.

BBCM-1 *Avoid using lattice-type structures, placing external ladders and platforms on towers to minimize perching and nesting.* – The generation portion of the Project will not incorporate towers or similar structures. The use of lattice towers, platforms, and ladders for transmission purposes have been minimized to the extent practicable. Although lattice structures will be used for meteorological towers, three transmission towers at the loop-in to the Primm substation, and possibly to mount and elevate a microwave communication dish on the Project Site, these will be in an area designated as a utility corridor that currently supports existing transmission lines, including those on lattice towers. The Project would not cause a substantial increase on the number of lattice towers within this corridor. This BBCM corresponds to requirements within MM BIO-10 of the FSEIS (BLM 2013b).

BBCM-2 *Implement measures to reduce or buffer adverse noise effects associated with operation of the facility on surrounding wildlife habitat. Noise impacts to birds (Rheindt 2003, Brumm 2004, Parris and Schneider 2009) and bats (Schaub et al. 2008) have generally been found to be negative; therefore facility design should*

take this fact into consideration when selecting the type of solar technology (such as photovoltaic panels vs. parabolic dish engines) to be used and the placement of the solar power plant within bird and bat habitats. The Project utilizes photovoltaic panel technology which has little potential for noise impacts. Noise impacts during construction would include noise generated from the operation of construction equipment and construction vehicles. The O&M phase of the Project would have little or no noise for both the solar farm.

BBCM-3 *Avoid the use of guy wires for all meteorological towers and do not light them unless the Federal Aviation Administration (FAA) requires them to be lit, which is generally >60 meters (>199 ft) AGL in height.* Any necessary guy wires on meterological towers should be marked with recommended bird deterrent devices (APLIC 2012, USFWS 2000).

BBCM-4 *Facility lights will be focused downward to reduce skyward illumination and keep light within the boundaries of the site. Lights should be equipped with motion detectors to reduce continuous illumination*. The Applicant and its contractors shall reduce night lighting in the proposed Project area and the surrounding non-developed areas to avoid unnecessary visual disturbance to wildlife. Night lighting during construction, operations, and maintenance shall be reduced in the proposed Project area and the surrounding non-developed areas using directed lighting, shielding methods, and or/reduced lumen intensity. The Applicant shall indicate anticipated measures to resource agencies for approval prior to construction. This BBCM corresponds to MM BIO-13 in the FSEIS (BLM 2013b).

BBCM-5 *Where feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the Bird Power Line Interaction Committee (APLIC 2012) for any required above-ground lines, transformers, or conductors*. Power lines will be in accordance with Bird Power Line Interaction Committee guidelines.

BBCM-6 *Avoiding the creation of roads to minimize further loss and fragmentation of migratory bird habitat.* New roads associated with Project activities will be kept to a minimum. Roads associated with the solar farm site will be within the Project fence whenever practical.

BBCM-7 *If evaporation ponds are required for the operation of the facility, placement of netting over the surface of the ponds has been encouraged to prevent birds and bats from contacting the water's surface*. There will be no evaporation ponds for operation of the facility. Temporary construction ponds will be used only during the construction phase. Ponds will be monitored for instances of avian mortality in lieu of utilizing exclusion netting.

BBCM-8 *Assessing the impact potential of solar panels to birds will help reduce the potential threats that these facilities pose to birds and bats*. Monitoring conducted during the construction phase and first year of the post-construction phase of the Project is discussed in Section 5.0 and will assist in determining whether the Project's photovoltaic panels attract birds and bats.

4.3 CONSTRUCTION CONSERVATION MEASURES

Bird and bat conservation measure that will be implemented during construction that relate to conservation include:

BBCM-9 **Road minimization.** Minimize permanent disturbance area such as creating unneeded access roads. The Gen-tie access road will serve as the main access road to SCE's switchyard. Construction of the gen-tie line and other linear features will avoid vegetation clearing, and grading whenever possible.

BBCM-10 **Vegetation clearing.** Vegetation within the Project footprint that will be disturbed will be cleared outside of the bird breeding season to the maximum extent practicable. If the Project plans vegetation removal within the bird breeding season (February 15- August 31 for passerines), it would be because desert tortoise (a federally and state threatened species) protection measures and timing may take precedence, or that reason for work to be completed during the breeding season were beyond the Applicant's control. When vegetation removal cannot take place outside of the breeding season the Lead Avian Biologist, or a person under their direct supervision, will be on site during construction activities to: locate active nests, establish exclusion zones around active nests, watch for new nesting activity; and if necessary stop, construction when noise and general activity threaten to disturb an active nest. All active nests of protected birds (e.g., MBTA, ESA, state protected) would not be disturbed until the nest is determined to be inactive by the Lead Avian Biologist. This BBCM corresponds to requirements contained within MM BIO-8 in the Project FSEIS (BLM 2013b).

BBCM-11 **Nest searching measures.** In areas with planned construction or other activities with potential to disturb nesting, surveys for avian nests will be conducted throughout the breeding season by the Avian Lead and Avian Biologists. A combination of full-coverage transect-based surveys and behavioral-based nest searches (Martin and Guepel 1993) will be used to locate nests active nests in the Project Site and surrounding 300-ft buffer. These nest searches will be continuous throughout the breeding season during the construction phase. The entire Project Site and buffer area should be covered at least once within 4 days prior to planned construction activities. Nest search surveys will contine within active construction areas at the discretion of the Project's Lead Avian Biologist.

Exclusion zones will be established around active nest sites. Details for specific exclusion zones for passerines, raptors and eagles are described in Section 4.4. Biological monitors working with construction crews will inspect work areas for nests and enforce exclusion zones found in the Project during construction and during nest searching efforts. This BBCS corresponds to requirements contained within MM BIO-8 in the Project FSEIS (BLM 2013).

BBCM-12 **Burrowing owl measures.** Within 30-days prior to initiation of construction, a burrowing owl survey will be conducted in the construction area and a 250-foot buffer. These surveys shall be performed using pedestrian transects spaced no greater than 20 meters apart. All burrows with burrowing owl sign will be observed by an Avian Biologist to determine occupancy. During the breeding season (February 1 to August 31), occupied burrows will not be disturbed. If an active nest is identified, there will be no construction activities within 250 feet of the nest to prevent isturbance until the chicks have fledged, as determined by a qualified biologist. The occurrence and location of any western burrowing owl will be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. Within 24 hours of all incidents of disturbance or harm to burrowing owls, the authorized biologist will report such incidents to the appropriate resource agencies (USFWS [Michael Burroughs 702 515-5230], BLM [Melanie Cota 702-515-5233], and NDOW [Christy Klinger 702-486-5127 ext 3717]). This BBCM corresponds to MM BIO-11 in the FSEIS (BLM 2013b).

BBCM-13 **Bat colonies.** Bat colonies have not been observed on site. However, in the event that a bat colony is found during pre-construction clearance surveys, the colony will be identified and clearly marked with an exclusion zone of at least 165 feet (50 meters). Whenever possible, these zones will be avoided by construction activities.

BBCM-14 **WEAP.** Discussions of nest avoidance for passerines, raptors, and golden eagles will be part of mandatory site training for all construction personnel and will be included in the Worker Environmental Awareness Plan (WEAP) training briefings. Bat colony avoidance discussions will be part of mandatory site training for all construction personnel and will also be included in WEAP training briefings. Training will include identification of exclusion zones and requirements for these zones.

BBCM-15 **Inclusion of APLIC guidelines.** The Project will follow APLIC guidelines for overhead utilities to the extent practicable (APLIC 2012) and reporting requirements.

BBCM-16 **Trash abatement.** During construction, all trash will be removed promptly and disposed of properly to avoid creating attractants for birds and bats. Trash and food items will be contained in closed, secured containers on site and removed

frequently to reduce the attractiveness to ravens and other opportunistic scavengers; regular litter pick-up schedule will be established within and around the perimeter of the Project site; all work vehicles will have a sufficient supply of durable garbage bags and closed containers to assist in collection of any refuse found on-site; trash and recycling bin locations will be selected to accommodate frequent pick up and removal and be able to be sealed completely to prevent encroachment by wildlife; and trash containers will be inspected daily by Biological Monitors (during construction and decommissioning). This BBCM corresponds to requirements within RMM-5 contained within the Silver State Solar South Raven Management Plan (Ironwood 2013)

BBCM-17 **Vegetation and Noxious Weeds.** Appropriate control measures will be implemented to prevent the introduction and spread of invasive plant species within and surrounding the Project Site. Only plants native to the area will be used seeding or planting during any required habitat revegetation and/or restoration efforts. A Noxious Weed Control Plan, corresponding to APM-9 in the FSEIS (BLM 2013b), will be developed and implemented.

BBCM-18 **Avian and Bat Fatality Monitoring.** An Avian and Bat Fatality Monitoring Plan (Appendix C) will be adopted. This plan will require monitoring and reporting of avian and bat fatalities. The project will apply for a Special Purpose Utility Permit (SPUT) through coordination with USFWS. This BBCM corresponds to MM BIO-10 in the FSEIS (BLM 2013b).

BBCM-19: **Removal of Hollow Plastic Mine Claim Markers**. Upon detection of an uncapped hollow plastic mine claim marker found within the Project area, construction personnel will inform an Avian Biologist or Biological Monitor and report the location of the marker. The Monitor or Coordinator will remove the marker and place it on the ground at the location from which it was removed. NDOW will be notified of any hollow plastic mine claim markers.

BBCM-20 **Additional avian and bat monitoring**. Additional avian and bat monitoring activities will be conducted as described in Section 5.0 of the BBCS.

BBCM-21 **Raven Management Plan**. A Raven Management Plan will be developed and implemented for the life of the Project (Ironwood 2012). The objectives of the RMP are to identifiy the Project-specific conditions of concern that may attract ravens to the Project site; provide specific measures intended to avoid, minimize, and/or mitigate raven impacts on desert tortoises; provide plans for monitoring raven activity at the Project site; specify plans for reporting frequency and content; and specify the conditions under which adaptive management measures will be selected and implemented, should the monitoring data suggest the original measures are not meeting Project goals in controlling local raven populations.

4.3.2 Operations and Maintenance

During the O&M phase of the Project, BBCMs will be enforced to reduce the attractiveness of the facility to breeding, migrating, and wintering birds and bats to ensure mortality is minimized:

BBCM-22 **Road kill management.** The Project will not create or maintain attraction features for birds and bats by removing and disposing of road kills near the Project that attracts raptors and other scavengers to the site, regularly removing vegetation around larger facilities such as substations to reduce raptor foraging, and eliminating open water sources after the construction phase of the Project.

BBCM-23 **Project Lighting.** The Project will minimize the use of lighting that could attract migrating birds and bats (feeding on concentrations of insects at lights). Lighting will be kept to the minimum level necessary for safety and security. High intensity, steady burning, bright lights such as sodium vapor or spotlights will not be used on Project facilities. Lighting will be motion-sensored where practicable and allowed by safety regulations. This BBCM corresponds to MM BIO-13 in the FEIS (BLM 2013b).

BBCM-24 **Anthropogenic noise.** The Project will minimize anthropogenic noise which been found to be potentially adverse for birds (e.g., Rheindt 2003, Brumm 2004, Parris and Schneider 2009) and bats (Schaub et al. 2008), though not all species are affected to the same degree (Brumm 2004). During the O&M phase, methods to buffer, muffle, or otherwise dampen any anthropogenic noise pollution that exceeds ambient noise will be considered and may serve as additional adaptive management measures.

4.3.3 Decomissioning

This BBCS is intended to provide bird and bat conservation measures applicable to the construction and operations and maintenance phases of the Project. Prior to decommissioning, a detailed decommissioning plan will be developed and bird and bat conservation measures specific to the decommissioning phase will be provided to the appropriate resource agencies at that time.

4.4 EXCLUSION ZONES

Exclusion zones will be established to protect active raptor and other bird nests, areas of high bird and bat use, and known bat roosts from disturbance related to the construction of the solar farm. Nest surveys will be conducted within 2 days prior to vegetation removal, construction activities, or any other activities with the potential to disturb nesting birds in order to locate any active nests, burrowing owl burrows, or bat roosts. Vegetation removal will occur outside of the breeding season for all protected bird and bats species to the maximum extent possible. If any active nests, roosts or burrows are located during these surveys, exclusion zones will be established by the Avian Lead in coordination with BLM.

Active bird nests shall be definied as nests containing at least one egg that is being incubated or belonging to a female in the process of laying. Inactive nests may be removed by the Avian Lead or Avian Biologists. The Lead Avian Biologist will be responsible for ensuring all exclusion zones are correctly established and Avian Biologists will monitor nest activity throughout the nesting cycle to determine potential disturbance level nest fate. Nest exclusion zones may be changed based on observed evidence of disturbance. The Avian Lead will also be responsible for managing the collection of data for these exclusion zones, nests, roosts and burrows.

4.4.1 Passerines

Exclusion distances for active passerine nests will be determined by the Lead Avian Biologist based on species, terrain, habitat type, and existing anthropogenic activity level as these features relate to the bird alert distance and bird flight initiation distance (Whitfield et al. 2008). Exclusion zones will initially be established upon discovery of an active nest minimum using a minimum 100-foot radius. Any changes in this minimum exclusion distance based on circumstances such as topography and type of construction activities would be determined by the Avian Lead. Nests will be checked within a week prior to construction to determine success and whether young have fledged. The exclusion zone boundary will not be removed until the Avian Lead has determined that the nest has failed or the young have fledged.

4.4.2 Raptors and Eagles

Project-related disturbances such as construction traffic, noise, lighting and dust will be avoided within 500 feet of an active raptor nest and within one mile of any active golden eagle nest. Recommendations for appropriate buffer distances to minimize disturbance vary by geographical location and by activity, but are not explicitly stated in current USFWS guidance (USFWS 2013). Any changes in this buffer distance based on conditions such as topography and type of construction activities would be determined by the Lead Biologist. All nests will be checked within a week prior to construction to determine nest success and whether young have fledged. The exclusion zone boundary will not be removed until the biological monitor has determined that the nest has failed or the young have fledged. Surveys for golden eagle nests will be conducted during each year of construction, both within and outside the nesting season. These surveys and subsequent monitoring of active nests will be completed in accordance with current USFWS guidance and protocols (USFWS 2010) under the Ground-based Golden Eagle Nest Surveys and Monitoring discussed below in Section 5.1.2.

4.4.3 Burrowing Owls

All active burrowing owl burrows will be avoided with a 250-ft radius exclusion zone during the nesting season (February 1 – August 31st). All occupied burrows outside or adjacent to construction areas will be avoided with an exclusion of 165 feet during the non-breeding season (Sept 1-January 31). Any changes to these exclusion distances, based on circumstances such as topography and type of construction activities, would be determined by the Lead Biologist. Nests will be observed by an Avian

Biologist at least one week prior to construction or other activities with the potential to disturb the nest to determine success and whether young have fledged. The exclusion zone boundary will not be removed until the biological monitor has determined that the nest has failed or the young have fledged. Outside the nesting season or after determining a nest has failed or young have fledged, owls will be passively relocated after approval of specific methods by NDOW and BLM. Passive relocation will include:

- Identifying suitable relocation sites within one mile of the Project;
- Creating or enhancing at least two natural or artificial burrows per relocated owl;
- Passively relocating burrowing owls using accepted methods for excluding owls from burrows such as one-way doors or otherwise ensuring owls are not in burrows while burrows are collapsed; and
- Monitoring and reporting the results of the passive relocation including the number and original location of each owl, and known additional locations for each individual.

4.4.4 Bats

Construction activities will avoid any bat roost sites, maternity colonies, or hibernacula found during clearance surveys. Appropriate exclusion distances will be established by the Lead Bat Biologist in consideration of the disturbance type, distance to roost or hibernacula, time of year of, and the duration of the disturbance.

5.0 CONSTRUCTION AND POST-CONSTRUCTION MONITORING

A bird and bat monitoring program will continue to be implemented throughout the construction and for at least one year post construction, as specified below. The ongoing monitoring will inform adaptive management decisions regarding and additional appropriate and practicable BBCMs to avoid, minimize, and mitigation observed impacts to bird and bats on the Project Site and vicinity.

5.1 CONTINUATION OF BASELINE DATA SURVEYS

The following surveys conducted for the acquisition of baseline data will be continued during the Construction and Post-construction phases of the Project with modifications as described below.

5.1.1 Avian Point Counts

Avian point counts will continue to be conducted at the 64 sampling stations used during baseline surveys. Based on statistical power analyses discussed in Section 2.4.1, additional sampling stations will be needed in order to have sufficient likelihood of detecting meaningful changes in total avian density and detections per survey per point. Sixty-four additional sampling stations will be placed throughout the Study Area. The new points will be randomly placed on the landscape and stratified by the vegetation types described in Section 2.1. Existing points will be classified within these same vegetation types. These point count data are expected to provide a means of tracking temporal changes in avian density and occurrences throughout the progression of the project. During the construction phase and for the first one year post construction, point counts will continue to be conducted once per season in the spring, fall, and winter during the same weeks they were conducted in the pre-construction phase. Density estimates and detection data from the post-construction point counts may be used in conjunction with the data from the Avian Mortality Monitoring Plan to identify species with mortality risk disproportionate to their local population size.

5.1.2 Ground-based Golden Eagle Nest Searching and Monitoring

Golden eagle nest survey and monitoring will continue during the construction phase and for the first one year post construction. During the peak of each breeding season throughout the construction phase, an inventory of all golden eagle territories within 10 miles of Project facilities will be conducted to determine whether any territory is occupied (USFWS 2010). Potential golden eagle nesting habitat within 10 miles of the Project Site will be searched on foot for new active nests and to check historical nests. Data collected during the inventory shall include:

- Territory status (unknown, vacant, occupied, breeding successful, breeding unsuccessful);
- Nest location;
- Nest elevation;
- Age class of golden eagles observed;
- Nesting chronology; number of young at each visit;

- Digital photographs;
- Substrate upon which nest is placed; and
- Nesting status (active/nonactive and productivity).

If an occupied nest is detected during construction within 10 miles of any Project component, the Applicant will coordinate with BLM, USFWS, and NDOW for the duration of construction to ensure that construction activities do not result in injury or disturbance to golden eagles (USFWS 2010).

5.1.3 Incidental Sightings of Special Status Species and Fatalities

Throughout the construction phase of the Project, all incidental sightings of special-status bird and bat species and fatalities of all species will be recorded by Biological Monitors and Avian Biologists. Additionally, other non-biological project personnel will be instructed during the required WEAP training to report all observation of species fatalities to a Biological Monitor, Avian Biologist, or Avian Lead. All fatalities recorded during construction will be reported to the resource agencies. The Lead Avian Biologist will be responsible for keeping records and reporting these data. Incidental data would not be used in quantitative analysis; rather these data would be reviewed for evidence of general changes in species composition that could warrant more focused evaluation.

5.2 CONSTRUCTION AND POST-CONSTRUCTION MONITORING

To provide data on potential impacts to bird and bat resources during the construction and post-construction phases of the Project, additional monitoring efforts will be implemented as described below. Monitoring activities related to common raven management are described in the Silver State Solar South Raven Management Plan (Ironwood 2013).

5.2.1 Passerine Nest Surveys and Monitoring

Nest surveys and monitoring activities for passerine species are described above in Section 4.3 by BBCM-11.

5.2.2 Raptor Nest Surveys and Monitoring

In addition to the golden eagle-specific nest searching and monitoring described in Section 5.1.2, surveys and monitoring for other raptor nests within the Project Site and a 1-mile buffer will be performed during the construction phase of the project. These surveys will be conducted once per month during the raptor breeding season (February 1 to August 31) and will entail inspecting all potential structures and trees within the Project site and 1 mile buffer for the presence of raptor nests. Active raptor nests will be monitored twice per month to determine nest fate and make behavioral observations to evaluate the effectiveness of any associated exclusion zones.

5.2.3 Long-sit Migration Surveys/Eagle Counts

As recommended by USFWS Eagle Conservation Plan Guidance (USFWS 2013), long-sit migration surveys will be conducted in order to characterize non-breeding season golden eagle and raptor use of the Study Area during the construction phase and for one year post-construction. These surveys will be conducted once per week from September to December at two locations immediately adjacent to the Project Site. The survey locations will be consistent among years, and 1) allow wide expanse of observation area from a single point with visibility of the surrounding airspace, at topographic funnels or corridors such as ridges, cliff rims, or saddles in mountains; 2) be away from public view; and 3) afford a location where topographic and biological features are likely to be used by raptors during migration. Migration surveys are conducted weekly from each observation survey point from 15 March through 31 May (spring migration) and from 1 September through 15 November (fall migration). The survey will consist of an Avian Biologist remaining at a single survey point for 5 consecutive hours, recording all avian species observed passing through the survey area. Data will be collected on species, behavior (i.e. flying, foraging, perching), estimated distance from observed, estimated height off ground, flight directions, and weather conditions (USFWS 2013). Additionally, observers will record incidental observation of passerine species in order to characterize migratory bird use of the Study Area. The long-sit migration surveys are intended to replace the golden eagle point counts, used for establishing baseline conditions and conducted from 2012-2013.

5.2.4 Avian Mortality Monitoring Plan

Appendix C provides details of the avian and bat fatality study to be conducted during the post-construction phase of the project. This study will be implemented for two years post-construction with the potential for a third year contigent upon the findings from the first two years of surveys. Data and results of the study will be used to inform adaptive management decisions and serve as a basis for avian fatality comparisons across other regional renewable energy projects.

5.3 RISK ASSESSMENT VALIDATION

Using data collected throughout this process, the Applicant will attempt to validate the identified risks of the Project. The validation process will use data from the baseline surveys and ongoing monitoring to evaluate if the implemented conservation measures are adequately minimizing impacts to bird and bat resources to the maximum extent practicable, and if additional and appropriate conservation measures would likely further reduce avian and bat mortality rates.

Updates on risk assessment validation will be made during each annual report as described in Section 6.0.

5.4 ADAPTIVE MANAGEMENT

Silver State Solar Power South LLC has implemented adaptive management at the Project throughout pre-construction baseline data collection efforts and during project planning and siting. Adaptive management measures will be implemented during construction and for 1-3 years post-construction. This adaptive management approach will include the following six key concepts described by Williams and Brown (2012):

- Problem Assessment
- Design
- Implementation
- Monitoring
- Evaluation
- Adjustment

The Project will submit mortality survey results to the regulatory agencies on a quarterly basis. The BLM, in consultation with the Project Owner, USFWS and NDOW, will discuss the findings. Further avian and bat mortality monitoring for up to three years post-construciton may be implemented to help understand impacts.

Post-construction decision making is complex and the results of action implementation may require several years of assessment before results are apparent. It is important for stakeholders and resource managers to incorporate statistically sound modeling into any iterative feedback cycle prior to implementation of additional or modified control measures (Williams and Brown 2012).

After end of first year of post construction monitoring, the Project Owner will coordinate with BLM, NDOW, and USFWS to determine if additional monitoring would be required. If additional monitoring is required, triggers and thresholds for additional adaptive management measures will be established at that time.

6.0 REPORTING

Quarterly e-mail summaries of all biological monitoring activities will be submitted to BLM, USFWS, and NDOW by the Avian Lead. A specific section of these quarterly reports will document results of the avian and bat fatality study. The reports may also include recommendations for possible adaptive management actions.

On or before January 15th of each calendar year during the construction phase and for the first 1-3 years post-construction, an annual report will be submitted to the BLM that summarizes all avian and bat monitoring activities sufficient for the BLM to provide necessary reporting to the USFWS and NDOW in their annual permitting report, due on or before February 1 of each year. This annual report will summarize all quarterly reports and be submitted via e-mail and hard copy by the Avian Lead.

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Appendix A. List of Bird Species Observed at Silver State Solar South and Vicinity, 2011-2013

Common Name	Scientific Name	Sign
American Kestrel	*Falco sparverius*	O
Anna's Hummingbird	*Calypte anna*	O
Ash-throated Flycatcher	*Myiarchus cinerascens*	O,V
Barn Swallow	*Hirundo rustica*	O
Blue-Gray Gnatcatcher	*Polioptila caerulea*	O,V
Black-headed Grosbeak	*Pheucticus melanocephalus*	O
Brewers Sparrow	*Spizella breweri*	O,V
Broad-tailed Hummingbird	*Selasphorus platycercus*	O
Black-tailed Gnatcatcher	*Polioptila melanura*	O,V
Black-throated Sparrow	*Amphispiza bilineata*	O,V
Bullock's Oriole	*Icterus bullockii*	O
Burrowing Owl	*Athene cunicularia*	S
Cactus Wren	*Campylorhynchus brunneicapillus*	O,V,N
Canyon Wren	*Catherpes mexicanus*	V
Chipping Sparrow	*Spizella passerina*	V
Cliff Swallow	*Petrochelidon pyrrhonota*	O,V
Coopers Hawk	*Accipiter cooperii*	I
Common Raven	*Corvus corax*	O,V
Crissal Thrasher	*Toxostoma crissale*	
Golden Eagle	*Aquila chrysaetos*	O
Gray Flycatcher	*Empidonax wrightii*	V
Greater Roadrunner	*Geococcyx californianus*	V
Horned Lark	*Eremophila alpestris*	O,V
House Finch	*Carpodacus mexicanus*	O,V
House Wren	*Troglodytes aedon*	I
Ladder-backed Woodpecker	*Picoides scalaris*	O,V
Le Conte’s Thrasher	*Toxostoma lecontei*	O,V,N
Lesser Goldfinch	*Carduelis psaltria*	O,V
Lesser Nighthawk	*Chordeiles acutipennis*	O,V
Loggerhead Shrike	*Lanius ludovicianus*	O,V
Northern Flicker	*Colaptes auratus*	I
Mourning Dove	*Zenaida macroura*	O
Northern Harrier	*Circus cyaneus*	O

Common Name	Scientific Name	Sign
Northern Mockingbird	*Mimus polyglottos*	V
Osprey	*Pandion haliaetus*	I
Peregrine Falcon	*Falco peregrinus*	I
Phainopepla	*Phainopepla nitens*	O,V
Prairie Falcon	*Falco mexicanus*	I
Pine Siskin	*Spinus pinus*	O,V
Red-tailed Hawk	*Buteo jamaicensis*	O,V,N
Rock Wren	*Salpinctes obsoletus*	O,V
Ruby-crowned Kinglet	*Regulus calendula*	V
Sage Sparrow	*Amphispiza belli*	O,V
Sage Thrasher	*Oreoscoptes montanus*	I
Say's Phoebe	*Sayornis saya*	O,V
Scott's Oriole	*Icterus parisorum*	O,V
Sharp-shinned Hawk	*Accipiter striatus*	I
Tree Swallow	*Tachycineta bicolor*	I
Turkey Vulture	*Cathartes aura*	O
Verdin	*Auriparus flaviceps*	O,V,N
Violet-green Swallow	*Tachycineta thalassina*	O
Western Kingbird	*Tyrannus verticalis*	O
Western Meadowlark	*Sturnella neglecta*	I
Western Tanager	*Piranga ludoviciana*	O
White-crowned Sparrow	*Zonotrichia leucophrys*	O,V
White-throated Swift	*Aeronautes saxatalis*	O,V
Wilson's Warbler	*Wilsonia pusilla*	O,V
Yellow-rumped Warbler	*Dendroica coronata*	O,V
Yellow Warbler	*Setophaga petechia*	O

O – Observed Directly
V – Vocalization
N – Nest
I – Incidental Observation (not made during point count survey)
S—Sign (Burrowing Owl)

Appendix B. Summary of special status species occurrences, Silver State Solar South, 2011-2013

Species	Number of Observations		
	Fall (Sep-Nov)	Winter (Dec-Feb)	Spring (Mar-May)
Brewer's Sparrow	0	0	14
Burrowing Owl (burrows with sign)	4	0	4
Crissal Thrasher	0	0	2
Golden Eagle	0	2	2
Le Conte's Thrasher	5	0	25
Loggerhead Shrike	12	0	16
Long-eared Owl	1	0	0
Northern Harrier	4	0	0
Phainopepla	6	0	16
Prairie Falcon	0	0	1

Appendix C. Avian and Bat Mortality Monitoring Plan

Silver State Solar South Avian and Bat Mortality Monitoring Plan

Prepared for:

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1.0 OVERVIEW

Silver State Solar South Project (hereafter; Silver State or Project) is a solar power generating facility proposed by Silver State Solar Power South, LLC, in unincorporated Clark County, NV, near the interstate boundary of California and Nevada, east of Primm, NV (Figure 1). Silver State is anticipated to have a final development footprint of 2,427 acres, located on Bureau of Land Management (BLM) administered lands outside the boundaries of existing BLM Area of Critical Concern (ACEC) and Desert Wildlife Management Area (DWMA), and wilderness areas.

When complete, Silver State will include 1) a 250 MW fixed panel PV array solar farm with associated operations and maintenance buildings, 2) a 220kV on-site substation, and 3) approximately 1 mile of 220kv overhead interconnect to the existing Eldorado to Ivanpah transmission line.

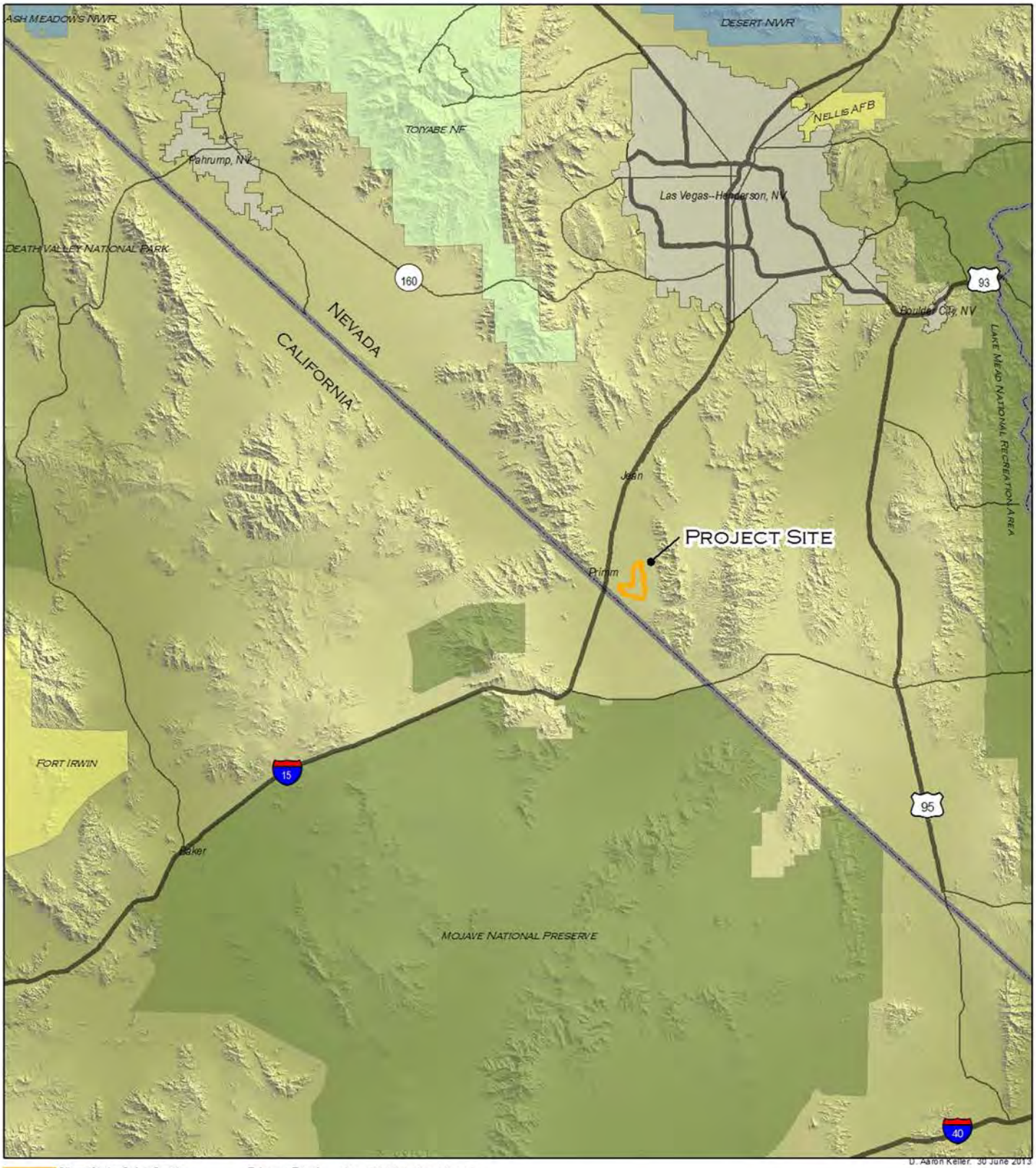
Some Project feature may present a potential risk for injury and mortality to birds and bats. Prerequisite to issuance of a right-of-way (ROW) permit (NVN-089530, NVN-085801, NVN-090050, NVN-090823), BLM requires a Bird Monitoring and Avoidance Plan (BMAP) to be developed in consultation with and approved by U.S. Fish and Wildlife Service (FWS) as a component of the Bird and Bat Conservation Strategy (BBCS). The avoidance component of the BMAP is addressed within the Risk Analysis segment of the BBCS and the monitoring component is presented herein, as the Avian and Bat Mortality Monitoring Plan (AMMP).

This AMMP will standardize the documentation of bird injuries and potential fatalities that may be associated with the development of Silver State and quantitatively estimate avian fatality at the facility once the Project is complete. The plan's design incorporates guidelines developed for the electric utility industries to mitigate the potential risks to birds and bats by the development of energy infrastructure such as wind turbines, transmission lines and solar panels. It includes survey protocols that:

- schedule carcass searches;
- describe a spatial and temporal sampling plan;
- detail methods for handling dead or injured birds and bats;
- specify the data to be collected;
- specify reporting procedures.

The AMMP also includes components that:

- validate the spatial and temporal sampling plan;
- correct for searcher efficiency;
- estimate carcass removal rates.



D. Aaron Keller. 30 June 2013

Silver State Solar South
State Boundary
Primary Road
Secondary Road
Urban Area

Non-BLM Federal Lands
Department of Defense
USFWS
USFS
NPS

N

0 5 10 20 30 Miles
1:750,000
1 in = 12 miles

FIGURE 1 - REGIONAL SETTING

SILVER STATE SOLAR SOUTH | CLARK COUNTY, NEVADA

2.0 OBJECTIVES

The primary objective of the AMMP is to provide information used to assess the level of potential impact from the solar facility on birds and bats, and to determine the need, if any, for impact reduction measures supplmental to those contained in the BBCS. This will be achieved by implementing an avian and bat fatality monitoring program at the facility that consists of standard carcass searches to record carcasses, and bias trials to adjust the observed carcass counts for detection and scavenging rates. Analyses will be conducted to:

- quantify bird and bat fatalities
- quantify fatalitesof species of concern
- if sufficient data are available, compare fatality rates at Silver State with those of existing projects with similar site characteristics and species composition
- use data from ongoing point count surveys to compare recorded fatalities with the species composition (resident and migrant) at the site.

Actual numbers of fatalities will be quantified and reported. The sampling design will estimate fatality rates with a high level of precision. Fatality rates will be reported with a confidence interval.

3.0 PROJECT SITE DESCRIPTION

3.1 ENVIRONMENTAL SETTING

Silver State is located in the Ivanpah Valley, within the Mojave Desert bioregion on undeveloped gentle slopes between 2600 feet and 3500 feet in elevation at the base of the Lucy Gray Mountains, intersected by numerous alluvial dry washes, which drain to Roach Dry Lake to the north and Ivanpah Dry Lake to the south. Streams, washes and playas are dry most of the year, with surface water present only following storm events. The most prevalent vegetation communities are dominated by creosote bush (*Larrea tridentata*) and white burro bush (*Ambrosia dumosa*).

Anthropogenic features are found throughout the Ivanpah Valley, but are concentrated near developed areas associated with Primm, NV. The existing casinos, restaurants, outlet mall, gas stations and other facilities (located within 1.5 miles of the Project boundary) represent the core area of human activity within the valley.

Water bodies within arid landscapes are attractants for many species of migratory birds. Although the Project Site contains no persistent natural surface water two sources of surface water are present within the vicinity of the site: 1) the Walter M Higgins NV Engergy Generating Facility has an assoicated suface pond located adjacent to the Project Site and 2) the Primm Valley Golf Course, located south of Primm and within 4 miles of the Project, contains water features and large mature trees that may be used by birds for roosting and/or nesting. Temporary artificial ponds with associated exclusion fencing, constructed on the Project site to provide construction water for the Silver State solar project may

present a potential avian hazard during construction. These ponds will be removed at completion of construction.

3.2 SITE DEVELOPMENT

The solar facility will be composed of PV arrays mounted on fixed-tilt mounting systems, supported on metal posts within approximately $2m^2$ of bare, compacted ground and connected in rows of uniform length and height. High-voltage (34.5 kV) collection lines will transfer power output from the PV arrays to the onsite substation via overhead lines supported by approximately 16m-tall wooden poles. The 1-mile long Gen Tie Line, will consist of steel monopoles approximately 40m-tall and spaced approximately 300m apart, and will occupy a 49m-wide transmission ROW connecting the on-site substation to a Southern California Edison (SCE) switchyard and related facilities (loop-in lines, telecommunications site, microwave site, fiber optic installation and separate access road) located adjacent to the Eldorado-Ivanpah Transmission Project (EITP).

Ancillary features will include approximately 21 miles of new access roads, a 1.4m high chain-link perimeter fence, a 3 mile long security perimeter road, and buildings for operations, maintenance, and security personnel.

3.3. AVIAN AND BAT USE OF SILVER STATE

Baseline pre-construction avian surveys collected data in spring seasons of 2008, 2009 and 2011, and in 2012 (Ironwood Consulting). Observed avian use of the project was typical of other creosote-scrub and playa desert communities. Avian surveys and incidental detections have documented 59 bird species within the Project Study Area, including 10 special-status species. An additional 4 special status avian species were not detected within the Project Study Area but were determined to have moderate potential for occurrence: ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), western snowy plover (*Charadrius alexandrines nivosus*), and Bendire's thrasher (*Toxostoma bendirei*) (Table 1).

Table 1. Special status avian species.

Scientific Name	Common Name	Status	Occurrence within Study Area
Aquila chrysaetos	golden eagle	BLM: Sensitive IUCN: LC	**Present – Resident** Nesting habitat absent within Project alternatives, but 5 historical abandoned nests and one active (2013) nest located within 5mile buffer. Foraging habitat present.
Asio otus	long-eared owl	BLM: Sensitive IUCN: LC	**Present—Possible Resident** One individual observed adjacent to site during non-breeding season. No observations of breeding individuals.
Athene cunicularia	western burrowing owl	BLM: Sensitive IUCN: LC USFWS:BCC	**Present – Likely Resident** Four observation of burrowing with owl sign during surveys. May be present throughout year. Nesting habitat present.
Buteo regalis	ferruginous hawk	BLM: Sensitive IUCN: LC USFWS:BCC	**Not observed – Low Potential** Nesting habitat absent. May use site vicinity for overwintering.

Scientific Name	Common Name	Status	Occurrence within Study Area
Buteo swainsoni	Swainson's hawk	BLM: Sensitive IUCN: LC USFWS:BCC	**Not observed—Likely Migrant** Not observed on site, but two individuals were observed in migration approximately 5 miles west of the site in 2011. Nesting habitat absent. May be present (foraging) during summer and fall during migration.
Charadrius alexandrinus nivosus	western snowy plover	BLM: Sensitive ESA: Threatened USFWS:BCC	**Not observed – Low Potential** May be a rare migrant to Ivanpah Dry Lake during winter months.
Falco mexicanus	prairie falcon	BLM: Sensitive IUCN: LC USFWS:BCC	**Present – Foraging** One individual observed on site. Foraging habitat present. Nesting substrate present in the Project Site in the form of transmission towers.
Falco peregrinus anatum	peregrine falcon	BLM: Sensitive NDOW: SE USFWS:BCC	**Present – Migration** Known to be present in area during migration from 4 observations made approximately 5 miles southwest of site. Known to be present and breeding in the area year-round in the South Spring Mountains and MuCullough Mountains. Nesting habitat absent from site. Nesting habitat absent from site.
Lanius ludovicianus	loggerhead shrike	BLM: Sensitive NDOW: SS IUCN: NT USFWS:BCC	**Present –Resident** Individuals have been observed on the Project Site throughout the year. Common on site.
Phainopepla nitans	phainopepla	BLM: Sensitive IUCN:LC	**Present—Resident** Observed on site during breeding season. Nesting habitat present.
Spizella breweri	Brewer's sparrow	BLM:Sensitive NDOW: SS IUCN: LC	**Present—Resident** Observed on the Project Site.
Toxostoma bendirei	Bendire's thrasher	BLM: Sensitive IUCN: VU USFWS:BCC	**Not observed - Moderate Potential** Nesting habitat present.
Toxostoma crissale	crissal thrasher	BLM: Sensitive IUCN: LC USFWS:BCC	**Present—Possible resident** One individual has been observed on the site, mid-March 2013.
Toxostoma lecontei	Le Conte's thrasher	BLM: Sensitive IUCN: LC USFWS:BCC	**Present –Resident** Individuals have been observed on the Project Site throughout the year. Nesting habitat present.

NDOW- Nevada Department of Wildlife
SE – State Endangered
SS – State Sensitive
USFWS - Fish and Wildlife Service
BCC - Birds of Conservation Concern

IUCN - International Union for Conservation of Nature
LC – Least Concern
NT – Near Threatened
VU – Vulnerable

Black-throated Sparrow, Common Raven House Finch Horned Lark, and Rock Wren were the most common species detected.

As the primary avian scavenger in the area, Common Ravens have the potential to influence carcass removal rates. A Raven Management Plan has been prepared for the project (Ironwood Consulting 2013) and will be implemented to minimize site-wide occurrence of Common Ravens. Ravens occur throughout the site in low numbers and are relatively common in the area and may be attracted to the area from nearby Primm; where Ravens are heavily subsidized by the presence of humans.

Bat surveys have not been conducted on the Project Site. A review of existing data pertaining to the vicinity of the Project Site (Brown 2011) and region (Tetra Tech 2012) revealed 16 bat species with potential to occur within the Project Site. Species were included in this list if they had been observed

during at least one of the two referenced studies and were determined to have potential for occurrence on the project site. No mines are located within the Project Study Area.

Table 2. Bat species with potential for occurrence on Project Site.

SPECIES	STATUS		OCCURRENCE
Antrozous pallidus Pallid bat	Federal: BLM: NDOW:	SOSC sensitive SP	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Observed within 5 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Corynorhinus townsendii Townsend's big-eared bat	Federal: BLM: NDOW:	SOSC sensitive SS	Low potential for occurrence. Large cavities for roosting and hibernation not located within Study Area. No observations from referenced studies (Brown 2011, Tetra Tech 2012).
Eptesicus fuscus big brown bat	Federal: BLM: NDOW:	none none none	Some potential to occur on site based on observations year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Eumops perotis californicus greater western mastiff bat	Federal: BLM: NDOW:	SOSC none SS	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Lasiurus blossevillii western red bat	Federal: BLM: NDOW:	none sensitive SS	Potential to ocurr on site during migration. Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Lasiurus cinereus *Hoary bat*	Federal: BLM: NDOW:	none none none	Observed during migration at Primm Valley Golf Course within 4 miles of the site (Brown 2011). Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Lasionycteris noctivagans silver-haired bat	Federal: BLM: NDOW:	none none none	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Macrotus californicus California leaf-nosed bat	Federal: BLM: NDOW:	SOSC none SS	Some potential to occur on site based on observations year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis californicus California myotis	Federal: BLM: NDOW:	none none none	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Has been detected within 5 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis ciliolabrum western small-footed myotis bat	Federal: BLM: NDOW:	SOSC sensitive none	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Has been detected within 5 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis thysanodes fringed myotis	Federal: BLM: NDOW:	SOSC sensitive SP	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Myotis yumanensis Yuma myotis bat	Federal: BLM: NDOW:	SOSC sensitive none	Moderate potential to occur. Individuals were detected near Primm Valley Golf Course within 4 miles of site (Brown 2011). Observed year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).

SPECIES	STATUS		OCCURRENCE
Nyctinomops femorosaccus pocketed free-tailed bat	Federal: BLM: NDOW:	none none none	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Nyctinomops macrotis big free-tailed bat	Federal: BLM: NDOW:	SOSC none none	Observed during migration at Searchlight Wind Energy Project site (Tetra Tech 2012).
Parastrellus hesperus western pipistrelle	Federal: BLM: NDOW:	None none none	Some potential to occur on site based on observations year-round at Searchlight Wind Energy Project site (Tetra Tech 2012).
Tadarida brasiliensis Brazilian free-tailed Bat	Federal: BLM: NDOW:	none sensitive SP	Moderate potential to occur within rocky substrate in upper elevations of the Study Area. Has been detected within 5 miles of site (Brown 2011)

FWS - U.S. Fish and Wildlife Service
NNHP - Nevada Natural Heritage Program
MSHCP –Clark County Multiple Species Habitat Conservation Plan
Protected - NRS 501

FWS Classification
SOSC- Species of Special Concern

NDOW Classification
SS- State Sensitive
SP- State Protected

Data from large solar arrays in California suggest there is very low bat mortality ratesassociated with PV projects. For example, the Desert Sunlight Solar Project recorded approximately 75 bird carcasses within an approximate 4,000 acre site over a two-year period (September 2011 through August 2013), while only a single bat carcass (Pallid bat, unknown causes, undeveloped desert) was identified over the same period. (Ironwood Consulting unpublished data, 2013).

4.0 SURVEY METHODS

Few avian and bat fatality studies have been conducted at large-scale PV solar facilities since few of those facilities have been completed. Most post-construction mortality studies for renewable energy projects to date have been conducted on wind energy facilities. Additionally, although FWS has issued monitoring guidance for wind energy projects, similar guidelines for solar projects have yet to be completed.

4.1 SPATIAL CONSIDERATIONS

Sample spatial designs for estimating post-construction impacts to birds and bats at wind-energy projects assume irregular distribution of injured birds (concentrations proximal to very tall turbines).

The comparatively uniform distribution of potential hazards in a PV installation (low installed height on relatively flat terrain), coupled with incidental observations from a small number of existing large-scale PV installations, suggests the potential for a more random distribution of avian mortality from a broader species spectrum across a PV project such as Silver State. This uniformity encourages a simple spatial sampling method constrained only by the physical layout of the installed panels and the limits of observer acuity. Statistical simulations conducted by Western Ecosystem Technology Inc. (Western Ecosystems Technology 2011) to understand the expected precision for the nearby Ivanpah solar project suggests that a sample of between 10% and 20% of the solar arrays should lead to reasonable precision in the fatality estimates.

- During the first year, the AMMP will sample 25% of project components including: solar arrays, perimeter fence and overhead powerlines, once construction activities at the facility have been completed. After one year, sampling effort will be re-evaluated and scaled back if appropriate. Sampling effort can be assessed by re-sampling subsets of the monitoring data and calculating variance in the estimates. Variance will decrease as sampling intensity increases up to a point; at this point, additional sampling does not improve the precision of the estimate.
- Carcass detection rates and precision will be assessed following the first round of searcher efficiency trials, and these data will be used to inform a sample size equivalent to 25% of Project components as described in section 4.3.

4.2 TEMPORAL CONSIDERATIONS

The length of time for which carcasses persist in the environment varies according to factors such as specimen size, weather, and scavenging; with larger carcasses persisting for several weeks and smaller carcasses often being removed from the environment within days (FWS 2012). Data from wind energy projects in the Mojave Desert (Chatfield et al. 2009, 2010; Thompson and Bay 2012) suggest average carcass persistence times of 29 days and 10 days for large and small birds respectively. However, a uniform, arid solar field mostly covered with PV panels, within a region supporting low avian abundance, and surrounded by a chain-link fence offers minimal foraging habitat for avian scavengers (mostly Ravens) and may reduce opportunities for terrestrial scavengers (mostly kit fox and coyote). The Silver State Solar Raven Management Plan will further deter avian scavenging and support a longer search interval.

Preliminary incidental data from Desert Sunlight (Ironwood Consulting, Appendix 2) supports reduced survey frequency from December through February due to corresponding seasonal reductions in transient avian movements during winter. Survey intervals will be based on the results of carcass removal trials (see Section 5.4). The BLM will be notified as soon as surveys intervals have been decided in order to provide justification for the determination.

Survey days will be spaced approximately evenly within interval periods to eliminate bias from irregular peak avian events that occur in response to meteorological and lunar conditions, and migratory pulses.

Results will be analyzed after the first quarter, and then after every quarter thereafter for the duration of the monitoring effort, in order to validate the search effort and adjust (if necessary) survey intervals to account for carcass persistence assumptions.

4.3 PROJECT COMPONENT SURVEY METHODOLOGIES

Surveys will occur within the solar arrays, under overhead power lines, and along the perimeter fence. Surface ponds are temporary during the construction phase and, therefore, will not be surveyed as part of this AMMP during the post-construction phase. The surface ponds will be monitored daily during the construction phase as specified in the BBCS. Project components surveyed as part of the AMMP may change as a result of ongoing agency consultation

4.3.1 Solar Arrays

PV modules are installed on an elevated rack support system mounted on metal posts which are driven into the ground, forming rows approximately 70m long and 3m wide, with a minimum height of approximately 1.5m. Rows are grouped into arrays which cover approximately 6-7 acres. Pedestrian access between rows is a simple unobstructed linear path, and trial surveys conducted by Ironwood Consulting at Desert Sunlight Solar Farm (Desert Center CA) indicated surveyors can accurately sample an 8m wide belt transect in one pass.

4.3.2 Overhead Power Lines

Overhead power lines present a potential collision threat both inside the solar farm, where 34.5kV lines connect array blocks to the onsite substation, and outside the solar farm, where a 220kV line transmits energy to the SCE switch yard. Distribution of birds killed or injured as a result of colliding with overhead lines depends on several factors, including species, flight speed, wind and height of the lines above ground. Overhead lines within the solar farm are typically suspended on wood poles (>16m high) alongside access roads where an absence of vegetation enhances search detections, but along the Gen Tie line, taller (>40m) monopole support structures spaced more widely (>275m) over uneven terrain and vegetative cover will reduce sample efficiency. To account for these differences:

- Surveys of overhead lines within the solar farm be conducted as a transect centered at 7m on each side of the line – surveyed as one return trip over a segment of distribution line the full length of an array. The nominal width of each transect will be 10m.
- The Gen-tie line will be divided into 20 segments of equal length.
- A start segment will be randomly selected and the sample area will be comprised of 2-4 stratified segments.
- Stratified random sampling will provide spatial representation of the site.
- Surveys along the Gen-tie line will be conducted as a 40m wide belt transect with passes centered 10m apart (at 5m and 15m respectively) on each side of the line.

4.3.3 Perimeter Fence

Silver State is bounded by 3 miles of 1.4m-high chain-link security fence. Fences that interrupt unbroken, open expanses, with few intervening obstacles present a potential collision threat to flying birds; especially in low-light conditions. The nature of the barrier results in associated fatalities remaining close to the fence, a phenomonen that supports high search efficiency from a relatively narrow search transect. This search will be conducted for at least one year to determine if longer term monitoring is necessary.

- The perimeter fence will be divided into 20 segments of equal length. A start segment will be randomly selected and the sample area will be comprised of 2-4 stratified segments.Stratified random sampling will provide spatial representation of the site.
- Surveys of perimeter fencing will be conducted as a two 10m wide transects. One transect will be centered 5m from the fence line, outside of the project footprint and the second transect will be centered 5m from the fence line inside the project footprint. Surveyors will search 5m on either side of the transect line. Both transects will cover the same predetermined segments.

5.0 SURVEY PROTOCOL

The sampling design is intended to optimize efficiency and spatial coverage of the study site. Good spatial coverage is important because it is unknown whether fatalities may be spatially heterogeneous due to landscape/habitat factors, or edge effects; or at what scale (project, block or array) edge effects may be a factor.

The following terminology is useful for describing the spatial sampling design that will be used to monitor the solar arrays for fatalities:

1) Module: an engineered PV cartridge assembly installed as a single unit (approximately 1.22 x 0.61 m or 4 x 2 ft)

2) Row: a collection of modules arranged side by side on a common, linear support structure (table) (approximately 71-73 m or 232-240 ft long)

3) Subsection: a collection of rows surrounded on all sides by open access routes; dimensions are uniform within blocks but vary slightly among blocks (dimensions are on the order of 71-73 x 84-87 m or 232-240 x 274-288 ft)

4) Array: a collection of four subsections connected to a common power converter station (PCS) and transformer, encompassing 2.4–2.8 ha (6–7 acres), depending on subsection dimensions and spacing between subsections. It is the sampling unit for analyses (n = 192 total units in the Solar Farm)

Assuming 20 rows of modules in a subsection, each array consists of approximately 20 x 71 x 4 = 5,680 meters of 4-m wide strips between rows (figure 1), plus about 350 m of interior roads between subsections. Based on the disk and roll site preparation, it is assumed an observer can detect a small bird out to a range of 20 m and will be tested as part of the study design.

5.1 CARCASS SEARCHES

Searchers will walk transects that are perpendicularly oriented with respect to the rows, and that follow interior subsection edges within each array (Figure 1).

Searchers will look down each row in turn for carcasses. Searchers will carry binoculars to aide identification of carcasses. This system will produce coverage of 20 rows x 20 m x 4 subsections = 1600 meters (14%) of the strips between rows. This sampling strategy will allow searchers to search every array on the property. In addition, the broad spatial acreage increases the chances of detecting a large but localized mortality event. For statistical purposes, sampling units will be whole arrays.

The proposed design is a distance-sampling design. To complete a distance sample a searcher walks a transect and records the distance from transect to all observed carcasses. Two important assumptions required for distance sampling are 1) that the probability of detection along the transect (0 m from the observer) is 1.0, and 2) that the probability of carcass presence is uniform along the transect. Detection is assumed to decrease as a function of distance from the transect, and the analysis of distance sampling involves estimating the function, p(x), that describes how probability of detection (p) varies with distance from the transect (x). It is then possible to calculate the number of carcasses that were not detected, based on the prevalence and distribution of carcasses that were detected.

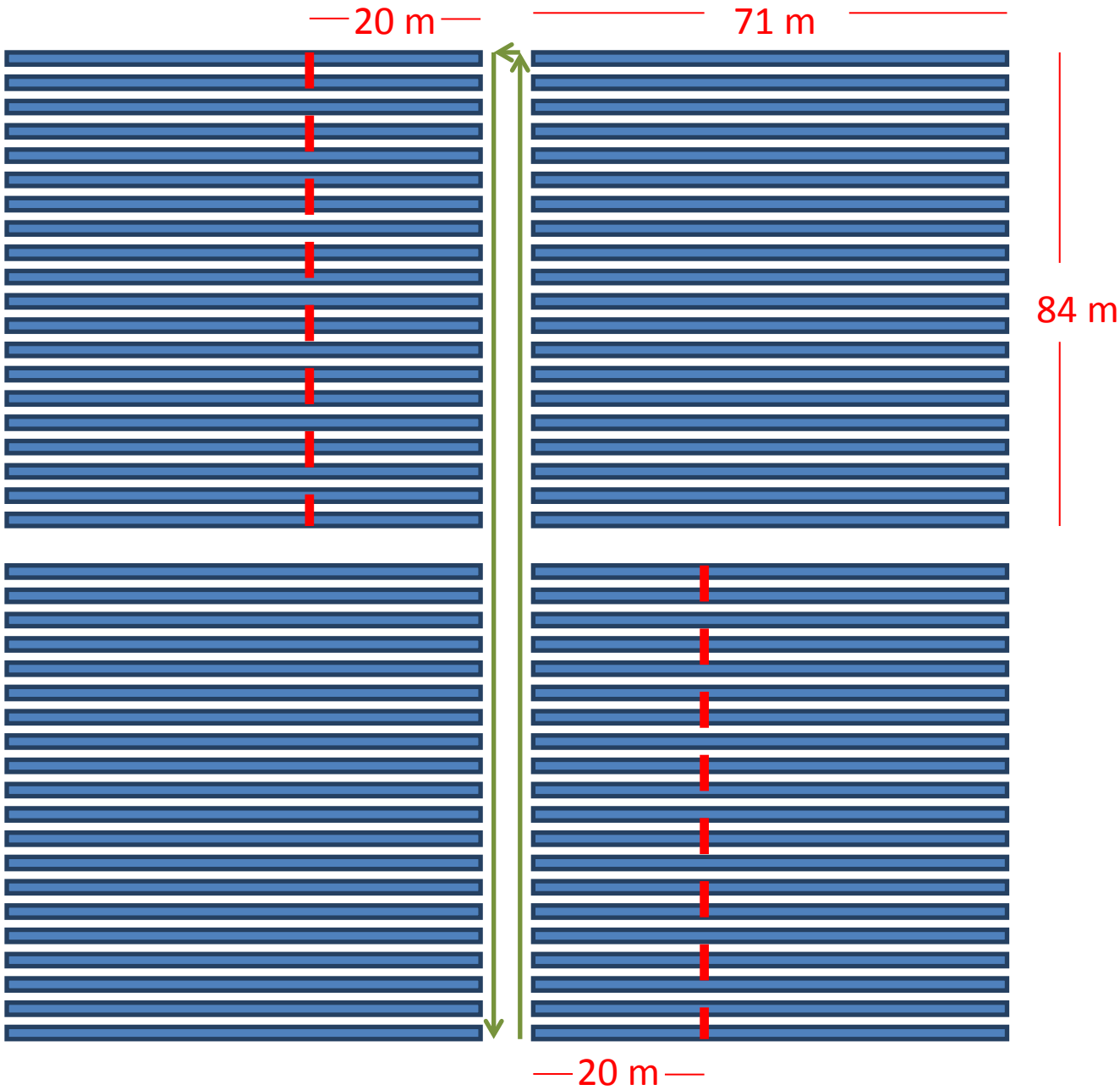


Figure 2. Layout of rows (blue strips), and subsections within arrays. Green arrows indicate travel pattern for searchers, and red dashed lines indicate the extent assumed to be searchable.

5.2 DATA COLLECTION

Surveyors will record data dectection data on a standardized form (Appendix 1). To conform to requirements from wildlife agencies (WLA), data collection will include:

- Surveyor name
- Discovery date and time
- Species
- Sex and age (if determined)
- Cause of death or injury (if determined)
- GPS waypoint of find (WGS84 datum)
- Nearest project component (PV array, power line, power line structure, building, fence, pond, materials storage, vehicle /equipment, other
- Distance to nearest project component
- Distance to nearest PV panel
- Identifiers for photographs taken in situ (close and wide)
- Observed weather (% cloud, temperature, wind)
- moon phase (C, Q, F, N)
- precipitation within previous 24 hours, and since previous survey
- Sustained high winds during previous 24 hours, and since previous survey
- Condition of specimen -
    - alive, no sign of physical trauma
    - dead and intact
    - dismembered
    - feather pile*
    - injured but alive
- Disposition of live bird/bat
    - released
    - sent to rehab
- Estimated Time since death
    - < 1 day (no rigor mortis)
    - 1 day (rigor mortis, no odor)
      2-3 days (odor present, eyes dried /missing)
    - 3-5 days (strong odor, decomposing)
    - Unknown (feather pile*/drowning)
    - N/A (animal still alive)
- Evidence of scavenging (Y/N)
- Additional relevant comments to support the recorded information.

*A feather pile consists of a minimum of 10 feathers, all found within 5m of each other, and must include at least 2 primaries or 5 tail feathers.

All specimen collectors will be covered under appropriate federal and state salvage or scientific collecting permits that authorize removing from the field all carcasses discovered during the study. Any species not authorized for collection under such permits will be photo-documented, left in place, and reported to appropriate agencies within 48 hours. Collectors will place all discovered carcasses in zip-

locked plastic bags, clearly label each bag with the incident number, and then deliver the bags for storage within a designated freezer at the facility. Injured birds/bats will be transported by qualified individuals to the nearest permitted rehabilitation facility for proper care. From the Project site, the closest rehabilitation facilities capable of handling avian species are:

- Wild Wing Project, Las Vegas, 702-238-0570 (non-raptors)
- Havasu Wildlife Rehabilitation Center, Lake Havasu, 928-855-5083 (all birds, incl. raptors)

5.3 SEARCHER EFFICIENCY TRIALS

It is assumed that as a result of varying surveyors, habitats, lighting, and carcass characteristics, not every avian or bat fatality will be found. However, by quantifying searcher efficiency (the ability of surveyors to detect carcasses of varying sizes under varying condition) and correcting for detection biases, an adjusted fatality estimate can be determined.

In principle it is not necessary to estimate searcher efficiency for a distance sampling design. However, distance sampling assumes that the sample of carcasses will be large enough to reliably fit the detection function. In the event that data are too sparse to estimate this function, and as a secondary check on the analysis, it is prudent to estimate searcher efficiency independently.

Searcher efficiency trials may be conducted concurrently with carcass searches, and searchers will be 'blind' to the presence and locations of trial carcasses. On the morning before searches an individual not involved with the search will place trial carcasses within arrays to be searched that day. Carcass locations will be randomly generated, and distances from the walking transect will vary between 0 and 40 m. At present the assumption is that searches will be effective to 20 m, but the effective search distance is still unknown, and may well be greater for large birds. Conducting searcher efficiency trials out to 40 m will resolve these uncertainties. Carcasses will be distributed on at least four separate dates and will include at least ten each of small and large sized birds. All searchers will be exposed to both sizes of carcass, so that an integrated estimate of staff searcher efficiency can be calculated.

Trial carcasses will be:

- discreetly marked so they may be identified as trial carcasses when found
- randomly distributed at GPS-recorded locations within search plots (by a person not taking part in the survey)
- dropped from waist height such that they land in a natural manner (to simulate a fall from a collision)
- promptly retrieved after surveys, if not found during surveys

Trial carcasses will be retrieved on the same day, after searches have been completed. Immediate carcass retrevial serves the dual purpose of verifying availability of carcasses that were not detected, and removing scavenger attractants from the site.

Uniformity of the solar farm landscape throughout the year suggests that searcher efficiency trials should not to be repeated in every season. Nevertheless, searcher efficiency trials will be conducted at least twice per year, every year, to ensure data integrity and will be conducted for all new search personnel. Differing conditions, such as vegetation densities, topography and transect width, demand independent searcher efficiency trials be conducted in order to produce sound data analysis. Specifically, trials will be needed for each stratum: 1) PV arrays , 2) along perimeter fence lines, 3) along overhead lines, and 4) gen-tie line. The goal will be to place approximately 15-20 small and 15-20 large carcasses within each of the stratum, for a total of 180-240 carcasses. If detection rates are similar among strata, pooling of information may occur, and sample sizes may decrease if future years. When available in sufficient sample sizes, bat carcasses may also be used during the searcher efficiency trails.

The desert landscape surrounding the Project generally exhibits little seasonal change, likely reducing the seasonal variability in carcass removal and searcher efficiency rates. This assumption can be tested seasonally during the first year of trials. Substrate within the solar facility is not anticipated to significantly change over the period of this plan. Adjustments in searcher efficiency trials may be necessary to adjust for changes in visibility should significant ground cover be permitted to emerge.

5.4 CARCASS REMOVAL TRIALS

It is assumed that not every avian or bat fatality will be discovered before the carcass is no longer present. By quantifying the length of time a carcass remains in the study area and is available for detection, an adjusted fatality estimate can be determined. Carcass removal will be quantified separately for small and large birds. At least ten fresh carcasses in each size class will be distributed in each season to assess carcass removal throughout the year, and carcasses will be dispersed to random locations throughout the study site and a few at a time to avoid affecting scavenger behavior. Carcasses will be checked on days 1, 2, 3, 4, 5, 7, 9, 11, 13, 15, 22, 29 and 36 after placement and at each visit will be scored as present, scavenged, or removed. Carcasses still present after 36 days will be removed from the study site.

Carcass removal trials will be conducted once per season throughout the study period, with carcasses scattered within search plots and overhead power line transects. Trial carcasses will be:

- discreetly marked so they may be identified as trial carcasses when found
- randomly distributed at GPS-recorded locations within arrays that are not a part of a mortality survey area
- dropped from waist height such that they land in a natural manner (to simulate a fall from a collision)
- checked daily for the first five days
- checked every other day between day 7 through day 15
- checked every 7th day between days 22 and 36
- retrieved on Day 36 if still present.

An estimator will be applied that is suitable for the proposed sampling design and associated trials. The most current models such as the USGS fatality CMR model (http://www.mbr-pwrc.usgs.gov/software.html) or Shoenfeld estimator will be considered.

5.5 Data Reporting

The Silver State Lead Avian Biologist will report all documented bird injuries and fatalities to the FWS Bird Fatality/Injury Reporting Program (https://birdreport.fws.gov/ BirdReportFAQs.cfm) on a monthly basis. Additionally, all mortality data will be submitted into an internal electronic database designed to assist a results analysis.

The Avian Lead will compile all Project-related bird fatalities and/or injuries detected and prepare and submit quarterly and annual reports to: BLM, FWS and NDOW. Reports will summarize the dates, durations, and results of all fatality monitoring conducted. Any mortality of special status species will be reported to BLM and NDOW within 48 hours of discorvery. Reporting will continue for the duration of the post-construction monitoring effort.

5.6 Analysis

The analysis will follow a distance-sampling methodology. Distance sampling analysis utilizes count data combined with detection distances from the transect to estimate a detection function that describes how probability of detection decreases with increasing distance from the transect. Based on these two pieces of information, the density of carcasses in an area can be estimated. Distance sampling relies on two core assumptions: first, that detection of carcasses right on the transect line is perfect, and second, that carcasses are equally likely to fall at any point in the sampled region. The first assumption is probably justified because transect lines are placed along cleared roadways (the decay in detection away from the transect line and under the panels is explicitly modeled and adjusted by distance sampling). The validity of the second assumption is less certain because edges of arrays may pose a different hazard than interiors of arrays. This assumption can be tested with the use of searcher efficiency trials. If the assumption is grossly violated, other methods of carcass density estimation are available, and can be calculated with the survey data, carcass removal trial data, and searcher efficiency data.

5.7 Incidental Avian and Bat Injury/Mortality Reporting

The surveys described by this AMMP will be conducted for two years during the post-construction phase. Data from the first two years will be used to determine if an additional (third year) is necessary. Project Managers and regulatory agencies, including the BLM and USFWS, will be involved in determinating the need for an additional survey beyond the first two years.

Logistical issues such as lack of access to active construction areas and safety regulations prevent a complete survey of the Project Site during the construction phase. Uncontrollable conditions (such as area closures and the inconsistent presence of construction personell) complicate sampling efforts

during the construction phase. However, duing the construction phase, biological monitors will be present on site as described in the Final Supplemental Environemental Impact Statement for the Project (BLM 2013). These monitors will record all instances of avian mortality observed during the course of their duties. All construction personnel will be required to attend a Worker Environmental Awareness Program (WEAP) training prior to project involvement, which will include required actions, such as the reporting of dead and injured birds. Construction workers and biological monitors will report and record all instances of dead and injured birds using the standardized data form (Appendix 1).

6.0 SURVEYOR REQUIREMENTS

Surveys will be conducted by qualified Avian Biologists. The Avian Lead will submit the resumes of all proposed Avian Biologists to the BLM for review. Avian Biologists will have the following minimum qualifications:

- A bachelor's degree in biological sciences, zoology, botany, ecology or a related field
- 3 years experience in field biology with an emphasis on avian ecology

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the BLM that the proposed Avian Biologists have the appropriate training and background to effectively implement the AMMP.

7.0 ADAPTIVE MANAGEMENT

It is important for stakeholders and resource managers to incorporate statistically sound modeling into any iterative feedback cycle prior to implementation of additional or modified control measures (Williams and Brown 2012). However, the dearth of information pertaining to avian mortality at large-scale photovoltaic solar energy facilities makes the establishment of additional adaptive management recommendations and trigger thresholds difficult. The Project will continue to consult with BLM, USFWS, and NDOW to determine if any additional management action, including changes to the monitoring protocol, may be needed based on the initial results of the mortality surveys.

Mortality monitoring protocols must also integrate with other monitoring components of the Silver State Project, including the Raven Management Plan. For example, if monitoring data suggests an increase in Raven activity in the Project area as a consequence of Carcass Removal Trials, adaptive management may be required to address both the methods and metrics of all associated protocols.

8.0 REFERENCES

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Appendix 1. Avian Mortality Form

Avian Mortality/Injury Form

Detection /Specimen Code_____ **Species Common Name**_____ **Number of Individ, or Nests?** _____

Age? ☐Adult ☐After Hatching Year ☐After Second Year ☐Hatching Year ☐Juvenile ☐Sub-Adult ☐Unknown ☐Mixed (multiple birds)

Gender? ☐ male ☐ female ☐ unknown ☐ mixed (multiple birds)

Date found_____

How was it found? ☐ Mortality Survey ☐ Incidental detection

Time Found (24 hr)? _____ **Who Found?**_____

Condition Of Animal? ☐ Active Nest Relocation ☐ Alive, injured ☐ Alive, no sign of physical trauma ☐ Alive, sick ☐Articulated skeletal ☐Broken up/dismembered ☐ Dead, fresh (eyes moist) ☐ Mummified ☐ Dead semi-fresh (eyes desiccated, rigor mortis) ☐ Feather spot

Time Since Death ☐ 0-8 hours ☐ 8-24 hours ☐ 2 days ☐ 3-6 days ☐ 7 days ☐ 2 weeks ☐ 3 weeks ☐ 1 month+ ☐ N/A Animal still alive ☐ Unknown (feather pile etc)

Describe Carcass or Injury_____

Evidence Of Scavenging ☐ yes ☐ no ☐ unknown

Describe Evidence Of Scavenging _____

Cause of Death/Injury ☐ Barotrauma ☐ Blinded/optical trauma (radiant flux) ☐ Collision (other) ☐ Collision w/solar panel/heliostat ☐ Collision with wind turbine

☐ Collision with wire ☐ De-oiled ☐ Disease/Illness ☐ Drowned (evaporation pond) ☐ Drowned (other) ☐ Drowned (stock tank) ☐ Electrocution ☐ Entangled (net) ☐ Entrapment

☐ Exposure/Dehydration ☐ Other (describe) ☐ Physical trauma (unknown) ☐ Poisoned (Lead) ☐ Poisoned (other) ☐ Poisoned (Pesticide) ☐ Predated ☐ Predated while entangled

☐ Scorched or singed ☐ Trauma (hard landing) ☐ Unknown

Level of Certainty on Cause of Death or Injury (% Certainty in parenthesis) ☐ Observed or Confirmed (100%) ☐ Valid (>90%) ☐ Probable (>50%) ☐ Possible (<50%,0) ☐ Not applicable or Unknown

Describe Evidence of Predation_____
_____
_____

Disposition Of Live Bird ☐ Sent to Rehab ☐ Released ☐ Euthanized ☐ Died

Location of release or Name of Rehab Facility_____

Comments_____
_____

Project _____ **Site Name**_____ Zone IIS **Easting**_____ **Northing**_____

Describe Habitat_____

<u>For detections within the Solar Farm:</u>

Nearest Block_____ **Nearest Array**_____ **Row (if bird/ bat is found within array)**_____

Precip Within Past 24 Hours? ☐ Yes ☐ No **Current Temperature (C)**_____ **Current Wind Speed (mph)**_____ **Cloud Cover %**_____

High Winds (25 Mph Sustained) Within Past 24 Hours? ☐ Yes ☐ No **Weather Conditions at Death/Inj** ☐ Clear ☐ Fog ☐ Raining ☐ Snowing ☐ Windy ☐ Unknown

Estimated Wind Speed at Death/Inj _____ **Estimated Max Wind Gust at Death/Inj** _____ **Estimated Wind Dir at Death/Inj (N, S, etc)** _____

Moon Phase ☐ New moon (no moon) ☐ Crescent (sliver) ☐ Quarter (1/2 full) ☐ Full Moon

Nearest Project Component ☐ Brine Pond ☐ Communications Tower ☐ Evaporation Pond ☐ Fencing ☐ Guy Wires ☐ Heliostat ☐ None-open deser
☐ Other (describe in comments) ☐ Other machinery ☐ Pond Net ☐ Project Building ☐ PV Panel ☐ Road ☐ Solar Array Framework (no panels) ☐ Solar Concentrating Towe
☐ Solar Trough ☐ Transmission Line ☐ Transmission Tower ☐ Vehicle ☐ Water Supply Pond ☐ Wind Turbine

Distance (m) From Nearest Project Component _____ **Azimuth to Nearest Component** _____ **Distance (m) To Nearest Photovoltaic Panels** _____

Flight Diverters Present? ☐ Yes ☐ No ☐ Unknown **Type of flight diverter**_____ **Transmission compliant with APLIC?** ☐ Yes ☐ No ☐ Unknown

Additional details about the nearest component _____

Biometric Details of the Bird _____

Photo Code 1 (Close up shot #1) _____ **Photo Code 2 (Close Up #2)** _____ **Photo Code 3 (Close up #3)** _____

Photo Code 4 (Area to N) _____ **Photo Code 5 (Area to E)** _____ **Photo Code 6 (Area to S)** _____

Photo Code 7 (Area to W) _____**Photo Code 8 (Infrastructure)** _____

Photo Code 9 (Infrastructure #2) _____

Carcass Disposition

Collector Name _____ **Date Of Collection** _____ **Time Of Collection (24 hr)** _____

Carcass Disposition ☐ BLM investigations ☐ Buried onsite ☐ CDFW lab San Bernadino ☐ CDFW Law Enforcement ☐ CFWO lab ☐ Freezer on site ☐ Incinerated ☐ Left in place ☐ Nest relocated ☐ Other ☐ SDMNH ☐ Sent to National Eagle Repository ☐ Transferred to other permittee (enter permit # in comments) ☐ USFWS Law Enforcement ☐ Used in Research Trials (searcher efficiency and carcass removal)

Disposition Comments_____

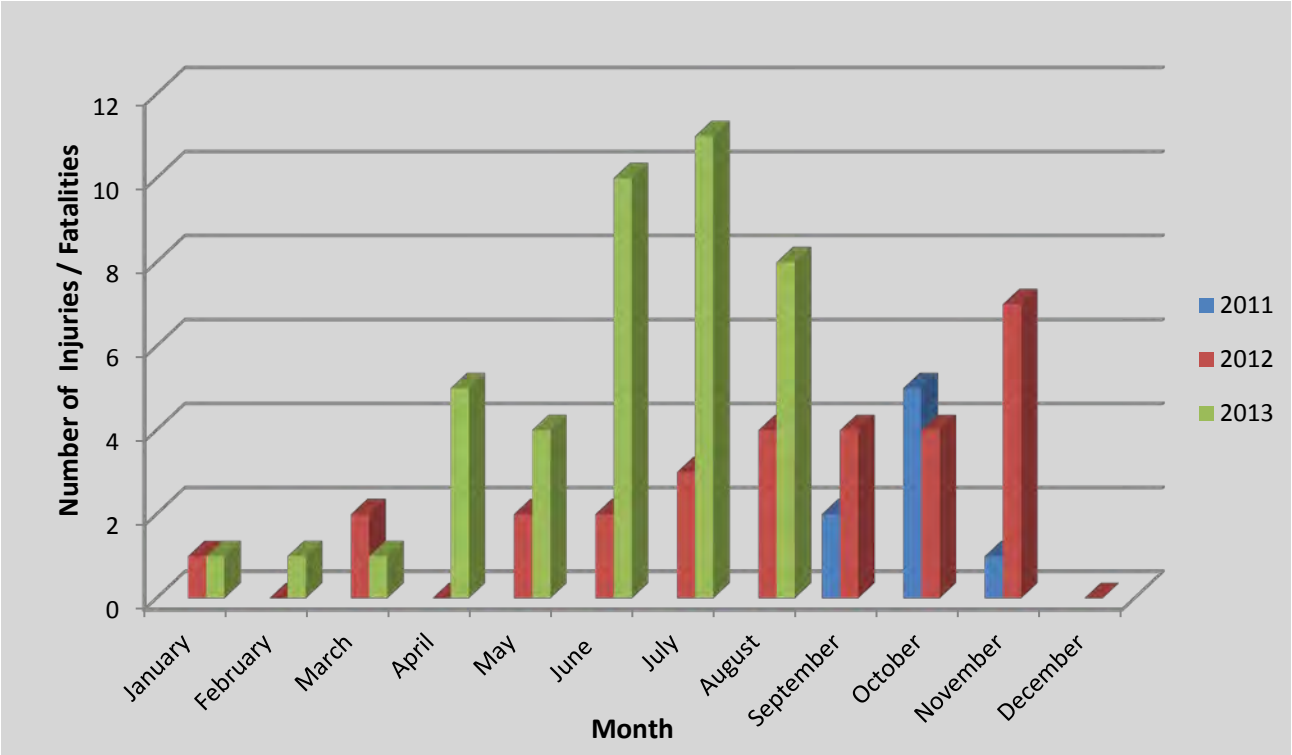
Date and Time of Agency Notification _____

Shipped To: Institution Name_____ **Date Shipped**_____ **Time Shipped**_____

Official Cause of Death_____ **Who Determined Cause of Death?** _____

Necropsy Performed? ☐ Yes ☐ No ☐ Unknown

Appendix 2. Avian Fatalities by Month at Desert Sunlight Solar Farm



Appendix D: Response to Comments Received on Final SEIS/PRMPA

APPENDIX D: COMMENTS AND RESPONSES TO THE FINAL SUPPLEMENTAL EIS/PRMPA

Appendix D is organized as follows:

D.1 Introduction

D.2 Format of the Responses to Comments: This section describes the format and organization of the comments received on the Final Supplemental EIS/PRMPA and the responses to those comments.

D.3 Index of Comments Received: This section provides a list of the comments received on the Final Supplemental EIS/PRMPA, by a member of the public, agency, company, or organization, and lists the unique letter number for each comment letter.

D.4 Individual Responses to Comments: This section provides responses to individual comments for letters that contain substantive comments.

D.1 INTRODUCTION

A total of 10 comment letters were received on the Final Supplemental EIS/PRMPA, Individual responses for all substantive comments are provided in Section D.4.

D.2 FORMAT OF THE RESPONSES TO COMMENTS

Each comment letter or e-mail is assigned a unique number with each comment individually numbered as well. Individual comments and issues within each comment letter or e-mail are numbered individually along the margins in Section D.4. For example, comment 1-01 is the first substantive comment in Comment Letter 1; “1” represents the commenter; the “01” refers to the first comment in that letter. All comment letters and their appendices are available in the Administrative Record for the Project.

D.3 INDEX OF COMMENTS RECEIVED

Table D-1 lists all individuals, agencies, and organizations that provided written comments on the Final Supplemental EIS/PRMPA. As described above, each comment letter was assigned a unique number.

Table D-1: Index of Comments Received on the Final Supplemental EIS/PRMPA

Comment Letter Number	Name of Commenter	Response to Comment Location
1	US Environmental Protection Agency (USEPA) (agency)	Page D-3

Comment Letter Number	Name of Commenter	Response to Comment Location
2	Federal Aviation Administration	Page D-5
3	Clark County Department of Aviation (CCDOA) (agency)	Page D-7
4	Las Vegas Metro Chamber of Commerce	Page D-23
5	The Nature Conservancy	Page D-25
6	Ken Freeman, SNORE	Page D-31
7	Primadonna Corporation	Page D-32
8	Service Rock Corporation	Page D-34
9	Southern California Edison	Page D-36
10	Jared Fuller	Page D-41

D.4 INDIVIDUAL RESPONSES TO COMMENTS

The following pages contain copies of the comment letters that were determined to be substantive and that require individual responses. On the left side or top of the page is a copy of the comment letter with vertical lines indicating the extent of specific numbered comments, and on the right side or bottom of the page in italics are the responses to individual comments.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

NOV 0 5 2013

Attn: Nancy Christ
Renewable Energy Project Manager
Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines Drive
Las Vegas, NV 89130

Subject: Final Supplemental Environmental Impact Statement for the Silver State Solar South Project, Clark County, Nevada [CEQ# 20130277]

Dear Ms. Christ:

The U.S. Environmental Protection Agency has reviewed the Final Supplemental Environmental Impact Statement for the Silver State Solar South Project. Our review and comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

EPA reviewed the Draft and Final Environmental Impact Statements for the Silver State Solar Energy Project and provided comments to the Bureau of Land Management on June 2, 2010 and October 8, 2010, respectively. We rated the 2010 Draft EIS as *Environmental Objections – Insufficient Information* (EO-2), primarily due to concerns over potential impacts to waters of the United States, as well as concerns about groundwater availability and the need for additional biological surveys. The 2010 Final EIS addressed our concerns about groundwater availability and included results from the most recent desert tortoise surveys, but did not provide clarification on the extent of waters, and impacts to these waters, as requested. Subsequently, the BLM authorized only Phase 1 (50 megawatts; Silver State North) of the Silver State Solar Energy facility.

In early 2011, the Applicant submitted a new Right-of-Way application for the Silver State South Project that encompassed an additional 5,610 acres. In October 2012, the BLM issued a Draft Supplemental EIS that included two new alternatives. The EPA reviewed the DSEIS and provided comments to the BLM on December 21, 2012. We rated the 2012 DSEIS as *Environmental Concerns – Insufficient Information* (EC-2), due to the fragmentation of key desert tortoise habitat in the Ivanpah Valley. We recommended that BLM consider repositioning the project or modifying its size to support a 250 MW facility, instead of a 350 MW facility, in order to allow for both the preservation of a suitable linkage corridor through key desert tortoise habitat and the minimization of impacts to jurisdictional waters, as required by Section 404 of the Clean Water Act.

We appreciate the efforts of BLM, the Applicant, and its consultants to respond to our comments on the 2012 DSEIS and the 2010 Draft and Final EISs. We are pleased to see that the Applicant, in consultation with the BLM, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers, has developed a new Project layout that addresses our previous concerns. The new BLM Preferred

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Response to Comments – Comment Letter 1

Alternative would support a 250 MW facility and allow for a protected corridor of undisturbed desert tortoise habitat between the eastern edge of the Project footprint and the Lucy Gray Mountains. According to the FSEIS, the linkage corridor would be 1.26 miles wide at its narrowest point, with an average width of 1.53 miles. We note that the Biological Opinion for the project indicates that the narrowest point of the corridor would be 1.39 miles wide. We recommend that the BLM work with the U.S. Fish and Wildlife Service to resolve this discrepancy and clarify the minimum width of the corridor in the Record of Decision. The BLM Preferred Alternative would also avoid drainages delineated as jurisdictional waters of the US. We commend the Applicant for working closely with state and federal agencies to develop this new alternative that would both avoid jurisdictional waters and reduce impacts to desert tortoise. **Cmnt 1-1**

In our previous comments on the DSEIS, we expressed concern about potential impacts to biological soil crusts. In response to our concerns, the BLM notes that stockpiling biological soil crusts for long periods of time is not typically effective. Further, the Applicant has agreed to provide $50,000 in funding for a BLM study to analyze effective ways to mitigate the loss of cryptobiotic soils. We look forward to seeing the results of this study, and respectfully request that a copy of the final report be provided to this office when it is completed. In the meantime, we continue to recommend that BLM and the Applicant minimize the disturbance of cryptobiotic soils to the extent feasible. **Cmnt 1-2**

We recommend that all mitigation measures, including specific criteria for successful mitigation, be adopted in the ROD, and be included as conditions in construction contracts and any other approvals, as appropriate, to minimize adverse environmental impacts to the extent possible. If any mitigation measures proposed in the FSEIS are not adopted, the ROD should provide the basis for the decision not to adopt them. **Cmnt 1-3**

We are available to discuss all comments and recommendations provided. Please send one hard copy and one CD ROM copy of the ROD to us when they are filed with our Washington D.C. Office. If you have any questions, please contact me at 415-972-3311, or contact Ann McPherson, the lead reviewer for this project. Ann can be reached at 415-972-3545 or mcpherson.ann@epa.gov.

Sincerely,

Jeff Scott, Director
Waste and Communities and Ecosystem Division

cc: Amy Lueders, Bureau of Land Management, Reno, NV
Patricia L. McQueary, U.S. Army Corps of Engineers, St. George, UT
Edward D. Koch, U.S. Fish and Wildlife Service, Reno, NV
Amy M. LaVoie, U. S. Fish and Wildlife Service, Las Vegas, NV

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Response to Comments – Comment Letter 1

Response to Comment 1-1: The corridor width used in the Final EIS (1.26 miles average) was a preliminary value provided for planning purposes by the Applicant's biologists during preparation of the revised BA. That measurement was refined through the consultation with USFWS, finally resulting in the value included in the Biological Opinion (BO) (pg. 69), "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." In its BO, the USFWS concluded that the construction of the Silver State South Project, based on the proposed layout and the agreed upon minimum width requirements under the BLM Preferred Alternative, "is not likely to appreciably diminish the likelihood of recovery of the desert tortoise." The BLM, in consultation with the USFWS, will continue to regulate the activities covered by the BO and ensure the terms and conditions are added to its' Record of Decision and any right-of-way grant(s) issued for the Project.

Response to Comment 1-2: Once complete, the results of the study will be provided to the EPA.

Response to Comment 1-3: The ROD will identify all mitigation measures contained in the Supplemental Final EIS/RMPA and the BO. Any right-of-way grant(s) issued for the Project will be conditioned on implementation of mitigation measures, monitoring programs and agreements/protest resolutions as identified in the ROD.

U.S Department
of Transportation
Federal Aviation Administration

Airports Division
Western-Pacific Region

P.O. Box 92007
Los Angeles, CA 90009-2007

October 30, 2013

Ms. Nancy Christ
Renewable Energy Coordinator
United States Department of the Interior
Bureau of Land Management
Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, Nevada 89130

Dear Ms. Christ:

Final Supplemental Environmental Impact Statement
Proposed Silver State South Solar Project

The Federal Aviation Administration (FAA) requests 90-days additional days from the date of this letter to review the Final Supplemental Environmental Impact Statement for the proposed Silver State South Solar Project (Solar EIS). The Solar EIS was published on September 20, 2013. The partial shutdown of the Federal Government from October 1 through October 16, prevented a number of FAA's lines of business from having adequate time to conduct a review of the document.

The FAA is generally supportive of solar power generation projects and facilities when they are sited and designed in ways that do not adversely affect the safety and efficiency of aviation. However, the FAA needs significant additional information and time to verify that the proposed project can be constructed without affecting aviation safety and/or efficiency.

The Solar EIS also contains a proposed Area of Critical Environmental Concern (ACEC) that may adversely affect the Clark County Department of Aviation's ability to construct and operate the proposed Southern Nevada Supplemental Airport (SNSA), as envisioned in the *Ivanpah Valley Airport Public Lands Transfer Act* of 2000 (Public Law 106-362). Pursuant to Public Law 106-362, the BLM is a joint lead agency for preparation of an EIS for the proposed SNSA (Airport EIS). Consistent with this law, both FAA and BLM must be able to verify that the proposed ACEC would not impede the construction and operation of the proposed airport. Thus far, however, we have been unable to locate any analysis (within the Solar EIS) regarding how the proposed project might impact the various components necessary for the proposed SNSA that would be located outside of the 6,000 acre parcel owned by Clark County in the Ivanpah Valley. We are particularly interested in the proposed modified retention basin north of the Lucy Gray Mountains, and the use of BLM managed lands within an ACEC to accommodate construction of the proposed airport.

Cmnt 2-1

Response to Comments – Comment Letter 2

Response to Comment 2-1: As with any proposal on federally managed lands, the Supplemental Airport and associated infrastructure (e.g. roadways, flood control facilities, etc.) will be subject to analysis under the National Environmental Policy Act and consultation with the USFWS pursuant to section 7(a)(2) of the Endangered Species Act (50 CFR 402.02).

According to the Congressional legislation, the 17,000 acres of the noise overlay district; which includes portions of the ACEC identified under the BLM Preferred Alternative, would not be transferred to Clark County and the 6,000 acres already transferred to Clark County would revert to the BLM if the Federal Aviation Administration and BLM do not approve the airport in the record of decision.

FAA is concerned the proposed Solar project, including the establishment of an ACEC, could adversely affect the ability of Clark County to construct the proposed SNSA. In addition, the location of the ACEC might negatively impact FAA's ability to site required navigational aids, both within and outside of the airport's boundaries that will ensure safe and efficient aviation. We anticipate being able to provide BLM with detailed comments on the Solar EIS by January 31, 2014.

Cmnt 2-1 Cont'd

FAA would like to meet with you to discuss the information in the Solar EIS and how the ACEC could be developed or modified to accommodate the construction and operation of the proposed SNSA along with the other features and components outside the 6,000 acres owned by Clark County. We respectfully request the BLM take no action to approve the proposed ACEC until after full consideration of our comments and concerns.

Please contact David Kessler, of my staff, at 310-725-3615, so we can set up a time to meet.

Sincerely,

Mark A. McClardy
Manager, Airports Division
Western-Pacific Region

Cc: SFO-600, APP-400, APP-2, ARP-1, AGC-600
Amy Leuders, BLM Nevada State Director
Brenda Hudgens-Williams, BLM Director (210) Washington DC.
Horst Greczmiel, Council on Environmental Quality, Washington D.C.
Clark County Department of Aviation

Response to Comments – Comment Letter 2

LAS VEGAS
McCARRAN INTERNATIONAL AIRPORT

Department of Aviation
ROSEMARY A. VASSILIADIS
DIRECTOR

POSTAL BOX 11005
LAS VEGAS, NEVADA 89111-1005
(702) 261-5211
FAX (702) 597-9553

November 5, 2013

VIA EMAIL

Nancy Christ
Renewable Energy Project Manager
Bureau of Land Management
Las Vegas Field Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130-2301

RE: Comments on the Final Supplemental EIS and Proposed Resource Management Plan Amendment for the Silver State Solar South Energy Development Project

Dear Ms. Christ:

Clark County Department of Aviation (County or CCDOA) submits these comments on the Final Supplemental Environmental Impact Statement (FSEIS) for the proposed Silver State Solar South Project (Silver State South) and Las Vegas Field Office Resource Management Plan Amendment, as permitted by 40 C.F.R. § 1503.1(b) and within the deadline for comments as extended by BLM News Release No. NSO 2014-001.

As you know, the County has serious concerns about the proposed new Area of Critical Environmental Concern (ACEC) that is identified in the Bureau of Land Management (BLM) Preferred Alternative as well as the fact that CCDOA's comments on the Draft Supplemental Environmental Impact Statement relating to this issue were misplaced and not considered or addressed by BLM and other cooperating agencies until the few weeks before publishing the FSEIS. Clark County has separately filed a formal protest challenging the proposal to designate the ACEC. In addition to the protest, CCDOA is filing these comments regarding the FSEIS and BLM's Preferred Alternative to ensure its comments are considered, and appropriate action taken, before BLM issues a Record of Decision on the Silver State South project.

Please be aware that these comments include discussion of materials that CCDOA received in its capacity as a cooperating agency to the ongoing Resource Management Plan revision for the Las Vegas and Pahrump Field Offices. As you consider making CCDOA's comments on the FSEIS public, please bear in mind that Exhibits M and N contain documents not yet released to the general public by the BLM.

Please direct any questions you have regarding these comments to Mark Silverstein in our Planning Section. He can be reached at (702) 261-5709.

Sincerely,

ROSEMARY A. VASSILIADIS
Director of Aviation

cc: Don Burnette
Randy Tarr
Nancy Lipski
E. Lee Thomson
Teresa R. Motley
Philip Rhinehart

Enclosure

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Response to Comments – Comment Letter 3

Response to Comments – Comment Letter 3

Clark County Department of Aviation Comments on the Final Supplemental Environmental Impact Statement for the Proposed Silver State Solar South Project and the Proposed Las Vegas Field Office Resource Management Plan Amendment

November 5, 2013

A. BACKGROUND

The Ivanpah Airport[1]

Clark County Department of Aviation (CCDOA) is planning to construct and operate a new commercial service airport in the Ivanpah Valley. During the 1990s, it became increasingly evident that McCarran International Airport in Las Vegas (McCarran Airport or McCarran) could not provide sufficient capacity to accommodate the long-term demand for commercial air service to the Las Vegas metropolitan area. Recognizing the long lead-time necessary for such a project, civic leaders began studying options and identifying solutions to address the capacity problem.

In 2000, the United States Congress passed the Ivanpah Valley Airport Public Lands Transfer Act (Lands Act),[2] which mandated the sale of land in the Ivanpah Valley for the purpose of developing an airport and related infrastructure. In so doing, Congress recognized that the Ivanpah Valley is not just "an ideal place to build a new airport"[3] but also "*the only option* that can accommodate the growing air traffic need of the region."[4] Only the Ivanpah Valley satisfied the requirements necessary for the new Airport: proximity to Las Vegas; favorable topography and orientation; safe distance from the heavily constrained airspace in the region; proximity to existing highway and railroad infrastructure; and "minimal environmental problems with the site."[5] The site identified by Congress was patented to Clark County in 2004. In 2002, Congress also passed the Clark County Conservation of Public Land and Natural Resources Act (Clark County Act),[6] which identified a 17,000-acre Airport Environs Overlay District for transfer to Clark County upon final decision by the Federal Aviation Administration (FAA) and Bureau of Land Management (BLM) to approve the Airport.[7] The Clark County Act also directed BLM to establish a transportation and utilities corridor connecting the Las Vegas Valley to the Airport site to provide for necessary utilities and transportation infrastructure.[8] The corridor was established by BLM in July 2007, and the establishment will take effect upon issuance of a

[1] This planned Airport has been referred to both as the "Southern Nevada Supplemental Airport" (most recently, in the FSEIS and the Biological Opinion for Silver State South) and also as the "Ivanpah Valley Airport" or the "Ivanpah Airport" (*e.g.*, Public Laws 106-362 and 107-282). These comments refer to the facility as the Ivanpah Airport.
[2] PUB. L. 106-362 (2000).
[3] H. Rep. 106-471 at 3 (2000).
[4] S. Rep. 106-394 at 2 (2000) (emphasis added).
[5] H. Rep. 106-471 at 3 (2000).
[6] PUB. L. 107-282 (2002).
[7] PUB. L. 107-282 at § 501(c).
[8] PUB. L. 107-282 at § 501(b).

Response to Comments – Comment Letter 3

Record of Decision for the Airport EIS.[9] The FAA and BLM, as joint lead agencies, began preparing an environmental impact statement for the Airport (Airport EIS) in 2006.[10]

Flood Control Infrastructure for the Ivanpah Airport

The Airport site identified in the Lands Act is on a dry lake bed (the Roach Lake Playa) at the low point of a 250 square-mile watershed. Because of the topography and hydrology of the area, stormwater flows and water from flood events in this watershed get channeled to and terminate in the Roach Lake Playa. Therefore, consistent with requirements, and in consultation with BLM, the County's consultants and engineers performed detailed studies of the Ivanpah Valley and identified three sites as critical for semi-permanent water storage facilities (Modified Retention Facilities) to protect the Ivanpah Airport from flood events and to limit the stormwater flows that reach the Airport site.[11] In addition, fill material excavated from the Modified Retention Facilities will be used to build up the surface of the future runways. The fill material must be transported from the Modified Retention Facility sites to the Airport via temporary conveyor belts. The facility site that is relevant to this protest is called the Lucy Gray site, located at the northeastern tip of the Lucy Gray Mountains.

In September 2009, CCDOA applied to BLM Las Vegas Field Office (LVFO) for a right-of-way (ROW) permit for lands necessary to implement the Airport flood control plan, including the Modified Retention Facilities (BLM Serial No. NVN-087969) and accompanying temporary conveyor belt systems (BLM Serial No. NVN-088081). The ROW applications and accompanying Plan of Development provide further detail on the Modified Retention Basins and the conveyor system.[12] The area of critical environmental concern (ACEC) proposed in the Silver State South FSEIS encompasses the Lucy Gray Modified Retention Facility, much of the conveyor belt route associated with the Lucy Gray Modified Retention Facility, and portions of other lands necessary for stormwater management.[13] Without the ability to construct the Modified Retention Facilities, Clark County will not be able to construct and operate the Airport.

In 2011, Clark County and BLM entered into a Memorandum of Understanding (MOU) relating to the proposed airport.[14] The purpose of the MOU is to ensure consultation and coordination between CCDOA and the BLM Southern Nevada District Office with respect to management of federal lands near the Airport site. The MOU expressly identifies the Modified Retention Facilities as airport-related lands and details a process for communication between CCDOA and BLM regarding proposed uses of those lands. Immediately following execution of that MOU, former LVFO Field Manager Robert B. Ross, speaking for BLM, expressly recognized that Congress has expressed a "clear intent" through the 2000 Lands Act, the 2002 Clark County Act, and also the Southern Nevada Public Land Management Act of 1998 (SNPLMA)[15] that "lands in

[9] Letter from Mark R. Chatterton, BLM LVFO Assistant Field Manager, to Randall H. Walker, Director, Clark County Department of Aviation and Jim Gibson, Mayor, City of Henderson (Jul. 2, 2007) (**Exhibit A**).
[10] 71 Fed. Reg. 52,367 (Sept. 5, 2006) (Notice of Intent).
[11] *See* FAA, Advisory Circular 150/5200-33, *Hazardous Wildlife Attractants on or near Airports*. (**Exhibit B**).
[12] *See* **Exhibit C** (CCDOA's ROW applications, including a Plan of Development) for more detail on these facilities. The ROW applications seek permits for three modified retention facility basins and one drainage easement for flood control as well as for elevated conveyor systems and necessary service roads.
[13] *See also* FSEIS at Fig. 4-19.2. The differences between the ACEC in Alternative D and in the BLM's Preferred Alternative are not material to the overlap with Airport facilities.
[14] Memorandum of Understanding between Clark County and the BLM LVFO regarding the Southern Nevada Supplemental Airport (2011) (**Exhibit D**).
[15] PUB. L. 105-263

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the Ivanpah Valley be set aside for development of a new commercial service airport and related infrastructure."[16] In light of that recognition, Mr. Ross made the following commitments on behalf of the BLM:

> While the EIS for the [Ivanpah Airport] is pending, federal law and regulations prohibit the BLM from limiting the range of alternatives being studied in the EIS. Since the modified retention facility sites are being considered as part of the EIS for the [Ivanpah Airport], the BLM would not authorize land uses that preclude the siting of the modified retention facilities in the proposed locations. Additionally, given the Congressional intent outlined in the aforementioned Acts, the BLM will evaluate proposed land uses located on airport-related lands (as identified in the MOU) to ensure that they are not incompatible with the uses authorized in the Acts.[17]

Work on the Airport EIS has been suspended temporarily, but will be resumed when the economic climate and forecasted passenger levels at McCarran Airport warrant resumption. The ROW applications for the Modified Retention Facilities and temporary conveyor belts are still pending as well. In addition, bipartisan legislation – co-sponsored by the entire Nevada congressional delegation – currently pending in Congress would compel BLM to convey the acreage for the necessary Modified Retention Facilities to Clark County in order to protect the future airport.[18] Just three months ago, the BLM submitted written testimony to the Senate Energy and Natural Resources Committee Subcommittee on National Parks specifically supporting this subsection of the legislation.[19]

CCDOA's Comments on the Proposed ACEC

On January 2, 2013, CCDOA provided written comments on the Draft Supplemental Environmental Impact Statement (DSEIS) for the proposed Silver State South Project and LVFO Resource Management Plan Amendment, identifying various misstatements about the Airport and actual and proposed CCDOA facilities in southern Clark County.[20] In addition, CCDOA outlined its concerns about the proposed 40,180-acre ACEC identified in Alternative D of the DSEIS. Specifically, CCDOA explained that the proposed management prescriptions – including the exclusion of large site-type ROWs, and designation of the area as a linear ROW avoidance area – would directly conflict with stormwater facilities necessary to protect the Ivanpah Airport. In its January 2013 comments, CCDOA also reminded BLM that: (1) BLM has acknowledged that Congress expressed a clear intent that lands in the Ivanpah Valley be set aside for development of the planned Airport and necessary infrastructure; (2) BLM has committed to avoid authorizing land uses that would preclude the siting of critical stormwater facilities for the Ivanpah Airport while the Airport EIS is pending; and (3) BLM has committed to evaluate proposed land uses located on airport-related lands (including the lands necessary for

[16] Letter from Robert B. Ross, Jr, BLM LVFO Field Manager, to Mark E. Silverstein, CCDOA (Mar. 29, 2011) (Ross Letter) **(Exhibit E)**.
[17] *Id.*
[18] *See* H.R. 2015 and S. 974, the *Las Vegas Valley Public Land and Tule Springs Fossil Beds National Monument Act of 2013*. The legislation provides that, following completion of the Airport EIS, BLM must, upon request by Clark County, transfer the necessary lands to the County.
[19] BLM Statement for the Record, S. 974, Las Vegas Valley Public Land and Tule Springs Fossil Beds National Monument (July 31, 2013) **(Exhibit F)**.
[20] *See* Clark County Department of Aviation, *Comments on the Draft Supplemental EIS for the Silver State Solar South Project and Las Vegas Field Office RMP Amendment* (Jan. 3, 2013).

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Response to Comments – Comment Letter 3

Modified Retention Facilities) to ensure that they are not incompatible with the uses authorized in the relevant federal statutes.

When the Administrative Draft of the FSEIS was released on July 18, 2013, Clark County was surprised and disappointed to see that CCODA's January 2013 comments on the DSEIS were entirely unaddressed in the Administrative Draft FSEIS, and that maps in the draft final document still contained myriad errors regarding CCDOA facilities in southern Clark County.[21] Subsequent communications revealed that BLM staff had lost CCDOA's comments and that, as a result, the comments were *never considered* in the process of BLM identifying its Preferred Alternative. Of chief concern to the County was the revelation that its opposition to the ACEC, and the impact of the proposed ACEC on airport-related lands, was never taken into account by the BLM when the agency developed its Preferred Alternative.

Despite the ten-year record of Congressional and BLM commitment to the Ivanpah Airport, BLM's proposed ACEC now poses a serious obstacle to securing the approvals necessary for the Ivanpah Airport, both by directly interfering with the Lucy Gray Modified Retention Facility and by imposing new management priorities that are inconsistent with the new Airport and with future County plans for associated infrastructure and other development in this portion of southern Clark County.

Moreover, the impact of designation of an ACEC is not limited to the land within the boundary of the proposed ACEC. ACEC designations also formally establish the significance of resources which "must be accommodated" when BLM considers future land use proposals in *or near* an ACEC.[22] Even if it is currently BLM's informal intention that the ACEC and management prescriptions have *no* impact on the County's ability to construct or operate the proposed Airport or its ancillary facilities, BLM cannot subsequently ignore its duty to accommodate the significance of the ACEC resources – and the need to protect them – when deciding whether to approve uses needed by the County *within or near* the ACEC. Thus, this proposed ACEC designation would fundamentally alter the BLM's management priorities in the area, potentially adversely affecting the proposed Airport and the County's ability to provide other essential services and infrastructure in the southern part of the County.

[21] *See* Letter from Rosemary A. Vassiliadis, Director, Clark County Department of Aviation, to Amy Lueders, Director, BLM Nevada State Office (Aug. 29, 2013) (**Exhibit G**).
[22] BLM Manual 1613, *Areas of Critical Environmental Concern* (1988) at .02.

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Response to Comments – Comment Letter 3

B. COMMENTS ON THE FSEIS

Clark County is committed to ensuring that any new infrastructure and land management proposals in southern Nevada are compatible with the siting, construction, and operation of the Airport. As outlined below, the County still has concerns with the FSEIS.

1. BLM's last-minute corrections to the FSEIS cannot undo its fundamental failure to ensure an open, thorough public discussion and reach an informed decision about the proposed ACEC.

In spite of several sets of communications and face-to-face meetings between Clark County and the BLM, BLM has steadfastly refused to revisit its proposal to designate an ACEC in the Ivanpah Valley, relying instead on eleventh-hour edits to the Administrative Draft that provide only a superficial fix to its failure to meaningfully address CCDOA's comments and concerns during development of the Preferred Alternative. This violates core principles of the National Environmental Policy Act of 1969 (NEPA).

The process mandated by NEPA is intended to ensure an open, thorough public discussion that promotes informed decision-making.[23] NEPA regulations make clear that public scrutiny is essential to implementing the Act.[24] The public comment process is at the heart of the NEPA review process and the statute requires opposing viewpoints to be included in the final EIS. "This reflects the paramount Congressional desire to internalize opposing viewpoints into the decision-making process to ensure that an agency is cognizant of all the environmental trade-offs that are implicit in a decision. To effectuate this aim, NEPA requires not merely public notice, but public participation in the evaluation of the environmental consequences of a major federal action."[25] Designation of such a large ACEC (31,859 acres) requires an open public process in which the public and relevant cooperating agencies are informed about the proposed designation, can participate in a meaningful way in debate about the merits of the proposed designation, and can provide relevant information to contribute to the planning process. That was not the case here.

Cmnt 3-1

The BLM's Preferred Alternative (including designation of a 31,859-acre ACEC) was developed *after* release of the Draft SEIS "to address public and agency concerns related to desert tortoise demographic connectivity within the Ivanpah Valley."[26] Despite being a cooperating agency with special expertise and jurisdiction by law, CCDOA was entirely absent from the discussions leading to the development of the ACEC in the Preferred Alternative, both prior to the preparation of the DSEIS and prior to the preparation of the FSEIS. CCDOA's comments were not included and its opposition to the ACEC was not addressed in the Administrative Draft of the Final SEIS released in July 2013. When questioned, the BLM project manager for the Silver State South project informed the County that CCDOA's comments had been lost by BLM staff or consultants, and *were not considered* in the development of BLM's preferred alternative or in preparation of the final environmental document. Thus, BLM developed its Preferred

[23] *Westlands Water Dist. v. U.S. Dep't of Interior*, 376 F.3d 853, 872 (9th Cir. 2004).
[24] 40 C.F.R. § 1500.1(b) ("Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA").
[25] *State of Cal v. Block*, 690 F.2d 753, 771 (9th Cir. 1982).
[26] FSEIS at ES-1.

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Response to Comments – Comment Letter 3

Response to Comment 3-1: The proposed ACEC was described in the draft SEIS/PRMPA issued on October 12, 2012. Prior to publication of the final SEIS/PRMPA, the BLM revised management prescriptions for the proposed ACEC to allow for the consideration of CCDOA-proposed ROWs within the ACEC. Specifically, the management prescriptions were revised to read as follows: "Rights-of-way for construction and operation of the Southern Nevada Supplemental Airport and associated facilities are allowed, subject to an approved Airport Final Environmental Impact Statement and Record of Decision and subject to compliance with the Endangered Species Act."

Alternative *without ever coordinating or consulting with the one party – a cooperating agency no less – that had identified substantive legal and practical concerns about the ACEC.*[27]

BLM's last minute revisions to the text of the Administrative Draft, made in the few weeks between issuance of the Administrative Draft and publication of the Final SEIS provide some clarification, but they cannot cure the fact that that BLM's year-long review of the merits of an ACEC and its decision to designate a 31,859-acre ACEC, part of which overlaps airport-related lands, was insulated from public scrutiny.

There is a clear, reasonable, and immediately-available solution. The proposed ACEC can and should be addressed in the ongoing debate on ACECs in the pending regional planning process. The Resource Management Plan (RMP) revision involves more cooperating agencies, and a wider breadth of interests and viewpoints participating in the planning process, than does the Silver State South project did.

Cmnt 3-1 Cont'd

The LVFO is currently revising its RMP, and, as part of the revision process, is reconsidering *all* of the ACECs in the planning area. While there may be instances where it is appropriate for BLM to adopt RMP amendments as necessary components of an implementation decision even while an RMP revision is pending, the agency has offered no explanation for why it should do so here. In fact, to the contrary:

- The proposed ACEC is not required as mitigation for the Silver State South project;[28]
- The proposed ACEC is not essential to the "no jeopardy" finding by the U.S. Fish and Wildlife Service;[29]
- BLM admits in the FSEIS that: "The designation of this ACEC may occur independently of the Proposed Action;"[30]
- The FSEIS actually refutes the need and urgency for an ACEC related to the Silver State South project;[31]
- The proposed ACEC reflects regional concerns, rather than project-specific ones;
- The proposed ACEC has not been subjected to robust public input and dialogue.

2. BLM's Purpose and Need Statement is unreasonably narrow.

The Purpose and Need for the Silver State South project, according to the FSEIS, is to respond to the application for a ROW grant for the construction, operation, and decommissioning of a solar generation power plant. In addition:

Cmnt 3-2

> The BLM will also consider a concurrent amendment of the LVFO RMP to: 1) reduce the size of the Jean Lake/Roach Lake SRMA to ensure that the

[27] *E.g.*, FSEIS at 2-3 (The new ACEC was developed "through close consultation with the USFWS, BLM and USACE").
[28] The extensive list of mitigation measures required of the project applicant, including compensatory mitigation, does not mention the ACEC at all. *See* FSEIS at Table 2-4, MM BIO 17; *see also* FSEIS at 2.3.1 (describing BLM's Preferred Alternative).
[29] Biological Opinion for the Stateline Solar and Silver State Solar South Projects (Sept. 30. 2013) at 85-86.
[30] FSEIS at 106.
[31] Clark County Desert Conservation Program, *Technical Review of the Supplemental Environmental Impact Statement for the Silver State Solar South Project and Proposed Las Vegas Field Office Management Plan* (Oct 2013) at 4-5 (Desert Conservation Program Technical Review) **(Exhibit H)**.

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Response to Comments – Comment Letter 3

Response to Comment 3-2: The BLM's purpose and need is to respond to FirstSolar's right-of-way application for a ROW grant to construct, operate, and decommission a solar generation power plant. The consideration of changes to the RMP is not part of BLM's purpose and need; they are requirements under NEPA which direct the BLM to consider impacts of a proposed action. Further, the EIS makes clear that designation of the ACEC is not a requirement of the Project, as Alternatives B and C include no ACEC designation. Section 1.5 of the EIS is particular identifies various options for the RMP amendment, that may or may not include the ACEC designation.

proposed ROW grant is in conformance with the existing LVFO RMP and to ensure a balanced use of the public lands and the resources affected by those uses; 2) revise the VRM classification of lands within the Project footprint to ensure management is in conformance with existing LVFO RMP decisions; and 3) *designate an ACEC and identify management prescriptions for a portion of the proposed ACEC nomination.*[32]

This statement unreasonably narrows the agency's consideration of alternatives so that the designation of an ACEC is preordained.[33] While revisions to the Special Recreation Management Area (SRMA) and the visual resource management (VRM) classifications may be necessary for approval of the Silver State South project, the proposed ACEC is not a necessary component of the Silver State South project. The ACEC is not required as mitigation for the project.

Cmnt 3-2 Cont'd

Ostensibly, the ACEC designation is based on BLM's desire to maintain population connectivity for the Northeastern Recovery Unit of the Mojave desert tortoise. But the Project footprint in the Preferred Alternative preserves a tortoise connectivity corridor of the width required by BLM *even without the ACEC*. BLM contends that a functioning connectivity corridor for desert tortoise should be approximately 1.4 miles wide or more.[34] Under the Preferred Alternative, the footprint of the applicant's solar project was redesigned to protect a connectivity corridor between the Project and the Lucy Gray Mountains that is approximately 1.53 miles wide for most of the corridor and approximately 1.26 miles wide at its narrowest point.[35] And, BLM itself acknowledges that "current research does not indicate whether reductions in the width or configuration of the corridor compared to existing conditions would reduce or eliminate its ability to maintain the genetic linkage between populations north and south of the Project area."[36]

Given the evidence before the Bureau, it is unreasonable for BLM to craft its Purpose and Need Statement so narrowly that it *must* designate an ACEC and *must* identify management prescriptions for at least some portion of the proposed ACEC nominated by Basin and Range Watch in connection with the Silver State South project.

3. The designation of an ACEC in the Ivanpah Valley contradicts clear congressional directives.

Cmnt 3-3

BLM's stated objective of "designat[ing] an ACEC [in the Ivanpah Valley]" fails to take into account several clear statutory objectives. This is relevant because where an action is taken pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of the objectives outlined in an EIS.[37]

a. FLPMA Section 202

[32] FSEIS at 1-4 (emphasis added).
[33] *Alaska Survival v. Surface Transp. Bd.*, 705 F.3d 1073, 1084 (9th Cir. 2013).
[34] FSEIS at 4-31 (*citing* United States Fish & Wildlife Service, *Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance* (rev'd Nov. 2011)).
[35] FSEIS at ES-19 & 4-34. Without the Project, the narrowest point of the corridor is 1.3 miles wide.
[36] FSEIS at 4-34.
[37] *Alaska Survival*, 705 F.3d at 1084-5.

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Response to Comments – Comment Letter 3

Response to Comment 3-3: The draft and final SEIS/RMPA's were evaluated and prepared per BLM's requirements under FLPMA. Past, present, and reasonably, foreseeable future actions are fully analyzed based on best available information. Existing transmission lines and OHV trails within and near the project area were considered as the baseline condition for which future actions, included the proposed action, would occur.

Response to Comments – Comment Letter 3

Section 202 of the Federal Land Policy and Management Act (FLPMA)[38] provides that when BLM develops and revises land use plans, it shall give priority to the designation and protection of areas of critical concern.[39] However, it must also "consider present and potential uses of the public lands."[40] In this case, BLM failed to consider present and potential uses of the affected public lands when it included designation of an ACEC in the Statement of Purpose and Need.

First, as outlined above, BLM failed to acknowledge the clear congressional intent in the Lands Act and the 2002 Clark County Act to use lands in the proposed ACEC for airport infrastructure.

Second, BLM failed to take into account the fact that the area proposed for the ACEC has already been identified and used as a critical corridor for transmission lines. The ACEC encompasses parts of three separate designated utility corridors. *See* **Fig. 1.** One, a multi-modal Section 368 Energy Corridor, was designated by BLM in the 2008 West-Wide Energy Corridor Programmatic Final EIS (PEIS),[41] as required by the Energy Policy Act of 2005 (EPAct).[42] The other two are formally designated corridors as well. The locations identified in the 2008 PEIS were selected precisely because they already tracked existing ROW corridors.[43] Transmission lines continue to be sited through the proposed ACEC, consistent with the currently-designated corridors. Most recently, the Eldorado-Ivanpah Transmission Project Line project was completed, transecting the proposed ACEC, to connect new solar generation in the Ivanpah Dry Lake Area in California with the existing Eldorado Substation in Nevada.

Cmnt 3-3 Cont'd

Transmission lines provide extensive opportunities for ravens to perch in order to predate juvenile tortoises when they emerge from the ground, and are incompatible with the protection and enhancement of tortoise habitat.[44] As the proposed ACEC is intended to provide "home range" for tortoises,[45] locating it in the vicinity of multiple transmission lines, with more likely to be installed, is inconsistent with the resource priorities of the ACEC. Installation of new lines and maintenance of current ones also involves vehicle traffic on service roads, which both fragments habitat and contributes to tortoise mortality.

Third, BLM failed to account for the fact that the proposed ACEC location regularly experiences heavy off-highway vehicle (OHV) use, as indicated by the density of trails and high-speed race

[38] 43 U.S.C. §§ 1701 *et seq.*
[39] Id. al. § 1712(c)(3).
[40] Id. al. § 1712(c)(5).
[41] West-wide Energy Corridor Programmatic Final EIS (2008) at Vol. III, Part 2 (State Base Maps) (**Exhibit I**) (available at: http://www.corridoreis.anl.gov/documents/fpeis/maps/part_2/WWEC_State_BMS_07_NV.pdf)
[42] While the PEIS was subject to litigation as the result of environmental concerns, none of the corridors that transects the proposed ACEC was identified as being a "corridor[] of concern" that has "specific environmental issues." *See Wilderness Soc'y v. Dep't of Interior et al.*, Case No. 3:09-cv-03048-JW (N.D. Cal.) Settlement Agreement at 4 (July 3, 2012) (**Exhibit J**) available at: http://www.corridoreis.anl.gov/documents/docs/Settlement_Agreement_Package.pdf).
[43] *See* **Fig. 1** (showing existing energy corridors inside proposed ACEC); *see also* West-wide Energy Corridor Programmatic Final EIS (2008) at Vol. III, Part 4 (Right-of-Way State Base Maps) (**Exhibit I**) (available at http://www.corridoreis.anl.gov/documents/fpeis/maps/part_4/WWEC_State_ROW_07_NV.pdf); Record of Decision for the Approved Las Vegas Resource Management Plan and Final Environmental Impact Statement (1998), Map 2-4 (depicting multiple designated energy corridors passing directly through the proposed ACEC) (**Exhibit K**).
[44] FSEIS at 4-30; *see also* U.S. Fish & Wildlife Service, *Revised Recovery Plan for the Mojave Population of the Desert Tortoise (Gopherus agassizii)* (May 2011) at 77 (FWS Revised Recovery Plan) (**Exhibit L**) (available at http://www.fws.gov/nevada/desert_tortoise/dtro/dtro_recovery_plan.html).
[45] FSEIS at 4-31.

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routes shown in **Fig. 2** and in the FSEIS Fig. 4.11-4.[46] Over time, this has resulted in overwhelming habitat fragmentation and an extremely high density of existing OHV routes and trails.[47] In theory, the north-south corridor in the ACEC is to be protected so that tortoise may inhabit home ranges along the west side of the Lucy Gray Mountains and head eastward at the north end of the mountains towards the McCullough Pass area. As illustrated in **Fig. 2**, however, not only is there an extremely dense set of OHV trails in the northern part of the ACEC, but as tortoises move out of the ACEC heading east, they encounter a flat valley managed as a special recreation area (the Jean Lake/Roach Lake Special Recreation Management Area) that BLM manages *specifically* for OHV use. This valley also features a dense network of trails.

Cmnt 3-3 Cont'd

b. Section 501(a) of the Clark County Act

BLM is required to manage public lands under principles of multiple use and sustained yield and in accordance with land use plans developed by the agency "*except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law.*"[48] This is relevant because Congress has already prescribed a specific management policy for the lands at issue.

Specifically, Section 501(a) of the 2002 Clark County Act[49] defines a 155,000-acre Interstate Route 15 South Corridor (the I-15 Corridor) that encompasses most of the floor of the Ivanpah Valley and the location of the proposed ACEC. *See* **Fig 3**. The Act states that this entire corridor must be managed "in accordance with the Southern Nevada Public Land Management Act of 1988 (122 Stat. 2343) and this section."[50] In turn, the purpose of SNPLMA[51] is "to provide for the orderly disposal of certain Federal lands in Clark County, Nevada …." In particular, Section 4 of SNPLMA provides that:

> Upon application by a unit of local government or regional governmental entity, the Secretary, in accordance with this Act and the Federal Land Policy Management Act of 1976, and other applicable provisions of law, shall issue right-of-way grants on Federal lands in Clark County, Nevada, for all reservoirs, canals, channels, ditches, pipes, pipelines, tunnels, and other facilities and systems needed for … (ii) flood control management.[52]

Cmnt 3-4

As noted above, Clark County has already applied for right-of-way grants in the ACEC for the Lucy Gray Modified Retention Facility and a temporary conveyor belt required for construction of the Modified Retention Facility.[53] Through Section 501(a) of the Clark County Act and SNPLMA, the Secretary is required to issue these rights-of-way to Clark County, and to issue other ROWs that may be required by other units of local or regional government.

[46] In the FSEIS, BLM did not include the ACEC boundary on the map showing the impact on recreation trails of its Preferred Alternative, so a reader must estimate its boundaries. The ACEC encompasses the area north of the ROW application area to include many of the green trail routes shown on Fig. 4.11-4 in the FSEIS.
[47] *See* Desert Conservation Program Technical Review (**Exhibit H**) at 5-6 (citing data from BLM Travel and Recreation Implementation Plan Study Area, Goodsprings, Nevada, Las Vegas Field Office, March 7, 2011).
[48] 43 U.S.C. § 1732(a) (emphasis added).
[49] PUB. L. 107-282 § 501(c)(1).
[50] PUB. L. 107-282 § 501(a)(1).
[51] PUB. L. 105-263 § 2(b).
[52] *Id.* at § 4(b)(2).
[53] *See* **Exhibit C** (CCDOA Form 299 ROW application).

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Response to Comments – Comment Letter 3

Response to Comment 3-4:The BLM acknowledges that Section 501(a) of the 2002 Clark County Act defines a 155,000 acre Interstate 15 South Corridor (the I-15 Corridor). Regarding the comment that the BLM is required to issue rights-of-way per this and other Acts, the BLM, per its requirements under NEPA, must analyze each and every ROW application, regardless of the applicant. All proposed actions must be analyzed to determine effects to lands and resources managed by the BLM. Through this analysis, and if approved, alternatives and mitigation may be required prior to issuance of a BLM right-of-way grant.

The proposed ACEC designation fails entirely to acknowledge this prior, statutory management directive. In 2002, Congress clearly directed that the entire I-15 Corridor be managed in accordance with SNPLMA, *i.e.*, for "orderly disposal" and "to promote responsible and orderly development."[54] BLM's narrow objective of designating a portion of the already-designated I-15 Corridor as an ACEC is entirely inconsistent with and contravenes BLM's management obligations under Section 501(a) of the 2002 Clark County Act, SNPLMA, *and* FLMPA Section 302.

Cmnt 3-4 Cont'd

4. BLM has changed positions without explanation or reason.

a. Agreement to preserve Airport lands for development

The proposed ACEC violates BLM's prior commitment to avoid authorizing land uses that would be incompatible with the planned Ivanpah Airport and necessary airport infrastructure. As noted above, in 2011, former LVFO Field Manager Ross expressly recognized that "Congress has expressed a clear intent that lands in the Ivanpah Valley be set aside for development of a new commercial service airport and related infrastructure."[55] In light of that recognition, BLM made the following commitments:

- "while the EIS for the [Ivanpah Airport] is pending, federal law and regulations prohibit the BLM from limiting the range of alternatives being studied";
- "the BLM would not authorize land uses that preclude the siting of the modified retention facilities in the proposed locations"; and
- "the BLM will evaluate proposed land uses located on airport-related lands … to ensure that they are not incompatible with the uses authorized in the Acts."[56]

Cmnt 3-5

As also noted above, BLM has recently expressed support for bipartisan legislation pending in the current Congress[57] that would require the conveyance of 2,350 acres of land to the east of the proposed Airport – including land within the proposed ACEC – for necessary flood mitigation facilities to protect the future Airport.[58]

BLM's current proposal to designate a 31,859-acre ACEC on lands that it is simultaneously promoting for development and airport infrastructure is at once inconsistent and self-contradictory, and consequently inexplicable.

b. ACEC "Importance" Requirement

It is a foundational principle of administrative decisionmaking that, when an agency changes its mind, it is required to explain itself so that the public, and if necessary, the courts, can understand the reason for the shift and evaluate it.[59] BLM has made contradictory findings about whether the ACEC would properly satisfy the "importance" criteria required in 43 CFR 1610.7-2 without sufficient explanation or justification. This is the epitome of arbitrary and capricious decisionmaking.

Cmnt 3-6

[54] PUB. L. 105-263 § 2.
[55] Ross Letter (**Exhibit E**).
[56] *Id.*
[57] *See* H.R. 2015 and S. 974, the *Las Vegas Valley Public Land and Tule Springs Fossil Beds National Monument Act of 2013*.
[58] BLM Statement for the Record (**Exhibit F**).
[59] *Marmolejo-Campos v. Holder*, 558 F.3d 903, 920 (9th Cir. 2009).

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Response to Comments – Comment Letter 3

Response to Comment 3-5: The BLM does not agree that the proposed ACEC violates BLM's prior statements regarding authorizing land uses that would be incompatible with the planned Ivanpah Airport and necessary infrastructure. Management prescriptions for the ACEC allow for the consideration of CCDOA-proposed ROWs within the ACEC. Specifically, "rights-of-way for construction and operation of the Southern Nevada Supplemental Airport and associated facilities are allowed, subject to an approved Airport Final Environmental Impact Statement and Record of Decision and subject to compliance with the Endangered Species Act."

Response to Comment 3-6: Per guidance found in 43 CFR 1610.7-2, a BLM interdisciplinary team determined that 40,180 of the 98,300 nominated acres in Nevada meet criteria for both relevance and importance (see Chapter 2.3.5 and Appendix B – ACEC Evaluation and Nomination Checklist in the final SEIS/PRMPA.

The nomination for the ACEC at issue was initially submitted by the nonprofit environmental group Basin and Range Watch in October 2011.[60] In February 2012, BLM issued a report stating that the area did *not* meet importance criteria because the habitat "is not more distinctive than other habitat in the region."[61] Two months later, in May 2012 BLM made a presentation to the cooperating agencies for the RMP revision in which it stated unequivocally that the nominated ACEC did *not* have the required relevance and importance values.[62]

Cmnt 3-6 Cont'd

In October 2012, however, BLM released the Draft SEIS for the Silver State South project, with a new evaluation of the nominated area attached. In the new evaluation, BLM reversed its previous determination and found that part of the nominated area *did* meet importance criteria, specifically for desert tortoise and white-margined penstemon.[63] For tortoise, BLM described a "narrow area of habitat occupied by tortoises east of I-15 along the Lucy Gray Mountains that maintains population connectivity."[64] There is no explanation for the sudden change. The historical importance of genetic and demographic connectivity for a healthy desert tortoise population has been a topic of scientific research and ongoing debate since well before the initial October 2012 evaluation and does not explain BLM's complete about-face.[65]

BLM must provide an explanation, with supporting materials, to explain why, between May and October of 2012, it abruptly concluded, in contradiction to its previous findings, that the nominated area suddenly did meet importance criteria for desert tortoise.

5. BLM failed to conduct an adequate impacts analysis for the ACEC management prescriptions.

Cmnt 3-7

When BLM uses a single land use planning/NEPA process to make both land use plan and implementation decisions, it must ensure that *both types of decisions* are adequately addressed with the appropriate level of NEPA analysis.[66] BLM guidance recommends that the agency conduct a "thorough and well-documented analysis" of the effects of the management prescriptions for proposed ACECs.[67] BLM failed to do this.

a. Energy and minerals impacts

For many resources, the analysis in the FSEIS consists merely of variations on this statement: "Management prescriptions proposed for the ACEC ... would generally be similar or more restrictive when compared to existing management in this area. Therefore, the ACEC designation and related management prescriptions would have either no impacts or beneficial

[60] BLM, *ACEC Evaluation Report*, FSEIS at Appendix B (pages not numbered).
[61] BLM, *Evaluation Report for Areas of Critical Environmental Concern for the Las Vegas/Pahrump RMP Revision* (Feb. 2012) (Internal Review Copy) (**Exhibit M**) at 70-73.
[62] Las Vegas – Pahrump Field Offices Resource Management Plan Revision PowerPoint Presentation, Cooperator Agency Meeting, May 10, 2012 (**Exhibit N**).
[63] *Draft Supplemental Environmental Impact Statement for the Silver State Solar South Project and Proposed Las Vegas Field Office Resource Management Plan Amendment* (DSEIS), October 2012, at Appendix B.
[64] *Id.*
[65] *See, e.g.*, FWS Revised Recovery Plan (**Exhibit L**); Nussear, K.E., *et al. Modeling habitat of the desert tortoise* (Gopherus agassizii) in the *Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona* U.S. *Geological Survey Open File Report*, 2009.
[66] BLM Handbook H-1601-1, *Land Use Planning Handbook* (2005) at 30 (emphasis added).
[67] BLM Manual 1613 at .22.C.

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Response to Comments – Comment Letter 3

Response to Comment 3-7: See response to previous comment. The impact of the proposed action on energy and mineral impacts are sufficiently analyzed in the final SEIS/PRMPA. As per the comment that the "management prescriptions would effectively render new mineral development impracticable within the ACEC," the BLM would evaluate future request(s) for mineral development within the proposed ACEC pursuant their obligations under FLPMA.

impacts to [resource being discussed]."[68] Even where BLM does list possible impacts from the management prescriptions, the discussion is conclusory, without documentation or analysis. For example, although BLM states that the designation of the ACEC "would not substantially affect energy and mineral resources," it does not explain whether linear ROWs associated with new mineral development, like new roads, would be permitted in spite of the ACEC being a linear avoidance area. If not, the management prescriptions could effectively render new mineral development impracticable within the ACEC. If so, new road construction would further fragment the ACEC.

Cmnt 3-7 Cont'd

b. Socioeconomic impacts

Similarly, the only socioeconomic impact listed as an effect of the management prescriptions is potential loss of revenue from OHV recreation, possibly offset by increased tourism from users attracted to the ACEC and adjoining Ivanpah Desert Wildlife Management Area in California.[69] This speculative assertion is not supported by data or explanation. If this statement is true, BLM has failed to provide any analysis of the impacts of the possibly increased tourism on the ACEC.

And, it is inconsistent with other parts of the FSEIS where BLM claims that the ACEC "would not be expected to substantially change the level of intensity" of OHV use.[70]

Cmnt 3-8

The discussion of socioeconomic effects from the management prescriptions is silent as to impacts on, for example, jobs in the local area. If development of mineral resources is to be restricted within the ACEC, the FSEIS should note the loss of potential jobs. Otherwise, the FSEIS should acknowledge that the ACEC's management prescriptions are unlikely to slow down mineral resource development in or near the ACEC, which would in turn impair the presumed – but unproven – efficacy of the ACEC as protection against further fragmentation of the corridor along the Lucy Gray Mountains.

c. Impacts on desert tortoise

BLM's analysis of the effects of the management prescriptions on the desert tortoise – the basis for the relevance and importance of the proposed ACEC – provides little useful information. It lists only *two* of the nineteen management prescriptions as having impacts on tortoise that merit discussion. The first is the limitation of OHV use to existing routes and trails, which would "reduce the risk of collisions with desert tortoises and other wildlife." This limitation is curious indeed, since BLM states that it does not anticipate a change in the intensity of OHV use in the ACEC. The analysis provides no explanation or documentation for this counterintuitive (or perhaps contradictory) conclusion, and in particular, fails to explain why continuing to allow OHV use on all existing trails and routes at the current level of intensity would "reduce the risk" of collisions with tortoises.[71]

Cmnt 3-9

The second of the two management prescriptions expected to have an impact on desert tortoises is the avoidance of linear rights-of-way and exclusion of rights-of-way for sites greater than five acres. The extent of BLM's analysis of these limitations, which lie at the core of the proposed

[68] *See, e.g.* FSEIS at 4-7 (air quality); 4-10 (noise); 4-13 (geology, topography, or geological hazards); 4-17 (soils); 4-22 (water resources); 4-40 (cultural resources); 4-42 (paleontological resources).
[69] FSEIS at 4-28.
[70] *Id.* at 4-110.
[71] FSEIS at 4-110 ("The ACEC ... would not be expected to substantially change the level of intensity of recreational uses").

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Response to Comments – Comment Letter 3

Response to Comment 3-8: See response to previous comment.

Response to Comment 3-9: The BLM does not agree that the analysis on the effects of the management prescriptions on the desert tortoise is inadequate. The analysis provided in the final SEIS/PRMPA and USFWS's BO supports the BLM's relevance and importance analysis related to the ACEC decision.

ACEC's purpose, is that they "would reduce the potential for future habitat fragmentation for all wildlife."[72] BLM offers no discussion, analysis, or supporting documentation for its conclusion, nor does it acknowledge the extensive existing fragmentation in the proposed ACEC.[73] Given the countervailing requirements for maintenance of existing transmission corridors, new transmission lines in the corridors, potential new roads to access mineral development, and linear rights-of-way needed for the Ivanpah Airport, the BLM's conclusion is simply not plausible. Finally, BLM has not considered the impacts on surrounding areas if rights-of-way are disfavored or prohibited in the proposed ACEC and shifted to areas outside the ACEC.

Cmnt 3-9 Cont'd

As for the remaining seventeen management prescriptions, BLM states only that they "would be similar to existing management or have relatively minor benefits to wildlife."[74] This statement undermines the principles behind designation of an ACEC. (If the ACEC will provide management similar to existing management, why is there a need to designate the ACEC at all?) Ultimately, BLM's conclusions are rife with contradiction. With the proposed ACEC, management will remain essentially the same, existing uses will not be significantly affected, and no off-site impacts are expected. Based on BLM's analysis of the impacts of the management prescriptions, it is unclear that designation of the proposed ACEC could even accomplish the stated goals.

d. Impacts on the Ivanpah Airport

Finally, in the cumulative impacts section, BLM failed to provide the required "thorough and well-documented" discussion of socioeconomic and other effects of the management prescriptions on the proposed Ivanpah Airport. If BLM's intention is that the management prescriptions will have *no* impact on the proposed Airport or its ancillary facilities, it should make that clear in the FSEIS. Otherwise, the analysis in the FSEIS should have provided an analysis of the expected impact on the Airport and the resulting impact on tourism, tourism revenue, jobs, and other economic benefits otherwise expected from construction and operation of the Ivanpah Airport.

Cmnt 3-10

One of the central aims of NEPA is to "inform the public that [the agency] has indeed considered environmental concerns in its decisionmaking process."[75] The impacts analysis of the management prescriptions falls far short of what is required by NEPA and by BLM guidance as well.

6. BLM's determinations regarding the size and boundary, as well as the merits, of the proposed ACEC are not supported by substantial evidence.

BLM also failed to conduct a reasonable review of the proposed boundaries of the ACEC. As defined, the proposed boundaries have no apparent nexus with the impacts of the Silver State South project or the "importance" criteria identified in BLM's evaluation report. The ACEC Evaluation Report asserts that the ACEC is important because of a "narrow area of habitat occupied by tortoises within the nomination area east of I-15 along the Lucy Gray Mountains

Cmnt 3-11

[72] FSEIS at 4-33.
[73] BLM also ignores the County's interest and role in tortoise conservation measures within the County in its analysis. *See* Desert Conservation Program Technical Review at 5-7 (**Exhibit H**).
[74] *Id.*
[75] *Lands Council v. Powell*, 379 F.3d 738, 744 (9th Cir. 2004), *amended & superseded by* 395 F.3d 1019, 1026 (9th Cir. 2005) (citing *Earth Island Inst. v. U.S. Forest Serv.*, 351 F.3d 1291, 1300 (9th Cir. 2003)).

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Response to Comments – Comment Letter 3

Response to Comment 3-10: The cumulative impact of the proposed Project and amendments to the LVFO RMP and reasonably foreseeable actions related to the Ivanpah Airport are based on best available information when the draft and final SEIS/PRMPA was prepared. The construction and operation of the Ivanpah Airport will be subject to analysis under NEPA which will require a more detailed project description and alternatives than is currently available.

Response to Comment 3-11: The BLM does not agree that the size and boundary, as well of the merits of the proposed ACEC are not supported by substantive evidence. The analysis provided in the final SEIS/PRMPA and USFWS's BO supports the BLM's decision.

Response to Comments – Comment Letter 3

that maintains population connectivity."[76] If that is the case, there is no reason for the boundary of the ACEC to encompass the Lucy Gray Mountains or land east of the mountains, or to extend north beyond the northern end of the mountains.[77] Inexplicably, substantial areas of the ACEC contain slopes of greater than 30%, which are not suitable for desert tortoise.[78]

In addition, any additional measures to increase tortoise recovery in conjunction with the Silver State South project should focus on implementing the highest priority measures in the 2011 Fish and Wildlife Service Revised Recovery Plan for the Mojave Population of the Desert Tortoise, rather than protecting habitat connectivity, which the Fish and Wildlife Service – *the agency charged with managing threatened and endangered species like the desert tortoise* – identifies as an action "typically ranked as mid- to lower-level priority."[79]

Moreover, a north-south corridor along the west side of the Lucy Gray Mountains is not necessary to preserve genetic or demographic connectivity between the Ivanpah critical habitat unit (CHU) located in California and the Piute-El Dorado CHU located partially in California and partially in Nevada. BLM's proposal to designate the ACEC is predicated on the purported need to facilitate demographic and genetic connectivity between these two desert tortoise CHUs.[80] But BLM's documents suggest that existing linkages, and the extensive tortoise conservation areas around the Project area, may be adequate to ensure connectivity. There is currently a *contiguous* area of over 4 million acres of tortoise conservation areas in the Project region, of which 75 percent is modeled as good habitat for the desert tortoise.[81] Within this contiguous area, "large swaths of both habitat and vegetation connectivity do remain between these two CHUs and between additional conserved areas in the region, thus *protecting demographic connectivity of these populations in the future*."[82] BLM's own Biological Assessment for the Project concluded that "[the extensive tortoise conservation areas] appear to have been well planned throughout the process of developing the 1994 and 2011 Recovery Plans to provide for habitat and densities at a very large scale *to protect both genetic and demographic connectivity for this species in the region*."[83] According to this conclusion, the proposed ACEC would, at best, be duplicative of existing protection for genetic and demographic connectivity between the two CHUs.

Cmnt 3-11 Cont'd

In addition, a model developed from data in BLM's June 2013 Rapid Ecological Assessment for the Mojave Basin and Range shows that areas with climatic conditions necessary for tortoises will contract sharply across their entire range.[84] This contraction is expected to essentially eliminate desert tortoises from most of the Ivanpah Valley (including the proposed ACEC) by 2060. The model also predicts that a significant portion of the Ivanpah Desert Tortoise CHU is also projected to develop climatic conditions that would largely eliminate favorable tortoise

[76] BLM, *ACEC Evaluation Report*, FSEIS at Appendix B (pages not numbered).
[77] *See* FSEIS at Fig. 2-2 (map showing proposed ACEC in BLM's Preferred Alternative).
[78] *See* FSEIS at App. G, *Supplemental Biological Assessment* at p. 20.
[79] FWS Revised Recovery Plan (2011) at 75-76 (**Exhibit L**) at 75-76. (*See* pp. 68-75 of the Revised Recovery Plan for the higher priorities.)
[80] FSEIS at 3-20; *see* map at FSEIS, App. G, *Supplemental Biological Assessment Silver State Solar South Project* (June 30, 2013) at Fig. 7.
[81] *Id.* at 25-26.
[82] *Id.* (emphasis added).
[83] *Id.* (emphasis added).
[84] Desert Conservation Program Technical Review at 5-7 (**Exhibit H**) (citing Comer, et al., 2013. *Mojave Basin and Range Rapid Ecological Assessment Report* (Prepared for the U.S. Department of Interior, Bureau of Land Management)).

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habitat by 2060, including the area that connects Ivanpah Valley with the Ivanpah CHU. If neither the Ivanpah Valley nor the Ivanpah CHU will provide conditions within known tolerances for tortoises, a corridor between these two areas would be unnecessary and any attempts at fostering connectivity among these two habitats will be futile.

There is no evidence presented in the FSEIS that BLM considered how designating this ACEC in a location projected to develop climatic conditions outside the known tolerances for desert tortoises within the lifespan of one tortoise generation could meaningfully contribute to genetic or demographic connectivity for the species.

Cmnt 3-11 Cont'd

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Response to Comments – Comment Letter 3

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LAS VEGAS METRO CHAMBER OF COMMERCE

October 16, 2013

Ms. Gayle Marrs-Smith
U.S. Bureau of Land Management- Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

RE: Final Supplemental Environmental Impact Statement for the Silver State South Solar Project and Proposed Las Vegas Field Office Resource Management Plan Amendment

Dear Ms. Marrs-Smith:

The Las Vegas Metro Chamber of Commerce ("Las Vegas Metro Chamber") is the largest business organization in Nevada, representing more than 5,500 employers in this community that support nearly 250,000 jobs for Nevada's workforce. The Las Vegas Metro Chamber is responding to the Bureau of Land Management (BLM)'s proposed resource management plan amendment.

By this letter, the Las Vegas Metro Chamber respectfully states its concerns regarding the amendment to the *Final Supplemental Environmental Impact Statement (FSEIS) for the Silver State Solar South Project and Proposed Las Vegas Field Office Resource Plan Amendment, DOI-BLM-NV-S010-2012-0067-EIS.*

In the FSEIS, two of the five alternatives propose to designate an Area of Critical Environmental Concern (ACEC) as part of the BLM's approval of the Silver State South Solar Project. This designation is wholly inconsistent with plans to develop and construct a Southern Nevada Supplemental Airport ("Supplemental Airport") in the same area. As a result, the designation would cause an adverse impact on a long-planned land use that is being designed to serve an important public and economic purpose in the region.

Cmnt 4-1

First, the Supplemental Airport is an essential component to the long-term economic sustainability of Southern Nevada and adjoining areas. The future of our region's economy depends on the ability to plan for growth in travel and tourism. Travel and tourism is the leading industry in Southern Nevada and the driver of our economy, with nearly 40 million people visiting Southern Nevada in 2012. Tourism generates a $45 billion economic impact in Southern Nevada, which in turn supports nearly 400,000 jobs or about 47 percent of the local workforce. There undoubtedly will be capacity limitations in the near future as McCarran International Airport experiences more and more traffic. Thus, the Supplemental Airport is viewed as a much needed potential asset.

Second, the site at issue has long been identified as an ideal location for the development and construction of the Supplemental Airport because of its favorable topography, close proximity to the Las Vegas metropolitan area and minimal environmental problems. A change in location would be contrary

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Las Vegas, Nevada 89113
(702) 641-5822
www.lvchamber.com

Response to Comments – Comment Letter 4

Response to Comment 4-1: As with any proposal on federally managed lands, the Supplemental Airport and associated infrastructure (e.g. roadways, flood control facilities, etc.) will be subject to analysis under the National Environmental Policy Act and consultation with the USFWS pursuant to section 7(a)(2) of the Endangered Species Act (50 CFR 402.02).

According to the Congressional legislation, the 17,000 acres of the noise overlay district; which includes portions of the ACEC identified under the BLM Preferred Alternative, would not be transferred to Clark County and the 6,000 acres already transferred to Clark County would revert to the BLM if the Federal Aviation Administration and BLM do not approve the airport in the record of decision.

LAS VEGAS METRO CHAMBER OF COMMERCE

to its historically intended use and inconsistent with long-standing efforts to prepare this site for the proposed airport. In this regard, the Las Vegas Metro Chamber supports Clark County in its efforts to continue the planning and development of this site for the Supplemental Airport, especially the Lucy Gray Modified Retention Facility, which is necessary for flood control prevention measures.

For the above reasons, the Las Vegas Metro Chamber requests that the BLM not approve the ACEC as outlined in the Silver State Solar South project. We respectfully request that BLM reflect the position of the Las Vegas Metro Chamber in its findings at the appropriate time. If I can be of assistance or provide any additional information, please do not hesitate to contact me.

Cmnt 4-1 Cont'd

Sincerely,

Kristin McMillan
President and CEO
Las Vegas Metro Chamber of Commerce

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Response to Comments – Comment Letter 4

The Nature Conservancy
Protecting nature. Preserving life.

THE NATURE CONSERVANCY
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Southern Nevada Office
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Tel 702-737-8744
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November 6, 2013

Gayle Marrs-Smith,
Las Vegas Field Manager (Acting)
4701 North Torrey Pines Drive
Las Vegas, NV 89130

Subject: Final Supplementary Environmental Impact Statement for the Silver State South solar facility

The Nature Conservancy (TNC) respectfully submits these comments to the Bureau of Land Management (BLM) regarding the Final Supplementary Environmental Impact Statement (Supplementary EIS) for the Silver State South solar facility and accompanying biological opinion authored by the Fish and Wildlife Service (FWS).[1]

The Nature Conservancy is an international conservation organization dedicated to the preservation of lands and waters upon which all life depends. We have been active in the Mojave Desert since the 1970s and have been active participants in the development of the Solar Programmatic Environmental Impact Statement (Solar PEIS) and the Desert Renewable Energy Conservation Plan (DRECP) among other policy forums related to siting renewable energy on public lands in the Mojave Desert. We were active participants in the Dry Lake pilot regional mitigation planning project and are working to contribute to the revision of the BLM's Las Vegas Resource Management Plan. TNC also has been actively involved in working with the Department of Interior on efforts to implement the mitigation hierarchy.

TNC's particular expertise in this case is in landscape-scale conservation science. TNC's *Mojave Desert Ecoregional Assessment* (2010) provides us with a rigorous basis for evaluating the direct, indirect and cumulative impacts of the decision to permit the Silver State South solar facility and to evaluate the accompanying and broader biological opinion by the Fish and Wildlife Service.

TNC supports the President's Climate Action Plan, including the goal of an additional 10,000 MW of renewable energy on public lands. However, this goal must not be met through the avoidable and irreplaceable loss of wildlife, critically important habitats, wildlife corridors and ecosystem function.

TNC applauds the Department of Interior (DOI) and BLM for its significant progress recently in moving toward the broad adoption of the mitigation hierarchy, by which infrastructure is sited to first avoid, then minimize, restore and mitigate for unavoidable adverse impacts to ecosystems. Specifically, BLM's "Interim Policy, Draft – Regional Mitigation"; and Secretarial Order 3330; and adoption of the hierarchy

[1] The Biological Opinion (BO) assesses the effects of two large-scale photovoltaic generation projects planned for adjacent public lands in the Ivanpah Valley. One project (Stateline Solar) would be located in California and one (Silver State South) in Nevada.

1

Response to Comments – Comment Letter 5

in the Solar PEIS, all represent important advances toward improved stewardship of conservation values of federal lands.

TNC also recognizes the difficulty faced by BLM in achieving an appropriate balance between multiple uses of public lands. The Federal Land Policy and Management Act (FLPMA) calls on BLM to protect the ecological values on public lands along with facilitating other important land uses.

In light of this context, TNC's science-based judgment is that the Supplementary EIS does not provide necessary or adequate protections for critically important habitat. As detailed below, TNC believes BLM's preferred alternative to site another large solar facility in the Ivanpah Valley in Nevada does not conform to the interests of the recovery of desert tortoise; converts irreplaceable, high quality habitat; and restricts an important tortoise corridor. Further, relative to the magnitude of the habitat values that will be lost, the mitigation measures are not sufficient in scope or magnitude, nor are they sufficiently durable. Lastly, BLM's preferred alternative for the Silver State South solar facility will have the effect of nullifying previous mitigation actions taken in the same landscape.

In particular we reference Secretarial Order 3330. Released on October 31st, 2013, it lays out a compelling rationale and vision for why balance is needed in managing public lands and how implementing the mitigation hierarchy is the principal strategy to achieve this balance. The Secretary recognizes mitigation as the full hierarchy: first avoiding impacts, then minimizing impacts, and finally compensating for unavoidable impacts with offsite mitigation measures. In particular, Secretarial Order 3330 states that central to implementing the mitigation hierarchy

> "...will be (1) the use of a landscape-scale approach to identify and facilitate investment in key conservation priorities in a region; (2) early integration of mitigation considerations in project planning and design; (3) ensuring the durability of mitigation measures over time; (4) ensuring transparency and consistency in mitigation decisions; and (5) a focus on mitigation efforts that improve the resilience of our Nation's resources in the face of climate change."

The Nature Conservancy agrees with both this vision and the approach outlined in the Order. Our specific comments below further outline the aspects of the proposed decision that are of concern to TNC.

I. The Preferred Alternative is Not Compatible with Available Landscape Scale Conservation Science. As noted in Secretarial Order 3330:

> "The Department of the Interior has significant review and permitting responsibilities over infrastructure development projects both on and off public lands. In executing those duties, the Department seeks to avoid potential environmental impacts from projects through steps such as advanced landscape-level planning that identifies areas suitable for development because of low or relatively low natural and cultural resource conflicts."

Three separate, rigorous landscape-scale studies and plans identify the Ivanpah Valley as an area of high ecological value that is inappropriate for large-scale renewable energy development, including TNC's *Mojave Desert Ecoregional Assessment*, the FWS's Desert Tortoise Recovery Plan, and BLM's Solar PEIS.

Cmnt 5-1

2

Response to Comments – Comment Letter 5

Response to Comment 5-1: The referenced studies and plans cited by the Nature Conservancy were evaluated in the analysis conducted for the BLM's Draft and Final Supplemental EIS/RMPA and Biological Assessment and the USFWS' Biological Opinion.

However, the EIS, the alternatives analyzed and ultimate selection of the Preferred Alternative, is based on the Applicant's proposal at a specific site. The draft and final SEIS/PRMPA and the USFWS's BO, adequately considers the effect the Preferred Alternative on the existing landscape in the Ivanpah Valley.

More specifically, the Desert Tortoise Recovery Office identified the Ivanpah Valley as important desert tortoise habitat and determined that existing bottlenecks to population connectivity in the valley around the Stateline area are problematic for the species survival and recovery. By removing an additional 2,427 and 3,881 acres of tortoise habitat (depending on the alternative selected), the construction of this facility will further diminish the Ivanpah Valley tortoise habitat, further constrict an already compromised genetic corridor for this population and in all probability reduce tortoise numbers.

Cmnt 5-1 Cont'd

II. Decisions Do Not Conform to the Mitigation Hierarchy. BLM's *Interim Policy, Draft – Regional Mitigation* states:

> "The priority order for mitigating resource impacts is to 1) avoid, 2) minimize, 3) rectify, or 4) reduce the impact over time, and if necessary, 5) mitigate outside the area of impact..." (P.1-6)

The Solar PEIS identifies as an avoidance area the place where the new project in the Preferred Alternative will be built. While the Solar PEIS does not govern specific permit terms for the "grandfathered" Ivanpah Valley plants, the scientific assessments contained in the Solar PEIS about the importance of species and their habitats in this valley are a valid basis for agency decisions in this case.

If the Silver State South solar facility is built, it will join two other very large already constructed solar facilities and a number of other existing and planned development projects, displacing and fragmenting habitat, in this valley of critical ecological importance. One of those solar facilities, the Bright Source project, has already removed more than 3,500 acres of high quality tortoise habitat, rendering the site of Silver State South proposed facility even more important for desert tortoises and makes the need to avoid further development in the Ivanpah Valley even more urgent.

Additionally, the experience of the nearby Bright Source Ivanpah solar project is instructive. The site was found to be far more densely populated by desert tortoises than pre-project surveys estimated. Based on this experience it is reasonable to believe that the resource values of the lands to be overlain by the Silver State project are likely even higher than is currently understood.

Cmnt 5-2

III. Nullification of Previous Mitigation Actions. The Supplemental EIS has the effect of nullifying a prior desert tortoise mitigation effort. In the early 1990's Clark County worked with The Nature Conservancy to purchase and retire the Jean Lake livestock grazing allotment (Figure 1). Money to acquire that allotment came from desert tortoise mitigation funds generated by the loss of tortoise habitat to development in the Las Vegas Valley, under the Short Term Desert Tortoise Habitat Conservation Plan. A portion of the lands underlying the Jean Lake livestock grazing allotment that were retired are now overlaid by the proposed footprint of the Silver State South solar facility.

This reversal for mitigation raises questions about the effectiveness of the broader administrative program for mitigation actions on federal lands. It calls for improvements so that mitigation decisions made at one time are not undone in subsequent decisions. At a minimum, the lost mitigation contemplated in the Supplemental EIS should be accounted for in the mitigation obligations of the new projects.

Cmnt 5-3

3

Response to Comments – Comment Letter 5

Response to Comment 5-2: The BLM has determined that mitigation measures contained in the final SEIS/PRMPA and the terms and conditions in USFWS's BO will reduce or eliminate potential environmental impacts associated with the proposed Project.

Response to Comment 5-3: Mitigation measures built into the Project design, along with BLM-required mitigations, and the terms and conditions associated with USFWS's BO, were developed based on potential impacts of construction, operation, maintenance, and decommissioning of the proposed Project. Mitigation for the Project includes more than $5 million in funding for compensatory mitigation and research to benefit tortoise recovery objectives of the USFWS. The USFWS and BLM have determined that this level of mitigation offsets Project impacts to the referenced lands and compensates for the conversion of lands.

IV. Insufficiency and Lack of Durability of Proposed Mitigation Measures. BLM's interim mitigation policy states:

> "The BLM should ensure adequate management, protection, and monitoring of the mitigation during the expected lifetime of the development project and its associated impacts."[2]

We agree that the duration of mitigation measures must last at least as long as the impacts of development. Given the long-lived nature of desert tortoise, and the extremely long time periods required for the natural systems of the Mojave Desert to recover from adverse impacts, successful mitigation and recovery of the species and systems will require continuity of management actions for decades or longer. **Cmnt 5-4**

While we believe that the proposed site of the Silver State South plant is not appropriate in the first place, the proposed mitigation requirements are not sufficient or durable. Following are our recommendations for improving the mitigation approach:

1. Law enforcement monitoring in the newly designated and expanded ACEC acreage east of the First Solar Silver State South facility should be funded for the duration of impacts from the project, not merely the three years as currently stated. OHV activity in the area will only increase with time as the Las Vegas Valley continues to grow and given that such recreation is increasingly limited across the border in California.
2. Speed-based OHV events should be prohibited from the newly expanded and designated Ivanpah Valley ACEC – such events will only further degrade the already severely compromised functionality of this now very narrow connectivity corridor. **Cmnt 5-5**
3. Genetic monitoring of the population of desert tortoise on either side of the connectivity bottleneck, which will be further narrowed, should include provisions for tracking the results for the duration of impacts of the proposed projects, which means that monitoring should extend beyond any lease renewals and through restoration of facility sites. **Cmnt 5-6**
4. The proposed expansion of the Ivanpah ACEC into Nevada should include specific prohibitions against additional linear features being added at a later date which would further fragment the remaining habitat for tortoises and the numerous other vertebrate and invertebrate residents of that valley. Additionally, the configuration of the ACEC should match that of the already acquired and retired Jean Lake livestock grazing allotment. This would ensure greater protection for many other species besides the desert tortoise and would also include the elevational gradient necessary for these species and natural communities to adapt to and respond to projected climate change. **Cmnt 5-7**
5. The existing fenced area for White-margined Penstemon just north of the proposed Silver State South project should be expanded to include all known occurrences of that rare plant species in the Jean Lake and Roach Lake areas. Additionally, since this is a sand endemic species dependent on the continued delivery of sand to its habitat area, the sand transport corridor from source to deposition zone should be marked off as a no-development, no-impedance zone so as not to endanger the viability of that ecosystem and its hallmark plant species. **Cmnt 5-8**

[2] Interim Policy, Draft Regional Mitigation Manual Section 1794 (June 2013).

4

Response to Comments – Comment Letter 5

Response to Comment 5-4: The BLM Las Vegas Field Office has a staff of Law Enforcement Rangers who provide a regular and recurring presence over the resource area.

Response to Comment 5-5: Special recreation permits are required by the BLM for competitive organized OHV racing events within the Jean / Roach Lake SRMA. These permits are typically applied for six months in advance of the event. OHV high-speed events are restricted during tortoise active periods and typically occur during the winter and summer months. A biological assessment and consultation with the USFWS must be completed before each race event.

Response to Comment 5-6: Genetic monitoring will be conducted per the terms and conditions of the USFWS's Biological Opinion.

Response to Comment 5-7: Any future request for a linear right-of-way will be evaluated under BLM's requirements under FLPMA and NEPA.

Response to Comment 5-8: Comment noted. However, the Project would avoid all areas known to host white-margined penstemon and thus would not substantially affect this species. Therefore, no mitigation is required.

6. The project proponents should be required to map and monitor the population occurrences of any Desert Kit Fox, Western Burrowing Owls or Gila Monsters within or surrounding their project areas so as to determine the impacts of their facilities on the movement or persistence of those increasingly threatened species. Such monitoring plans should be designed by appropriate experts in the ecology of those species and should be incorporated into the already planned tortoise monitoring plans. **Cmnt 5-9**

7. The project proposes to pump groundwater from a significantly over-appropriated and over-drafted groundwater basin. BLM has proposed only conditional mitigation for the effects of this use. We believe that BLM should require compensatory mitigation for the pumping, in addition to modeling and monitoring of its effects. **Cmnt 5-10**

8. We also want to note a concern from the biological opinion for both Silver State South and Stateline. The fees for both projects should be the same and should be higher than proposed– the $824/acre for one and only $105/acre for the other is inconsistent and inadequate to compensate for the loss of habitat. Mitigation actions required for each proposed facility should be compatible. **Cmnt 5-11**

V. Implications for Future Public Lands Decision-Making. As noted above, TNC is actively involved in both the DRECP and the process for updating the Las Vegas RMP. The Supplemental EIS has implications for these two policy processes insofar as it is resulting in the irretrievable loss of priority habitat and restriction of an important connectivity corridor in a landscape context. The preferred alternative for the Silver State South solar facility, if adopted, will also have implications for the proposed Stateline solar facility. **Cmnt 5-12**

Although no future action will be able to offset the habitat lost under the preferred alternative, as a result of the proposed actions there must be an increase in emphasis given to the effort to conserve the remaining high quality habitat areas in both the DRECP and the Southern Nevada District RMP. Successful conservation of the Mojave Desert cannot be achieved with piecemeal decision-making. It is critical that BLM and FWS develop and adhere to landscape-scale goals and strategies for ensuring that future losses of habitat to development do not result in the extirpation of key species and loss of key ecological processes and functionality. TNC would welcome the opportunity to work with BLM and FWS toward development of such comprehensive goals and strategies.

Sincerely yours,

Michael Cameron
Associate State Director
Nevada Chapter

Laura Crane
Director, Renewable Energy Initiative
California Chapter

5

Response to Comments – Comment Letter 5

Response to Comment 5-9: Comment noted. The BLM has developed MM BIO-11(Western Burrowing Owl Measures), MM BIO-12 (Gila Monster and Chuckwalla Measures), and MM BIO-15 (American Badger and Desert Kit Fox Impacts Reduction Measures) to reduce potential impact to the referenced species. The BLM considers this impact adequately mitigated and is not proposing additional measures.

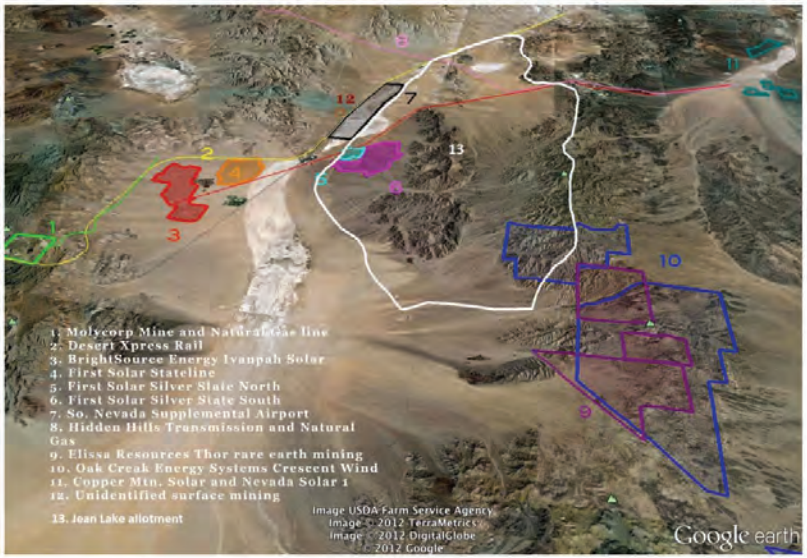
Response to Comment 5-10: Based on the drawdown study conducted for the Project and the re-charge agreement between the Applicant and Las Vegas Valley Water District, the proposed Project is not expected to have a substantial impact on groundwater supply or groundwater recharge.

The Nevada Division of Water Resources (NDWR) is responsible for management of Nevada's water resources. The NDWR, directed by the Nevada State Engineer, is responsible for the allocation of the public waters of the State, administering the law, and resolving disputes.

Response to Comment 5-11: Comment noted. Remuneration fees are determined in consultation with the BLM and the USFWS.

Response to Comment 5-12: Comment noted.

Figure 1 – Jean Lake Allotment (Polygon #13)



6

Response to Comments – Comment Letter 5

10/31/13 DEPARTMENT OF THE INTERIOR Mail - Re: Silver State Solar Project Final Supplemental EIS/PRMPA Notice of Availab...

Re: Silver State Solar Project Final Supplemental EIS/PRMPA Notice of Availab...

Snore1600rep@aol.com <Snore1600rep@aol.com> Sat, Sep 21, 2013 at 11:51 AM
To: Michael.Henry@amec.com
Cc: nancy_Christ@blm.gov

Your map that shows completive events is not accurate and does not have all tracks listed . You have missed events that have been permitted by the BLM since 1974 that run right though the middle of this project and would eliminate historic ohv activity . This project would work much better in baker California or on top of the Las Vegas convention center.

Cmnt 6-1

Ken Freeman

In a message dated 9/20/2013 1:20:04 P.M. Pacific Daylight Time, Michael.Henry@amec.com writes:

Dear Interested Party,

Attached please find a postcard announcing the availability of the Final Supplemental Environmental Impact Statement (EIS)/Proposed Las Vegas Field Office Resource Management Plan Amendment (PRMPA) for the proposed Silver State South Solar Project. You are receiving this email because you signed up for the project mailing list. Please refer to the attachment for information regarding the EIS as well as links to a website where you can download the document.

Michael Henry, PhD

Senior Environmental Scientist/Biologist

AMEC

Environment & Infrastructure

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amec.com

https://mail.google.com/mail/u/0/?ui=2&ik=80f18514cd&view=pt&search=inbox&th=141411dc91a2ef1a8 1/2

Response to Comments – Comment Letter 6

Response to Comment 6-1: Thank you for your comment. The BLM and Applicant worked closely with members of OHV groups including SNORE to identify and minimize impacts to existing, designated OHV routes. The Project layout has been altered from the original proposal to accommodate these OHV routes in and near the Project site.

COTTON•DRIGGS•WALCH
HOLLEY•WOLOSON•THOMPSON

WRITER'S EMAIL: TDRIGGS@NEVADAFIRM.COM

November 6, 2013

Via Email Brenda_Hudgens-Williams@blm.gov

Bureau of Land Management
Director (210)
Attn: Brenda Hudgens-Williams
P.O. Box 71383
Washington, D.C. 20024-1383

Bureau of Land Management
Director (210)
Attn: Brenda Hudgens-Williams
20 M Street SE, Room 2134LM
Washington, D.C. 20003

RE: N-85801, N-89530, N-90050, N-90823
2800 (NVS0100)

Dear Ms. Hudgens-Williams:

This office represents The Primadonna Company, LLC ("Primadonna") with respect to the above-referenced matters. Primadonna has reviewed the Final Supplemental Environmental Impact Statement (the "EIS") for the Silver State Solar South Project (the "Project") proposed by Silver State Solar Power South, LLC (the "Company"). Below for your consideration are comments to the EIS that have been prepared by our office and the Las Vegas office of MWH Americas, Inc. ("MWH") addressing various ground water issues. Some comments below relate to information received from meetings with Company representatives and a review of the West Yost Silver State Ground Water Impact Analysis report dated June 18, 2013.

Primadonna maintains and operates the four wells described in Section 3.5.3 of the EIS (the "Primadonna Wells"). We previously commented that Primadonna is concerned with the location of the proposed Project wells in relation to the Primadonna Wells and any adverse effects or draw down that may occur in the Primadonna Wells during the construction phase of the Project. This concern also includes any adverse effects to the water quality as one the Primadonna Wells –"Well 4"– is used for potable water service to the Walter M. Higgins Generation Station ("Higgins").

Primadonna's water permits associated with the Primadonna Wells allow pumping Primadonna's total combined duty of water. However, due to the sensitivity of the water quality issues in that portion of the Ivanpah North Basin, the Nevada State Engineer has directed Primadonna to pump water under those permits from wells located in California in an effort to reduce the water quality issues. Accordingly, Primadonna is concerned that the volume of pumping for the Project might adversely affect the water quality as well as water levels in the neighboring Primadonna Wells.

Cmnt 7-1

To address these concerns, we suggest that any permit issued to the Company for the Project include the following conditions during the construction phase of the Project and for a minimum period of one (1) year thereafter or until the TDS levels in Primadonna Well 4 are within 10% of the baseline (see No. 3 below):

400 SOUTH 4TH STREET - THIRD FLOOR - LAS VEGAS - NEVADA 89101 (702) 791-0308 FAX (702) 791-1912

08150-01/1180572.doc

Response to Comments – Comment Letter 7

Response to Comment 7-1: To address Primadonna Company's concern's, the BLM will adopt the proposed conditions in its ROD and any subsequent right-of-way grant(s), with the exception that the mitigation plan shall be developed in coordination with Primadonna Company and approved by BLM.

Bureau of Land Management
Attn: Greg Helseth
November 6, 2013
Page 2

1. The "**MM-Water-1: Groundwater Monitoring Plan**" detailed in Table 2-4 Proposed Mitigation Measures for Water Resources/Hydrology (4.5) of the EIS include monthly collection from the Project wells and the Primadonna Well 4, of the following data: (i) ground water production measurements; (ii) static water levels measurements; and (iii) water quality testing consisting of TDS measurements.

2. That Primadonna receive copies of all reports concurrently with the filing of such reports in accordance with the monitoring plan.

3. That the Company develop a mitigation plan acceptable to Primadonna in the event the Company's pumping degrades water quality in Primadonna Well 4 to the degree that Primadonna is unable to deliver potable water to Higgins. The parties will cooperate to develop a baseline water quality standard in Well 4 prior to the pumping of the Project wells.

Cmnt 7-1 Cont'd

The above described monitoring plan mirrors the monitoring plan that the Nevada State Engineer requires Primadonna to comply with on its production and monitoring wells in California to help document changes in the ground water system over time, and to allow future water production to be effectively planned and managed.

Notwithstanding the current BLM ROW process, the Company is presently working with Primadonna to develop a monitoring plan and mitigation plan to address Primadonna's concerns and minimize any adverse impacts to the water levels and water quality in Primadonna's wells.

For the reasons set forth above, Primadonna continues to be concerned that the ROW could adversely affect Primadonna's commercial operations and interests. Accordingly, Primadonna respectfully requests that BLM and the Company evaluate and address such concerns in connection with any approval of the proposed ROW.

Sincerely,

COTTON, DRIGGS, WALCH,
HOLLEY, WOLOSON & THOMPSON

Thomas D. Driggs

TDD:tdd
cc: Bob Swadkins
Marc Rubinstein
Angela MacKinnon
Marilyn Skender

08150-01/1180572.doc

Response to Comments – Comment Letter 7

SERVICE ROCK PRODUCTS CORPORATION
151 Cassia Way
Henderson, Nevada 89014
Phone: (702) 798-0568 Fax: (702) 798-0580

RECEIVED BLM
SOUTHERN NEVADA
DISTRICT OFFICE
2013 SEP 23 PM 3:34

September 20, 2013

Timothy Smith
District Manager
Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, Nevada 89130

Dear Mr. Smith:
Service Rock Products (SRP) has enjoyed a good working relationship with the Bureau of Land Management (BLM) for a number of years. While we have not always agreed on every issue, we have worked cooperatively to find common ground in our joint efforts to meet public demands in the Las Vegas Valley and elsewhere. To this end, I wish to share a concern that our company has with a proposed Area of Critical Environmental Concern (ACEC) being contemplated in the Final Supplemental Environmental Impact Statement (FEIS) for the Silver State solar project. We realize there will be an opportunity to provide formal comments once the FEIS is released to the public. Notwithstanding that opportunity, we wish to raise our concern prior to your issuance of the FEIS in hopes of avoiding conflict with potential mineral material sales in and around Sheep Mountain (T. 25 S., R. 60 E.). The proposed ACEC as described in Alternative D of the Draft EIS appears to include lands in this vicinity. If designated an ACEC as proposed, the management prescriptions would limit and/or preclude viable management options in the area for SRP as well as the BLM.

The Sheep Mountain area has been a topic of on-going discussions between the BLM and our company since 2006. That year, the BLM, SRP, and Tyrell Builders LLC entered into a formal settlement agreement (copy attached) which resulted in the release of previous mining claims in Anthem and elsewhere in return for future consideration of a mineral material sale in the Sloan area. The settlement agreement specified that alternative sites would be evaluated if the Sloan site was not approved by the BLM. The BLM and SRP acted in good faith to evaluate the Sloan site for a mineral material sale, expending over $1 million to complete required studies and related analysis, only to have public opposition force the BLM to deny our application. As a result of the BLM decision at Sloan, SRP and the BLM have been evaluating the Sheep Mountain area as a likely alternative site.

Cmnt 8-1

It appears that Sheep Mountain has suitable aggregate materials that would make the area an excellent source for the Las Vegas Valley market. Given the number of planning constraints already in place which limit the development of mineral material sites in Clark County, we hope the BLM would conduct a more thorough analysis of both the environmental and economic impacts prior to approving even more constraints. The Las Vegas metropolitan area is experiencing an increase in the number of building permits being issued after years of being

Response to Comments – Comment Letter 8

Response to Comment 8-1: Through the planning process (43 CFR 1610.4-1; Identification of Issues), the BLM analyzed an ACEC nomination brought forth during the public scoping period for the Project. To be eligible for designation as an ACEC, an area must meet the relevance and importance criteria described in 43 CFR 1610.7-2 and BLM Manual 1613.

An interdisciplinary team, consisting of BLM management and resource specialists, determined that portions of the nominated acreage in Nevada met the relevance and importance criteria for the Agassiz's desert tortoise. The remainder of the ACEC nomination area in Nevada is currently being addressed through the Las Vegas Field Office RMP revision process, with the California portion being evaluated in the Desert Renewable Energy Conservation Plan currently in progress in California.

Page 2 of 2

affected by a major economic recession. Continued economic recovery is dependent on affordable aggregate materials, among other factors.

Most of the Las Vegas Valley is currently off-limits to sand and gravel mining due to conflicts with nearby residential development and existing BLM initiated closures. The designation of an ACEC should not be considered as part of mitigation when evaluating the proposed Silver State Solar project. When addressing the proposed Silver State Solar Project in the Draft EIS, the BLM stated its intent to consider concurrent amendment of the Las Vegas Field Office Resource Management Plan to:

1) *Remove the Project footprint from the Jean Lake/Roach Lake SRMA;*

2) *Revise the VRM classification of lands within the Project footprint from VRM Class III to VRM Class IV to ensure management is consistent with existing and planned land use; and*

3) *Designate a 30,912-acre or 31,859-acre ACEC and identify management prescriptions for a portion of the proposed ACEC nomination in accordance with 43 CFR Section 1610.7 - 2- Designation of areas of critical environmental concern.*

   If the BLM decides to issue the ROW grant, this will require BLM to also approve at least #1 and #2 from above. The BLM preferred alternative for the RMP amendment identified in this Draft Supplemental EIS is to approve these two RMP amendments.

Cmnt 8-1 Cont'd

Given the terms of our existing settlement agreement with the BLM and the joint efforts we have undertaken during the past eight years to implement the provisions of that settlement, we cannot support any designation of an ACEC in the Jean area unless such designation occurs as part of a much broader land use planning effort and only after a robust analysis of the true impacts of that designation are known to the public.

Sincerely,

Michael W. Jasberg
President

Attachment (1)

cc: Amy Lueders, BLM Nevada State Director

Response to Comments – Comment Letter 8

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Wm. Jerry Silva
Project Manager

November 6, 2013

United States Department of Interior
Bureau of Land Management
Attn: Ms. Nancy Christ, Renewable Energy Project Manager
4701 North Torrey Pines Drive
Las Vegas, NV 89130-2301

Re: Silver State Solar South Project Final Supplemental Environmental Impact Statement

Dear Ms. Christ,

Thank you for the opportunity to comment on First Solar's Final Supplemental Environmental Impact Statement (SEIS) for the Silver State Solar South Project.

The attachment to this transmittal is provided via one e-mail message which contains Southern California Edison's (SCE) comments on the Silver State Solar South Project Final SEIS, circulated for public review on September 20, 2013. We request that BLM consider and address our comments prior to making the final land use planning and implementation decisions related to the Project.

We sincerely appreciate your consideration. If you have any questions, you may contact Messeret Yilma via telephone (626-302-7810), or e-mail (Messeret.Yilma@sce.com).

Sincerely,

Jerry Silva

CC:

Messeret Yilma, SCE
Phuong Trinh, SCE
Ken Borngrebe, First Solar

6 Pointe Drive
Brea, CA 92821
(626) 827-9510
Jerry.Silva@SCE.com

Response to Comments – Comment Letter 9

TABLE 1

SSSS FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (Final SEIS)
SCE COMMENTS AND SUGGESTED REVISIONS

No	Section	Page	FSEIS Text Revision	Comments and Justification	
1.	2.4.1 Proposed Project Components	2-20, bullet 5	The **enclosed** Primm Substation will ~~be within~~ **measure** an area approximately 600 feet by ~~310~~ **470** feet and will **be within an area approximately 850 feet by 730 feet, which includes an access road for the substation.** ~~i~~Included **inside the substation is** all of the equipment required for the 220-kV interconnection of the transmission line from the South Substation to SCE's Eldorado-Ivanpah transmission line. Silver State will own the gen-tie up to the "dead end structure" (the last **generation tie-line structure** ~~transmission pole~~ before the Primm Substation), and SCE will own and operate the Primm Substation. The Primm Substation would be an unattended, automated, switchrack with three positions equipped and an ultimate build out of ~~five~~ **eight** positions. This switching station (no power transformation) would be surrounded by a wall with **four** ~~two~~ gates. For more information, see Primm Substation Project Technical Description, attached as Appendix E.	The revisions reflect the current design.	**Cmnt 9-1**
2.	2.4.1 Proposed Project Components, Substations, Transmission Lines, and Interconnections	2-20, bullet 6	The Primm Substation would be connected to the Eldorado-Ivanpah 220-kV Transmission Line No. 2 via loop-in transmission segments. The proposed loop-in of the existing Eldorado-Ivanpah 220-kV No. 2 transmission line would require approximately ~~three~~ **four** double-circuit transmission lattice steel tower structures of 110 to 150 feet in height to enter the Primm Substation.	The revisions reflect the current design.	**Cmnt 9-2**
3.	2.4.1 Proposed Project Components, Communication Facilities	2-21, bullet 1	Fiber optic cable would be installed from a local service provider to the Project. Cable would be installed underground or on overhead lines along the Project access road to the O&M building and South Substation. In addition, cable would be installed within the transmission line corridor between the South Substation and Primm Substation.	SCE notes that these facilities would belong to the generator's portion of the project.	**Cmnt 9-3**
4.	2.4.1 Proposed Project Components,	2-21, bullet 2	Diverse fiber optic cable would be installed from Primm Substation to a new microwave site approximately 2 miles south	The revisions reflect the current design.	**Cmnt 9-4**

SSSS Final SEIS 1
SCE November 2013

Response to Comment 9-1 through 9-4: The proposed revisions are noted and are included in an errata attached to the Record of Decision.

No	Section	Page	FSEIS Text Revision	Comments and Justification	
	Communication Facilities		of Primm Substation in Nevada, east of Big Horn Substation. The new microwave site is approximately ~~125~~ **200** feet by ~~125~~ **200** feet; the microwave site would include a communication building, microwave tower, **communication manhole, distribution manhole, and a** generator/fuel tank ~~and fiber cable entry facility~~. A microwave path would be constructed from this microwave site to the Ivanpah Substation.		**Cmnt 9-4 Cont'd**
5.	2.4.1 Proposed Project Components, Communication Facilities	2-21, bullet 4	~~A m~~**M**icrowave ~~dish~~ **antennas** would be installed at both the ~~Project~~ **Primm Microwave Communication** site and ~~the~~ Ivanpah Substation to provide a redundant communication path. The microwave ~~dish~~ **antennas** located at the Project site would be installed on a ~~monopole or~~ lattice **steel tower** structure. Two redundant fiber optic cable communication lines would be installed underground from the Primm Substation to the ~~microwave dish location~~ **Primm Microwave Communication** site. The communication cable would be installed ~~within the proposed gen-tie corridor and along non-Project security fence~~ **in the diverse underground conduit along the access road**.	The revisions reflect the current design.	**Cmnt 9-5**

6.	2.4.1 Proposed Project Components, Communication Facilities	2-21, bullets 5 and 6	• ~~Approximately 1,500 feet of underground fiber would be constructed from the Primm substation to an Eldorado-Ivanpah 220 kV transmission line tower northeast of Primm substation to connect to the optical ground wire on that transmission line tower. This is for the communication path to the Eldorado Substation.~~
			• ~~Approximately 1,500 feet of underground fiber would be constructed from the Primm substation to an Eldorado-Ivanpah 220 kV transmission line tower southwest of the Primm substation to connect to the optical ground wire on that transmission line tower. This is for the communication path to the Ivanpah Substation.~~
			• **The optical ground wire (OPGW) constructed for the Eldorado Ivanpah 220 kV Transmission Line Project (EITP) would be tap spliced at separate transmission structures and routed to Primm Substation as follows:**
			  ○ **OPGW to Eldorado Substation would splice to non-conductive fiber cable at an existing EITP structure southeast of Primm Substation and enter the Primm Substation MEER via existing and new conduit system and cable trench;**
			  ○ **OPGW to Ivanpah Substation would enter Primm Substation via 1,500 feet of new OPGW**
				The revisions reflect the current design.	**Cmnt 9-6**

SSSS Final SEIS 2
SCE November 2013

Response to Comments – Comment Letter 9

Response to Comment 9-5 through 9-6: The proposed revisions are noted and are included in an errata attached to the Record of Decision.

No	Section	Page	FSEIS Text Revision	Comments and Justification	
			from an existing EITP structure south of Primm Substation to the Primm Substation dead-end rack, splice to non-conductive fiber cable, and continue to the MEER in new conduit system and cable trench; ○ **OPGW connecting Eldorado Substation to Ivanpah Substation would splice to non-conductive fiber cable in new conduit system between two lattice tower locations adjacent to the Primm Substation access road;** ○ **Where required, OPGW is spliced in a three-foot by three-foot by one-foot enclosure mounted on structures approximately 20 to 30 feet above ground.**		**Cmnt 9-6 Cont'd**
7.	2.4.1 Proposed Project Components, Water Supply	2-22	In addition to the Water Services Agreement, the Applicant is exploring other potential water sources to meet anticipated water demand of between 800 AF and 1,185 AF. This includes filing for additional temporary water (construction dust control) with the Nevada State Engineer and negotiating to obtain existing private water rights. This additional temporary water, if necessary, would be obtained from the on-site wells. **SCE may use water from an off-site location during construction through a separate agreement with Las Vegas Valley Water District.** Based on groundwater modeling (as described further in Section 4.5.2.2), the impacts associated with additional water use for the Project would not result in any significant increase in impacts compared with the impacts described in the Draft Supplemental EIS/PRMPA.	SCE plans to use water during construction from a separate source.	**Cmnt 9-7**
8.	Table 2-4, Proposed Mitigation Measures, MM BIO-8	2-36	For all non-raptor bird species, biologists shall survey within the proposed Project area. Because there are no standardized disturbance buffers for active non-raptor bird nests, the Applicant shall consult with the appropriate agencies (BLM, USFWS, and NDOW) ~~**on a case-by-case basis when active nests are found in Project areas, unless directed to do otherwise by all these agencies**~~ **when required by the approved Bird and Bat Conservation Strategy**.	The Bird and Bat Conservation Strategy does not require consultation on a case-by-case basis for certain species.	**Cmnt 9-8**
9.	Table 2-4, Proposed Mitigation Measures, MM VIS-1	2-40	The exterior of the inverter boxes and the exterior of the O&M building, walls or fences surrounding switchyard/ substation facilities, PCS stations, and lighting fixtures and poles, will be factory treated with a non-specular dull finish or using the BLM-standard environmental color Shadow Gray or Covert Green to minimize contrast with the existing landscape. If a fixed-tilt	SCE does not have the Corten (weathering steel) color treated steel included in its current standards. Corten components have been noted to reduce the efficiency of connecting hardware. It has also been noted to require extensive maintenance	**Cmnt 9-9**

SSSS Final SEIS 3
SCE November 2013

Response to Comments – Comment Letter 9

Response to Comment 9-7 through 9-9: The proposed revisions are noted and are included in an errata attached to the Record of Decision.

No	Section	Page	FSEIS Text Revision	Comments and Justification	
			design is chosen, the PV panel mounting clips shall be treated with a non-specular dull finish or using the BLM standard environmental color Shadow Gray or Covert Green. Whatever finish is chosen shall be used consistently for all structures to be color treated, not including transmission towers and fencing. The fence and weather station towers will be a non-specular dull finish to be approved by BLM prior to procurement and installation. Steel transmission or distribution ~~towers or~~ poles will be color treated of the rust exterior type (Corten or similar). Other panel support structures (i.e., posts, tables), temporary water tanks and other temporary construction support facilities, will not be color treated.	costs to reduce the probability of foundation component deterioration. Corten treated structure components do not currently meet SCE's personal protective grounding requirements for providing the highest level of worker safety while working on transmission lines. SCE would have to run tests and modeling to determine what impacts Corten has on the conductivity of the structure and requirements needed to make the structure safe from a personal grounding aspect. Since SCE does not have this type of structure in its standards, SCE cannot accept this structure as one of the options for structure finish without further testing and validation that it "could" somehow meet SCE's standards for personal protective grounding. SCE has used the dulled finish galvanized steel lattice components for other structures in the area of this project. SCE suggests that using the same type of finish for the steel transmission towers would better suit the needs of the agency in that it would blend in with the recently constructed existing EITP transmission structures installed near the Silver State Solar South Project next to the Primm Substation site.	**Cmnt 9-9 Cont'd**
10.	4.4.2.2, Alternative B –Applicant's Proposed Project, Effect SOILS-4: Effects on biological soils crusts	4-16	MM SOILS-3 would ensure that a study is funded to evaluate effective mitigation strategies for cryptobiotic soils that could be used to reduce impacts from this and other future projects that involve disturbance of desert soils.	SCE understands that providing funds for the study would complete the Applicant's responsibility under MM SOILS-3 and that no additional actions from the Applicant would be required.	**Cmnt 9-10**

SSSS Final SEIS 4
SCE November 2013

Response to Comments – Comment Letter 9

Response to Comment 9-10: The proposed revisions are noted and are included in an errata attached to the Record of Decision.

11/7/13 DEPARTMENT OF THE INTERIOR Mail - Comment on Final Supplemental EIS

Comment on Final Supplemental EIS

Jared Fuller <jgillenfuller@yahoo.com> Mon, Nov 4, 2013 at 4:02 PM
Reply-To: Jared Fuller <jgillenfuller@yahoo.com>
To: "SilverStateSouthEIS@blm.gov" <SilverStateSouthEIS@blm.gov>

Although the preferred alternative is an improvement of the other alternatives, ideally, the Silver State South solar project should not be built.
The project will harm populations of rare plants, other vegetation, desert tortoise, and other wildlife and their habitats. Recreational and visual resources will also be affected.
At the least, the solar field and the runoff control features should be further reduced in size, the tortoise connectivity corridor between the mountains and the project widened, and the area containing the Utah swallow-wart populations excluded from any disturbance. Also, more desert tortoise habitat could be protected under the ACEC/DWMA designations.

Cmnt 10-1

Jared G. Fuller
Pleasant Grove, UT
84062

https://mail.google.com/mail/b/957/u0/?ui=2&ik=2744c743ae&view=pt&search=inbox&th=1422591bda3e46d1 1/1

Response to Comments – Comment Letter 10

Response to Comment 10-1: Thank you for your comment. Impacts to biological, recreational, and visual resources were fully analyzed in the Draft and Final Supplemental EIS. The BLM worked closely with the Applicant and other agencies (e.g. USFWS, USACE, etc.) to minimize impacts to the environment. Any right-of-way grant(s) issued for the Project will be conditioned on implementation of mitigation measures, monitoring programs and agreements/protest resolutions as identified in the ROD.

Appendix E: Final SEIS/PRMPA Errata

The errata section of this Record of Decision (ROD) illustrates the BLM's revisions to the Final SEIS/PRMPA. The revisions have been developed from either comments received following the release of the Final SEIS/PRMPA and/or BLM's internal review of the Final SEIS/PRMPA. All revisions are shown with gray shading. Strikeouts indicate that text has been removed for the ROD. Italicized and underlined text indicates that text has been added to or revised for the ROD.

alternatives analyzed in the Draft Supplemental EIS/PRMPA, and thus involves no new areas of effect.

BLM Preferred Alternative

Since the publication of the Draft Supplemental EIS/PRMPA, the Applicant has developed a new Project layout to address public and agency concerns related to desert tortoise connectivity within the Ivanpah Valley, as well as agency and public interest in a reduced-scale alternative. The new Project layout is referred to as the BLM Preferred Alternative. The addition of this new alternative in this Final Supplemental EIS/PRMPA is consistent with the Council for Environmental Quality (CEQ) regulations (40 C.F.R. ~~*1509(c)*~~*1505.1(e))* guidance allowing an agency to develop new alternative(s) that are variations of alternatives analyzed in a Draft EIS and do not result in significant new impacts. This new layout is located entirely within the footprint of the alternatives analyzed in the Draft Supplemental EIS/PRMPA and is smaller in total area, representing a reduction of over 20 percent in total acreage in comparison to Alternative D. Thus, the BLM Preferred Alternative involves no new areas of effect and, in fact, reduces the Project's environmental impacts in comparison to those identified in the Draft Supplemental EIS/PRMPA.

The BLM Preferred Alternative is smaller in area and electricity generation capacity is reduced as compared to other action alternatives – 250 MW_{AC} for the BLM Preferred Alternative versus 350 MW_{AC} for Alternative B, C, or D. The BLM Preferred Alternative incorporates site layout modifications based on ongoing discussions with resource agencies, stakeholder groups, and comments received during the Draft Supplemental EIS/PRMPA public comment period (October 15, 2012 through January 11, 2013). The layout has been designed to address concerns associated with desert tortoise connectivity corridor characteristics and impacts to jurisdictional water of the U.S., and continues to minimize impacts to recreational areas in the Jean Lake/Roach Lake SRMA. The proposed footprint remains within the area evaluated in the 2010 Final EIS and Draft Supplemental EIS/PRMPA, and incorporates a 31,859-acre ACEC.

As with the other action alternatives, the layout for the BLM Preferred Alternative would include facilities for interconnection to Southern California Edison's (SCE) transmission system via the proposed Primm Substation (refer to Appendix E for technical description). Construction of the Project facilities and related infrastructure would disturb a total area of 2,427 acres. The solar field and ancillary facilities, including internal circulation roads would occupy approximately 1,898 acres inside the perimeter fencing. About 529 acres of the facility footprint would be located outside the perimeter fencing *(but within desert tortoise fencing)* including drainage facilities, the Primm Substation and associated infrastructure, including a 12-kilovolt (kV) distribution line from the NV Energy Bighorn Substation along the Project access road, interconnection facilities, and a maintenance road that would intersect the site. The maintenance road would allow public access through the Project area by connecting existing recreational routes that traverse the Project area. Acreages associated with other Project components under the BLM Preferred Alternative are listed in Table ES-1.

Drainage controls under the BLM Preferred Alternative would consist of detention basins and associated drainage channels. The drainage structures would be located along the eastern edge of the solar arrays, and would result in a permanent disturbance of 374 acres. As noted in Table 2-

1, and depending on final design, the drainage facilities may be located inside or outside the perimeter fence *but would remain within tortoise fencing*. In addition, the BLM Preferred Alternative would avoid drainages delineated by the U.S. Army Corps of Engineers (USACE) as jurisdictional waters of the US.

The BLM Preferred Alternative also includes a 31,859-acre area being considered for designation as an ACEC and management prescriptions that would be required for the designated ACEC. This is a portion of the area nominated by Basin and Range Watch, and was determined by a BLM Interdisciplinary Team to meet the relevance and importance criteria for consideration as an ACEC (refer to Appendix B for BLM evaluation of ACEC nomination).

No Action Alternative

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 CFR §1502.14[d]). The No Action Alternative is included in the analysis so that the EIS clearly evaluates the effects of not amending the LVFO Resource Management Plan and not developing the Silver State Solar South Project. For this analysis, the No Action Alternative includes the following:

- The BLM would deny the ROW application and not amend the LVFO RMP. Existing management of the area would continue in accordance with the current LVFO RMP.
- The proposed Project would not be built, and any environmental and socioeconomic impacts associated with construction and operation would not occur, including the benefits associated with a 250- to 350-MW_{AC} renewable energy source.

Alternative B – Proposed Action

Alternative B is the Applicant's proposal as described in their draft Plan of Development (CH2M HILL 2011). It is similar to Phases II and III of the Proposed Action (Alternative 2) evaluated in the 2010 Final EIS, but the layout of the Project, including solar arrays, drainage facilities and appurtenant structures, has been revised since 2010 to avoid potential impacts to resources, particularly to jurisdictional waters of the United States. The proposed generating capacity remains the same (350 MW_{AC}) as evaluated in the 2010 Final EIS.

Under Alternative B, Project facilities are proposed to be sited north of the location evaluated in the 2010 Final EIS, encompassing portions of the revised ROW application area not analyzed in the 2010 Final EIS. This revised layout avoids impacts to waters of the U.S. Construction of the Project facilities and related infrastructure would disturb a total area of 3,881 acres, of which 1,640 acres would be located in the portion of the ROW application area not analyzed in the 2010 Final EIS.

Project and related facilities inside the perimeter fence under Alternative B would cover approximately 3,796 acres. This would include limited amounts of open space between the perimeter roads and the arrays, as well as drainage facilities. Limited development would also occur outside the perimeter fencing, with approximately 85 acres that would include the Primm Substation and associated infrastructure, including a 12-kilovolt (kV) distribution line from the

approximately 501 acres of the facility footprint located outside the perimeter fencing, including drainage facilities, the Primm Substation and associated infrastructure, including a 12-kV distribution line from the NV Energy Bighorn Substation along the Project access road, interconnection facilities, an approximately 1-mile long 220-kV transmission line to interconnect the South Substation with SCE's Eldorado to Ivanpah 220-kV transmission line, perimeter roads around the exterior of the site and 2.45 miles of maintenance roads which would intersect the site. The maintenance roads would allow public access through the Project area by connecting existing recreational routes that traverse the Project area. Acreages associated with other Project components under Alternative D are listed in Table ES-1.

Drainage controls located outside the perimeter fence *but within the desert tortoise fencing* would consist of two detention basins and associated drainage channels. The drainage structures would result in a permanent disturbance of 364 acres.

Alternative D also includes a 30,912-acre area being considered for designation as an ACEC and management prescriptions that would be required for the designated ACEC. This is a portion of the area that was nominated by Basin and Range Watch, and was determined by a BLM Interdisciplinary Team to meet the relevance and importance criteria for consideration as an ACEC (refer to Appendix B for BLM evaluation of ACEC nomination).

Comparison between Alternatives

Table ES-1. Facility Features of Each Action Alternative

Project Components	BLM Preferred Alternative	Proposed Action (Alternative B)	Alternative Layout (Alternative C)	Modification to Proposed Action Layout (Alternative D)
Project Within Perimeter Fence [a] (Approximate Acres)				
Solar Field and Ancillary Facilities	1,898	3,796	2,449	2,609
Facilities Outside Perimeter Fence [a] (Approximate Acres)				
Drainage Facilities	374[b]	Included in the solar field	29[b]	364[b]
Primm Substation (SCE) Switchyard and Laydown	34	34	34	34
220 kV Transmission Line (Silver State South Substation to the Project Switchyard)	28[c]	23	16	13
34.5-kV Collection Lines	0	6	4	0
Temporary Construction Mobilization Area	28	8	4	28

Table ES-1. Facility Features of Each Action Alternative

Project Components	BLM Preferred Alternative	Proposed Action (Alternative B)	Alternative Layout (Alternative C)	Modification to Proposed Action Layout (Alternative D)
Maintenance Road	65	14	11	63
Total Disturbance Acreage	**2,427 acres**	**3,881acres**	**2,546acres**	**3,110 acres**

[a] The tortoise fence is considered the perimeter fence for the purposes of these calculations.
[b] The location of drainage facilities relative to the perimeter fence will be determined during final design, and will be documented in the subsequent Plan of Development. For the purposes of this table, the drainage facilities are presented as being outside the perimeter fence *but within the desert tortoise fencing.*
[c] The acreage provided represents the upper range of potential disturbance associated with 220 kV and/or 230 kV transmission lines for interconnection to the California or Nevada markets.
An 11.7-acre area comprising the existing maintenance road for Silver State North would also be used for the Project under all action alternatives, but would not constitute new disturbance.

Alternatives Considered but Eliminated from Detailed Analysis

A number of alternatives were recommended during the scoping period for the Supplemental EIS/PRMPA. The alternatives put forth were similar to alternatives suggested during the EIS process for the Silver State Solar Energy Project analyzed in the 2010 Final EIS, including consideration of alternative technologies; alternative locations (i.e., brownfield development, alternative BLM lands and lands in California); and alternative size and layout.

Following the close of the Supplemental EIS/PRMPA scoping period, the BLM reviewed all comments to determine which alternatives should be carried forward for detailed analysis. Concerns surrounding impacts to interstate drainages, desert tortoise connectivity and other special status species, and impacts to recreational areas in the Jean Lake/Roach Lake SRMA, led to the development of alternatives (Alternative D and the BLM Preferred Alternative) that consider modification of the Project layout.

Other suggested alternatives such as alternative technologies and locations were eliminated from further analysis as they were not viable and did not meet BLM's purpose and need. Specific details describing why these alternatives are not viable, is provided in *Section 2.2.3* in the 2010 Final EIS.

ENVIRONMENTAL IMPACTS

Proposed Action and Alternatives

The environmental effects of constructing, operating, maintaining, and decommissioning the solar facility for the Proposed Action and Alternatives are summarized in Table ES-2 below.

Table ES-2. Comparison of Effects from Alternatives (Continued)

Resource (Section)	No Action Alternative	Alternative B – Proposed Action	Alternative C – Alternative Layout	Alternative D – Modification to Proposed Action Layout	BLM Preferred Alternative
		of non-native species. Clearing and grading activities has the potential to remove populations of yellow twotone beardongue, a BLM sensitive species. Construction could directly affect wildlife by loss and fragmentation of cover, breeding, and foraging habitat. These activities and vehicle use could cause direct mortality to wildlife. Human activity would likely cause most wildlife species to avoid the Project area until the disturbance conditions have concluded. Transmission poles could also pose a direct collision hazard to birds. Human activities could potentially provide food or other attractants which could draw unnaturally high numbers of opportunistic predators and scavengers. Loss of burrows due to construction could also cause wildlife to search for	footprint and the Lucy Gray Mountains would be approximately 1.12 miles wide at its narrowest point, and would be an average of 1.73 miles along the entire corridor. This corridor would be wider than the corridor formed under the Proposed Action, and would be approximately the width of the narrowest portion of the existing corridor at the northern end of the ROW application area.	D would be similar to Alternative B. The primary difference would be that the connectivity corridor between the Project footprint and the Lucy Gray Mountains would be approximately 0.51 miles wide at its narrowest point with an average of 1.07 miles width across the total corridor. This corridor would be intermediate to the corridors formed by Alternative B and Alternative C, and would be less than half the width of the narrowest portion of the existing corridor at the northern end of the ROW application area. Designation of the ACEC under Alternative D would reduce the amount of native vegetation that may be affected by future ground-disturbing actions; and result in increased protection for vegetation, wildlife and wildlife	footprint and the Lucy Gray Mountains would be approximately ~~*1.26*~~ *1.39* miles wide at its narrowest point~~*, with an average corridor width of 1.53 miles or greater*~~. This corridor would be wider than the corridor formed under the Proposed Action. Designation of the ACEC under the BLM Preferred Alternative would reduce the amount of native vegetation that may be affected by future ground-disturbing actions; and result in increased protection for vegetation, wildlife and wildlife habitat, and special status species in the designated area.

Table ES-2. Comparison of Effects from Alternatives (Continued)

Resource (Section)	No Action Alternative	Alternative B – Proposed Action	Alternative C – Alternative Layout	Alternative D – Modification to Proposed Action Layout	BLM Preferred Alternative
		or dig new burrows. Infrastructure development could alter wildlife movement in the area and just outside the boundary of Project. Fences and transmission poles could also cause increased predation wildlife because raptors could use the infrastructure for perches. Loss of vegetation could indirectly reduce available forage and shelter, degrading and fragmenting existing higher quality habitat. Effects would be both short- and long-term. Alternative B could result in direct or indirect effects on birds protected by the Migratory Bird Treaty Act *from the loss of habitat as well as project features such as solar panels, transmission lines, and fences.* Desert tortoise are present on-site and could be adversely affected by the		habitat, and special status species in the designated area.	

Other suggested alternatives such as alternative technologies and locations were eliminated from further analysis as they were not viable and did not meet BLM's purpose and need. Specific details describing why these alternatives are not viable are provided in Section 2.2.3 in the 2010 Final EIS; this Supplemental EIS/PRMPA tiers from that analysis.

2.3 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.3.1 BLM Preferred Alternative

The BLM Preferred Alternative was developed by the Applicant after the Draft Supplemental EIS/PRMPA was published through close consultation with the USFWS, BLM, and USACE to reduce impacts to the desert tortoise and jurisdictional waters (Figure 2-1). During this consultation, the Applicant developed iterations of a revised Project layout that were reviewed by USFWS, BLM and USACE and refined based on agency feedback.

The BLM Preferred Alternative is smaller in area and electricity generation capacity is reduced as compared to other action alternatives – 250 MW_{AC} for the BLM Preferred Alternative versus 350 MW_{AC} for Alternative B, C, or D. The BLM Preferred Alternative incorporates site layout modifications based on ongoing discussions with resource agencies, stakeholder groups, and comments received during the Draft Supplemental EIS/PRMPA public comment period (October 12, 2012 through January 11, 2013). The layout has been designed to address concerns associated with desert tortoise connectivity corridor characteristics and impacts to jurisdictional waters of the US, and continues to minimize impacts to recreational areas in the Jean Lake/Roach Lake SRMA. The proposed footprint remains within the area evaluated in the 2010 Final EIS and Draft Supplemental EIS/PRMPA, and incorporates a 31,859-acre ACEC similar to Alternative D (Figure 2-2). This alternative would also require the BLM to reduce the acreage of the SRMA by the Project footprint, and change the VRM class from VRM Class III to IV for the Project footprint.

The layout for the BLM Preferred Alternative is shown in Figure 2-1, and would include facilities for interconnection to Southern California Edison's (SCE) transmission system via the proposed Primm Substation. Construction of the Project facilities and related infrastructure would disturb a total area of 2,427 acres. The solar field and ancillary facilities, including internal circulation roads would occupy approximately 1,898 acres inside the perimeter fencing. About 529 acres of the facility footprint would be located outside the perimeter fencing *(but within tortoise fencing)* including drainage facilities, the Primm Substation and associated infrastructure, including 12-kilovolt (kV) distribution line from the NV Energy Bighorn Substation along the Project access road, interconnection facilities, and a maintenance road that would intersect the site. The maintenance road would allow public access through the Project area by connecting existing recreational routes that traverse the Project area. Acreages associated with other Project components under the BLM Preferred Alternative are listed in Table 2-1.

Drainage controls under the BLM Preferred Alternative would consist of detention basins and associated drainage channels. The drainage structures would be located along the eastern edge of

the solar arrays, and would result in a permanent disturbance of 374 acres. As noted in Table 2-1, and depending on final design, the drainage facilities may be located inside or outside the perimeter fence*, but would remain within the tortoise fencing*. In addition, the BLM Preferred Alternative would avoid drainages delineated by the USACE as jurisdictional waters of the US.

2.3.2 Alternative A - No Action Alternative

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 CFR §1502.14[d]). The No Action Alternative is included in the analysis so that the EIS clearly evaluates the effects of not amending the LVFO RMP and not developing the Silver State Solar South Project. For this analysis, the No Action Alternative includes the following:

- The BLM would deny the ROW application and not amend the LVFO RMP. Existing management of the area would continue in accordance with the current LVFO RMP.
- The Silver State Solar South Project would not be built on this site, and any environmental and socioeconomic impacts associated with construction and operation at this site would not occur, including the benefits associated with a utility-scale renewable energy source.

Figure 2-3 depicts the current land use in the ROW application area and vicinity. Under the No Action Alternative, land use would remain the same.

2.3.3 Alternative B – Proposed Action

Alternative B is the Applicant's proposal as described in their draft Plan of Development (CH2M HILL 2011). It is similar to Phases II and III of the Proposed Action (Alternative 2) evaluated in the 2010 Final EIS, but the layout of the Project, including solar arrays, drainage facilities and appurtenant structures, has been revised since 2010 to avoid potential impacts to resources, particularly to jurisdictional waters of the United States. The proposed generating capacity remains the same (350 MW_{AC}) as evaluated in the 2010 Final EIS.

Project facilities under Alternative B are proposed to be sited north of the location evaluated in the 2010 Final EIS, encompassing portions of the revised ROW application area not analyzed in the 2010 Final EIS. This revised layout avoids impacts to waters of the U.S. Construction of the Project facilities and related infrastructure would disturb a total area of 3,881 acres, of which 1,640 acres would be located in the portion of the ROW application area not analyzed in the 2010 Final EIS. This alternative would require the BLM to reduce the acreage of the SRMA by the Project footprint, and change the VRM class from VRM Class III to IV for the Project footprint.

Project and related facilities inside the perimeter fence under Alternative B would cover approximately 3,796 acres. This would include limited amounts of open space between the perimeter roads and the arrays, as well as drainage facilities. Limited development would also occur outside the perimeter fencing, with approximately 102 acres that would include the Primm Substation and associated infrastructure, including a 12-kV distribution line from the NV Energy Bighorn Substation along the Project access road, an approximately 1-mile long 220-kV

transmission line, an *Applicant* ~~*First Solar*~~ switchyard, temporary construction mobilization area, perimeter roads around the exterior of the site, and 2.87 miles of maintenance roads that intersect the site. The maintenance roads would allow public access through the Project area by connecting an existing recreation route from the northwest of the Project area to an existing recreation route to the southeast. Proposed drainage controls include two drainage basins connected by a drainage channel. The drainage basins and connecting channel would be directly aligned with the eastern edge, and on the inside, of the perimeter fence and outside delineated jurisdictional waters.

Acreages associated with each Project component under Alternative B are listed in Table 2-1. These disturbance areas would be removed from the SRMA and their VRM classification would be changed from III to IV.

Table 2-1. Facility Features of Each Action Alternative

Project Components	BLM Preferred Alternative	Proposed Action (Alternative B)	Alternative Layout (Alternative C)	Modification to Proposed Action Layout (Alternative D)
Project Within Perimeter Fence [a] (Approximate Acres)				
Solar Field and Ancillary Facilities	1,898	3,796	2,449	2,609
Facilities Outside Perimeter Fence [a] (Approximate Acres)				
Drainage Facilities	374[b]	Included in the solar field	29	364
Primm Substation and Laydown	34	34	34	34
220 kV Transmission Line (Silver State South Substation to the Primm Substation)	28[c]	23	16	13
34.5-kV Collection Lines	0	6	4	0
Temporary Construction Mobilization Area	28	8	4	28
Maintenance Road	65	14	11	63
Total Disturbance Acreage	**2,427 acres**	**3,881acres**	**2,546 acres**	**3,110 acres**
Previously Disturbed Silver State North Access Road to Be Used	12 acres	12 acres	12 acres	12 acres

Table 2-1. Facility Features of Each Action Alternative

Project Components	BLM Preferred Alternative	Proposed Action (Alternative B)	Alternative Layout (Alternative C)	Modification to Proposed Action Layout (Alternative D)
[a] The tortoise fence is considered the perimeter fence for the purposes of these calculations. [b] The location of drainage facilities relative to the perimeter fence will be determined during final design, and will be documented in the subsequent Plan of Development. For the purposes of this table, the drainage facilities are presented as being outside the perimeter fence *but would be within tortoise fencing.* [c] The acreage provided represents the upper range of potential disturbance associated with 220 kV and/or 230 kV transmission lines for interconnection to the California or Nevada markets.				

When comparing the acreages of the four action alternatives (Table 2-1), it is important to note that the difference in acreages between Alternative B, C, and D are primarily related to drainage control design. Since the 2010 Final EIS, the Applicant has conducted further analysis of the drainages originating in the Lucy Gray Mountains to the east. This analysis has led to the design of detention basins and drainage channels for Alternatives B and D to ensure that the downstream discharge of storm water flow does not exceed pre-Project conditions. The proposed detention facilities for the BLM Preferred Alternative, Alternative B, and D require more acreage than the berm and channel system proposed for Alternative C. However, Alternatives B, D, and the BLM Preferred Alternative have the benefit of eliminating impacts to jurisdictional drainages identified for Alternative C.

Figure 2-4 shows the proposed site layout for Alternative B.

2.3.4 Alternative C – Alternative Layout

Alternative C represents Phases II and III of the Proposed Action (Alternative 2) as described in Section 2.2.2 of the 2010 Final EIS (BLM 2010). Project and related facilities would disturb a total area of 2,546 acres, all within the 7,925-acre ROW application area analyzed in the 2010 Final EIS. Acreages for major Project components under Alternative C are listed in Table 2-1. Figure 2-5 shows the proposed site layout for Alternative C. This alternative would require the BLM to reduce the acreage of the SRMA by the Project footprint, and change the VRM class from VRM Class III to IV for the Project footprint.

The maintenance roads would allow public access through the Project area by connecting an existing recreation route from the northwest of the Project area to an existing recreation route to the southeast. Drainage controls under Alternative C would consist of a series of up to five earthen drainage control berms that would contain surface runoff flows to existing primary drainages (storm water flow corridors) across the site. The berms would be constructed to a height of 3 to 5 feet above grade with a top width of approximately 15 feet. The 2010 Final EIS identified that the Alternative C drainage structures (Alternative 2 in the 2010 Final EIS) would result in impacts to waters of the U.S.

the top. Controlled access gates would be located at the site entrance and along the perimeter road to allow maintenance and security access to all portions of the Project site.

Substations, Transmission Lines, and Interconnections

- An onsite substation for Phase I, designated the South Substation and owned by Silver State, with 34.5-kV to 220-kV step-up transformer, breakers, buswork, protective relaying and associated substation equipment. The South Substation would provide interconnection to deliver renewable energy from the proposed Project to the California market via the Primm Substation and SCE's Eldorado to Ivanpah 220-kV transmission line. The South Substation area would be approximately 500 feet square. The highest point within the South Substation would be approximately 85 feet above grade, at the interconnection point with the 220-kV transmission line.

- Under Alternative B, C, or D, an onsite substation for Phase II with characteristics similar to the Phase I substation above, but with either 220-kV or 230-kV step-up transformers depending on which transmission system, SCE's Primm Substation, or NV Energy's Bighorn Substation, is required for Project interconnection. Figure 2-1 identifies a potential Phase II substation location. The final location will be determined based on the Phase II interconnection location, and final design considerations.

- An approximately 1-mile long 220-kV transmission line to interconnect the South Substation with SCE's Eldorado to Ivanpah 220-kV transmission line via the proposed Primm Substation.

- Under Alternative B, C, or D, an approximately 3.7- or 4.2-mile-long 220-kV transmission line to interconnect Phase II facilities to SCE's Primm Substation, or a 2.3- or 3.7-mile-long 230-kV transmission line to interconnect Phase II facilities to NV Energy's Bighorn Substation depending on which market is being served. The location and length of the transmission line will depend on the Phase II substation location selected.

- The *enclosed* Primm Substation will ~~*be within*~~ *measure* an area approximately 600 feet by ~~*310*~~ *470* feet and will *be within an area approximately 850 feet by 730 feet, which includes an access road for the substation. Included inside the substation would be* all of the equipment required for the 220-kV interconnection of the transmission line from the South Substation to SCE's Eldorado-Ivanpah transmission line. Silver State will own the gen-tie up to the "dead end structure" (the last *generation tie-line structure*~~*transmission pole*~~ before the Primm Substation), and SCE will own and operate the Primm Substation. The Primm Substation would be an unattended, automated, switchrack with three positions equipped and an ultimate build out of ~~*five*~~ *eight* positions. This switching station (no power transformation) would be surrounded by a wall with *four* ~~*two*~~ gates. For more information, see Primm Substation Project Technical Description, attached as Appendix E.

- The Primm Substation would be connected to the Eldorado-Ivanpah 220-kV Transmission Line No. 2 via loop-in transmission segments. The proposed loop-in of the existing Eldorado-Ivanpah 220-kV No. 2 transmission line would require approximately

four ~~*three*~~ double-circuit transmission lattice steel tower structures of 110 to 150 feet in height to enter the Primm Substation.

- Overhead 12-kV transmission lines and poles would be installed by NV Energy from Bighorn Substation along the Project access road to provide power for construction and operation of the Project, including the Primm Substation and required communication facilities (refer to Appendix E). The design of these elements is preliminary at this time, but have been included in the disturbance area for the Project.

Communication Facilities

The Project would require a communication system to the site from a local service provider. In addition, the Project will require a communication system between the South Substation and the Primm Substation as well as between the Primm Substation and the Ivanpah Substation. Redundant paths are required between the Primm Substation and the Ivanpah Substation and from Primm Substation to Eldorado Substation to provide reliability within the electrical transmission system. Two different types of communication (microwave and fiber) are preferred for redundancy. Detailed specifications for the communications facilities are provided in Appendix E.

- Fiber optic cable would be installed from a local service provider to the Project. Cable would be installed underground or on overhead lines along the Project access road to the O&M building and South Substation. In addition, cable would be installed within the transmission line corridor between the South Substation and Primm Substation.
- Diverse fiber optic cable would be installed from Primm Substation to a new microwave site approximately 2 miles south of Primm Substation in Nevada, east of Big Horn Substation. The new microwave site is approximately *200* ~~*125*~~ feet by *200* ~~*125*~~ feet; the microwave site would include a communication building, microwave tower, *communication manhole, distribution manhole, and a* generator/fuel tank ~~*and a fiber cable entry facility*~~. A microwave path would be constructed from this microwave site to the Ivanpah Substation.
- At the Ivanpah Substation, a microwave antenna/cable would be installed on the existing microwave tower/facility at Ivanpah Substation to communicate over the air path to the new microwave site.
- ~~*A*~~*M*icrowave ~~*dish*~~ *antennas* would be installed at both the *Primm Microwave Communication* ~~*Project*~~ site and the Ivanpah Substation to provide a redundant communication path. The microwave *antennas* ~~*dish*~~ located at the Project site would be installed on a monopole or lattice *steel tower* structure. Two redundant fiber optic cable communication lines would be installed underground from the Primm Substation to the *Primm Microwave Communication site* ~~*microwave dish location*~~. The communication cable would be installed ~~*within the proposed gen-tie corridor and along non- Project security fence*~~ *in the diverse underground conduit along the access road.*
- ~~*Approximately 1,500 feet of underground fiber would be constructed from the Primm substation to an Eldorado-Ivanpah 220-kV transmission line tower northeast of Primm substation to connect to the optical ground wire on that transmission line tower. This is for the communication path to the Eldorado Substation.*~~

- *The optical ground wire (OPGW) constructed for the Eldorado Ivanpah 220 kV Transmission Line Project (EITP) would be tap spliced at separate transmission structures and routed to Primm Substation as follows:*
    - *OPGW to Eldorado Substation would splice to non-conductive fiber cable at an existing EITP structure southeast of Primm Substation and enter the Primm Substation MEER via existing and new conduit system and cable trench;*
    - *OPGW to Ivanpah Substation would enter Primm Substation via 1,500 feet of new OPGW from an existing EITP structure south of Primm Substation to the Primm Substation dead-end rack, splice to non-conductive fiber cable, and continue to the MEER in new conduit system and cable trench;*
    - *OPGW connecting Eldorado Substation to Ivanpah Substation would splice to non-conductive fiber cable in new conduit system between two lattice tower locations adjacent to the Primm Substation access road;*
    - *Where required, OPGW is spliced in a three-foot by three-foot by one-foot enclosure mounted on structures approximately 20 to 30 feet above ground.*

Other Ancillary Facilities

- Weather stations (steel lattice towers) up to 33 feet in height mounted on concrete foundations.

Water Supply

Under the terms of its Water Service Agreement with Las Vegas Valley Water District (LVVWD) and in conjunction with the prior approval of the Silver State Solar North Project, Silver State implemented a program whereby it will treat all of the waste water generated by the Jean Prison in Jean, Nevada, to “Class B” standards (as defined by the NDEP) and infiltrate the treated waste water back to the groundwater basin through rapid infiltration basins in the Jean area (LVVWD 2011). The wastewater treatment facility is associated with the Gold Strike Hotel and Casino in Jean. The agreement required Silver State to complete this facility by January 1, 2013, which it did. In return, LVVWD will supply a maximum of 21 acre-feet per year (AFY) of water through an existing groundwater well which will be used by the Silver State Solar North Project for long-term operations and maintenance.

In addition, the LVVWD shall supply additional water to the Silver State Solar South Project, through two proposed onsite groundwater wells, to be used for dust control during construction and a nominal amount of water for potable and sanitary supplies during operations. The water wells would be drilled to an estimated depth of 800 feet. Estimated well depth is based on existing groundwater basin information and actual depth may vary. The amount of water available to the Project for construction under the Water Services Agreement would be a minimum of 200 AFY or 600 AF total. The Project is expected to use between 800 AF and 1,185 AF in total for construction. Operational water for the Project would be drawn from the same 21 AFY allotment for the Silver State Solar North Project.

In addition to the Water Services Agreement, the Applicant is exploring other potential water sources to meet anticipated water demand of between 800 AF and 1,185 AF. This includes filing for additional temporary water (construction dust control) with the Nevada State Engineer and

negotiating to obtain existing private water rights. This additional temporary water, if necessary, would be obtained from the on-site wells. *SCE may use water from an off-site location during construction through a separate agreement with LVVWD.* Based on groundwater modeling (as described further in Section 4.5.2.2), the impacts associated with additional water use for the Project would not result in any significant increase in impacts compared with the impacts described in the Draft Supplemental EIS/PRMPA.

Temporary Facilities

Construction of the Project would require the following temporary facilities. These temporary facilities would be removed at the end of the construction period.

- Temporary water storage ponds would be constructed as needed to maintain dust control during construction.
- An approximately 30-acre temporary construction mobilization and laydown area. The temporary mobilization and laydown area would contain temporary construction trailers, owner and construction workforce parking, above-ground water tanks, materials receiving and materials storage. The temporary mobilization and laydown area would be graded/compacted earth.
- Temporary construction utilities would include temporary power connection to the NV Energy distribution or SCE transmission systems adjacent to the Project, temporary power generator, and temporary above-ground water line.

2.5 PROJECT CONSTRUCTION

Construction of the Project, from receipt of environmental clearances to commercial operation, is expected to take place as early as the third quarter of 2013 to the fourth quarter of 2016. The Project construction sequence and activities would be similar under any of the Project alternatives, but would occur over a shorter duration under the reduced-scale BLM Preferred Alternative. Major construction activities include:

- Environmental clearances
- Tortoise fence installation
- Preparation of the site access and laydown areas
- Construction of on-site wells and temporary water storage ponds
- Construction of drainage facilities
- Construction of maintenance road
- Solar field site preparation
- Preparation of the O&M area
- Installation of the drainage control facilities
- Construction of the substation and switchyard
- Construction and installation of transmission lines
- Installation of the PV equipment
    - Prepare trenches for underground cable
    - Install underground cable
    - Backfill trenches

2.6.1 Decommissioning

The economic lifespan of the Project is expected to be in the range of 20 to 30 years, depending upon the availability of agreements with utility off-takers. At the end of the Project's useful economic life, the facilities would be either repowered or decommissioned. Due to the excellent solar resource at the Project area, repowering is a potential option. This may involve retrofitting existing components with updated, more efficient components; thereby extending the useful economic life of the Project.

The procedures described for decommissioning in the 2010 Final EIS are designed to ensure public health and safety, environmental protection, and compliance with applicable regulations. Decommissioning would begin after cessation of commercial operations.

The Project goals for site decommissioning are as follows:

- Remove above-ground structures, unless converted to other uses
- Restore the lines and grades in the disturbed area of the Project area to match the natural gradients of the site
- Re-establish native vegetation in the disturbed areas

If approved, the ROW authorization for the proposed Project would include a required Performance and Reclamation bond to ensure compliance with the terms and conditions of the ROW authorization, consistent with the requirements of 43 CFR 2805.12(g). The Performance and Reclamation bond would consist of three components: hazardous materials; decommissioning and removal of improvements and facilities; and reclamation, revegetation, restoration, and soil stabilization.

2.7 APPLICANT-PROPOSED MEASURES AND MITIGATION MEASURES

Applicant Proposed Measures (APMs) include project design features or mitigation requirements that have been incorporated into the proposed Project or alternatives to avoid or reduce adverse impacts to the surrounding environment. Such measures are implemented through the design process to minimize such impacts or avoid them altogether, and also through the development of site-specific management and operation plans.

APMs include the preparation of management plans, which would be similar to those submitted to and approved by the BLM prior to issuance of the notice to proceed on the $50MW_{AC}$ Silver State Solar North project. The APMs for the proposed Project are listed in Table 2-3 below.

In addition, construction of the Project would be subject to agency-required mitigation measures that are intended to guide construction activities and development of facilities to minimize environmental and operational impacts. Required mitigation measures are provided in Table 2-4 below. These APMs and mitigation measures, unless otherwise stipulated, would be required for implementation of any of the action alternatives.

It is understood that *the Applicant* ~~*First Solar*~~ and its contractors would implement the APMs it has proposed as part of its Project. Under the FLPMA, the BLM may impose conditions on any

Table 2-3. Applicant-Proposed Measures (Continued)

Streambank stabilization
BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion controls will be adjusted accordingly to control storm water runoff at the downgrade perimeter.

Sediment Control Measures
Sediment controls are intended to complement and enhance selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. The Project will incorporate sediment control measures required by regulatory agency permits and contract documents as well as other measures selected by the contractor. The Project will implement the following practices for temporary sediment control:

Year-round:
- The installation of detention ponds to control all storm water flow off site. The ponds will be designed to control sediment transport off site, *and will be enclosed within desert tortoise fencing*. Sediment will be removed from the ponds periodically and transported off site to a designated fill area.
- Maintain the following temporary sediment control materials onsite: silt fence materials, gravel bags for linear barriers, and fiber rolls in sufficient quantities throughout the Project site to implement temporary sediment controls in the event of predicted rain and to respond to failures or emergencies, in conformance with General Permit requirements and as described in the SWPPP. Install gravel filter berms at the base of slopes adjacent to delineated sensitive areas. Native onsite stones/rocks will be used in construction of gravel filter berms or check dams.
- Install gravel filter berms along the boundaries of delineated sensitive areas, if any, within the boundaries of the Project site or areas that receive runoff from the Project site. Native onsite stones/rocks will be used in construction of gravel filter berms or check dams.

During the rainy season:
Implement temporary sediment controls at the draining perimeter of disturbed soil areas, at the toe of slopes, and at outfall areas.

During the non-rainy season:
Implement temporary sediment controls such as hay bales, fiber rolls, or gravel bags at the draining perimeter of disturbed soil areas. A combination of the following sediment controls may be used at the site:
- Silt fence
- Sediment basin
- Sediment trap
- Check dam
- Fiber rolls
- Gravel bag berm
- Street sweeping and vacuuming

BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, sedimentation controls will be adjusted accordingly to control storm water runoff at the downgrade perimeter.

APM-2 EXCAVATION/GRADING
Prior to trench excavation, the area to be trenched will be graded and organic matter removed. Organic matter will be mulched and re-deposited within the site fill except under foundations and in trenches. Trench excavation will be performed with conventional trenching equipment. Excavated soil to be used as backfill will be maintained adjacent to the trench. Excessive soils may be balanced on site or transported to an offsite disposal facility. Sand slurry may also be used in the backfill, if the slurry composition is approved in advance by BLM. Excavated soil to be used as backfill will not be removed from the Project site. Temporary sheeting or bracing shall be used as necessary to support trench side walls in areas where soils are soft or collapsible. For trench work not conducted by SCE, the trench itself will be first backfilled with 3 to 4 inches of sand to provide suitable bedding for installed conductors, and then 3 to 4 inches of sand will be deposited on top of installed conductors. The remaining backfill will be composed of the native excavated soils or slurry and soils to be compacted to a density determined appropriate based on detailed geotechnical study findings and design requirements. During the backfill, underground utility

Table 2-3. Applicant-Proposed Measures (Continued)

- Regrading and restoration of original site contours; and
- Revegetation of areas disturbed by closure activities in accordance with the Site Rehabilitation Plan.

APM-11 AERONAUTICAL CONSIDERATIONS
Because of the proximity to the proposed Southern Nevada Supplemental Airport, the Applicant would file Notices of Proposed Construction or Alternation (Form 7460s) with the Federal Aviation Administration (FAA) prior to Project construction. The FAA review process will identify any aviation-related lighting requirements.

APM-12 VEGETATION TRIMMING
Except where excavation and grading is proposed, vegetation will be trimmed to an average height of not more than 12 inches. In these areas, the root systems of existing vegetation will be left in place to provide soil stability.

APM-13 CULTURAL
If archaeological properties are found to be eligible for National Register of Historic Places (NRHP) listing, the BLM will assess the potential adverse impact of the Project and *the Applicant would prepare* a plan to mitigate any potentially adverse impacts in consultation with BLM and Nevada SHPO. The Applicant shall be responsible for the costs to mitigate the discovery and any associated costs that may relate to curation.

APM- 14 ENVIRONMENTAL CLEARANCE
Initial site mobilization activities in each construction section would include environmental clearance in which site activities are reviewed and approved for compliance with resource protection plans and approved construction-compliance documents. Environmental clearance activities would:

- Be performed in each of the proposed Project construction sections as they are constructed;
- First be obtained for the site access roads, construction water storage pond and O&M area. Subsequent clearances would be obtained for each of the remaining major tasks;
- Delineate and mark the boundaries of each construction area during each phase of environmental clearance;
- Would use professional biologists to meet cactus salvage requirements, survey and relocate/translocate desert tortoise, and perform other sensitive species removal and mitigation;
- Install security and tortoise fencing around the perimeter of each construction area to prevent the reintroduction of sensitive species to the area; and
- Occur only during weather conditions permitted for the activity.

APM–15 GENERAL DESIGN AND CONSTRUCTION STANDARDS
The proposed Project would be designed in accordance with federal, state, local, and industrial code or standards.

APM- 16 ESTABLISH A PLANT NURSERY DURING CLEARING OF THE PROJECT SITE.
The proposed Project would establish a plant nursery on site during clearing as necessary in order to store salvage plants, including cactus and yucca that are protected under Nevada state law (Nevada Revised Statutes [NRS] 527.060-120 and Nevada Administrative Code [NAC] 527). As determined necessary, before clearing, field crews would salvage cacti and yucca to meet requirements established by the State. As determined by the BLM, plants would be made available for commercial and public use.

APM-17 PESTICIDE USE PROPOSAL

- Use of pesticides, insecticides, rodenticides, and herbicides (generally referred to here as pesticides) shall comply with all applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses within limitations imposed by the Secretary of the Interior. Prior to the use of the pesticides the Applicant shall obtain from the Authorized Officer, written approval of a Pesticide Use Proposal Plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, locations of storage and disposal of containers, and any other information deemed necessary by the Authorized Officer.
- Only those chemicals (pesticides) listed on the BLM approved label list are authorized for use on public lands. A Pesticide Use Proposal must be submitted for each chemical used, and it cannot be used until approval has been obtained in writing from the Authorized Officer. The proposal needs to identify any surfactants or dyes used in the spraying operation. Applicator(s) of chemicals used must have completed pesticide certification training and have a current up to date Certified Pesticide Applicator's License. Pesticide application records for the areas and acres treated must be submitted to the Authorized Officer each year. This includes the following:
    - Brand or Product name
    - EPA registration number

Table 2-4. Proposed Mitigation Measures (Continued)

MM SOILS-2: Ensure Soils are of the Same Soil Type. The Applicant shall ensure that imported soils are consistent in texture and drainage characteristics to existing on-site soils before use on the site. At the request of the BLM, soils shall be tested to ensure they are of the same soil type as pre-construction soils.

MM SOILS-3: Cryptobiotic Soil Mitigation Study Funding. The Applicant shall provide $50,000 in funding for a BLM study to analyze effective ways to mitigate the loss of cryptobiotic soils.

Water Resources/ Hydrology (Section 4.5)

MM WATER-1: Groundwater Monitoring Plan. The Applicant shall develop and implement a Groundwater Monitoring Plan during Project construction and operations. The plan shall include metering of Project wells and monthly reports to LVVWD and quarterly water use reports to the BLM and State Engineer. *The Plan will include monthly collection of the following data from the Project wells and the Primadonna Well 4 during construction when significant water use is occurring, but not operation when such use will be minimal: (i) ground water production measurements; (ii) static water levels measurements; and (iii) water quality testing consisting of TDS measurements. Primadonna shall receive copies of all reports concurrently with the filing of such reports in accordance with the monitoring plan. The Applicant shall develop a mitigation plan in coordination with Primadonna and acceptable to the BLM in the event the Project pumping degrades water quality in Primadonna Well to the degree that Primadonna is unable to deliver potable water. The parties will cooperate to develop a baseline water quality standard in Well 4 prior to the pumping of the Project wells.*

MM WATER-2: Operational Phase Erosion and Sedimentation Control Measures. The Applicant shall develop and implement erosion and sedimentation control measures to be used to minimize impacts during the life of the Project. At a minimum, this plan shall include:

- Soil stabilization measures to offset loss in vegetation;
- Biannual and post-storm monitoring of erosion and sedimentation;
- Annual monitoring of the surface of Ivanpah Dry Lake and Roach Dry Lake to assess effects of sedimentation;
- Monitoring at Roach Dry Lake will be conducted in a manner that will not interfere with the Southern Nevada Supplemental Airport; and
- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient to control surface water at the site. Any changes must be approved by the BLM.

MM WATER-3:Flood Risk Control Measures. The Applicant shall develop and implement flood risk control measures to minimize impacts during the life of the Project. These measures shall include, as appropriate, adhering to the recommendations presented in the Applicant's Initial Site Drainage Plan for the project proposed in the 2010 Final EIS (BLM 2010). At a minimum, this plan shall include:

- PV panels will be installed to remain a minimum of 6 inches above the high water mark, based on flood depth estimates;
- Steel post foundations (8 to 12 feet in depth) in flood-prone areas would be designed to withstand a minimum of 1.5 feet of scour; and
- Adaptive management of actions if erosion and sedimentation control measures are found to be insufficient or excessive or if flooding proves to be destructive. Any changes must be approved by the BLM.
- Ensure construction facilities do not cause inadvertent flooding (e.g., ensure temporary roads do not block drainage outlets).

MM WATER-4:Storm Water Monitoring and Response plan. The Applicant shall develop and implement a storm water monitoring and response plan to minimize impacts from flood damage during the life of the Project. At a minimum, this plan shall include:

- Visual surveys of all structures for scour following major storm events;
- Visual surveys of fencing to check for damage and/or debris;
- Cleanup of broken equipment if failures occur;
- Inspection and cleanup of downstream areas if debris is transported off site;
- Adaptive management of flood protection and erosion actions if the monitoring plan reveals routine damage to Project structures due to flooding. Any changes must be approved by the BLM.

MM WATER-5:Drainage Crossing Design. *The Applicant will actively seek to avoid placement of infrastructure in drainages and commit to the use of existing natural washes, with adequate buffers, to the greatest extent*

Table 2-4. Proposed Mitigation Measures (Continued)

practicable. If drainages cannot be avoided by infrastructure placement, then the Applicant shall design drainage crossings to accommodate estimated peak flows and ensure that natural volume capacity can be maintained throughout construction and upon post-construction restoration. This measure is necessary to minimize erosion and degradation to which drainages are subject.

Biological Resources (Section 4.6)

MM BIO-1. Preconstruction Surveys. Preconstruction surveys shall be coordinated by the Applicant and conducted by qualified botanists. Areas to be surveyed shall include mowing areas, brush clearing areas, and ground disturbance areas within habitat deemed suitable for sensitive species. These surveys shall be conducted for the presence of special status plants and noxious weeds to prevent direct loss of plants and to prevent the spread of weeds.

MM BIO-2. Best Management Practices. Crews will be directed by the Applicant to use BLM-approved BMPs, where applicable. These measures will be identified by the Applicant and approved by BLM prior to construction and incorporated into the construction operations.

MM BIO-3. Biological Monitors. Biological monitors shall be assigned by the Applicant to the proposed Project in areas of sensitive biological resources. The monitors shall be responsible for ensuring that impacts on special status species would be avoided to the fullest extent possible. Where appropriate, monitors shall flag the boundaries of areas where activities would need to be restricted to protect native plants or special status species. Those restricted areas shall be monitored to ensure their protection during construction.

MM BIO-4. Facility Siting. Final site layout and spur road locations shall be adjusted by the Applicant to avoid sensitive biological resources to the greatest extent feasible, *and shall remain within the Project ROW area.*

MM BIO-5. Yellow Twotone Beardtongue Measures. *If yellow twotone beardtongue are identified within the Project site,* specific mitigation measures to protect the yellow twotone beardtongue shall be developed by the Applicant through agency coordination and included in the restoration plan. Mitigation may include seed collection, nursery development, transplantation of individuals, and/or sponsorship of the plant into the Center for Plant Conservation National Collection of Endangered Plants at Missouri Botanical Garden.

MM BIO-6. Cactus and Yucca Salvage Plan. The Applicant shall salvage and/or purchase, as directed by BLM, all cactus and yucca plants from temporary and permanent impact areas within the right of way lease/grant. The salvage requirements will be described in the Project revegetation plan and will be approved by the BLM botanist prior to construction.

MM BIO-7. Worker Environmental Awareness Program. A Worker Environmental Awareness Program (WEAP) shall be prepared by the Applicant or their contractor. All construction crews and contractors shall participate in WEAP training prior to starting work on the proposed Project. The WEAP training shall include a review of the special status species and other sensitive resources that could exist in the Project area, the locations of sensitive biological resources and their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all trained personnel shall be maintained.

MM BIO-8. Migratory Birds and Raptors Impacts Reduction Measures. To reduce impacts on migratory birds and raptors, the following will be done:

The Applicant shall fund biological monitors to monitor and enforce disturbance buffers around all active bird nests (for raptors and species protected by the Migratory Bird Treaty Act) found in the Project area during construction. The general bird breeding season for this area is late February to early July. BLM will coordinate with NDOW prior to biological monitoring to ensure communication and details of monitoring are approved.

- For all bird species, biologists shall survey within the proposed Project area. Because there are no standardized disturbance buffers for active non-raptor bird nests, the Applicant shall consult with the appropriate agencies (BLM, USFWS, and NDOW) ~~*on a case-by-case basis when active nests are found in Project areas, unless directed to do otherwise by all these agencies*~~ *when required by the approved Bird and Bat Conservation Strategy.*
- Active bird nests shall not be moved during breeding season, unless the Project is expressly permitted to do so by the USFWS, BLM, and NDOW.
- All active nests and disturbance or harm to active nests shall be reported within 24 hours of detection to the USFWS, BLM, and NDOW. Work shall be halted if it is determined by the biological monitor that active nests

Table 2-4. Proposed Mitigation Measures (Continued)

are being disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.

- All measures should be tailored for the local environment, and actions specific to ravens and other potential avian predators of desert tortoise and wildlife shall be addressed as well.

MM BIO-9. Bird and Bat Conservation Strategy. Due to the ~~*potential*~~ presence of golden eagles, ~~*raptors*~~, *other migratory birds*, and bat species within the Project area, a Bird and Bat Conservation Strategy shall be developed with the goal of reducing the potential risks for avian and bat mortality resulting from construction and operation of the Project. The objectives of this Strategy would be to:

- Identify baseline conditions for *avian*~~*raptor*~~ and bat species currently present at the Project site;
- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project site, including bird mortality associated with potential attraction to PV panels;
- Specify steps that should be taken to avoid, minimize, and mitigate any potential adverse effects on these species, including necessary permits to collect bird carcasses for data collection and research; and
- Detail long-term monitoring and reporting goals, including collection and reporting of bird carcasses.

Applicable approved protocols would be used for any surveys and/or monitoring conducted. Golden eagle surveys would be conducted where necessary, according to methods specified in the Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols (Pagel et al. 2010).

MM BIO-10. Avian Protection. All transmission and subtransmission towers and poles will be designed to be avian-safe in accordance with the "Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006" (Avian Power Line Interaction Committee 2006) *and "Reducing Avian Collisions with Power Lines: State of the Art in 2012" (APLIC 2012).* Additionally, a post-construction bird study shall be conducted by the Applicant with review by BLM to monitor for incidents of bird strikes *and electrocutions* during the operation of the proposed Project. The scope and protocol of post-construction monitoring and reporting of bird *mortality* ~~*strikes*~~ will be determined from future consultation with the USFWS.

MM BIO-11. Western Burrowing Owl Measures. To reduce impacts on the western burrowing owl, the following will be done:

- A qualified biologist will conduct preconstruction surveys for western burrowing owl not more than 30 days prior to construction within suitable habitat, and prior to breeding season (February 1 through August 31). All areas within 250 feet of the proposed Project area will be surveyed per Arizona Burrowing Owl Working Group 2009 burrowing owl guidance.
- If an active nest is identified, there will be no construction activities within 250 feet of the nest to prevent disturbance until the chicks have fledged, as determined by a qualified biologist.
- The occurrence and location of any western burrowing owl will be documented by biological monitors in daily reports and submitted to the authorized biologist on a daily basis. Within 24 hours of all incidents of disturbance or harm to burrowing owls, the authorized biologist will report such incidents to the appropriate resource agencies (USFWS, BLM, and NDOW).

MM BIO-12. Gila Monster and Chuckwalla Measures. The following measures are the current NDOW construction site protocols for the Gila monster (NDOW 2012), and are also applicable for the chuckwalla. Through the WEAP, works and other Project personnel should know how to: (1) identify and distinguish Gila monsters from other lizards such as chuckwallas and banded geckos; (2) report any sightings of Gila monsters (in Nevada) to the biological monitor for notification to NDOW; (3) be alerted to the consequences of a bite resulting from carelessness or unnecessary harassment; and (4) be aware of protective measures provided under state law.

- Live Gila monsters found in harm's way on the construction site shall be captured and then detained in a cool, shaded environment (<85 degrees Fahrenheit) by the proposed Project biologist or equivalent personnel until a NDOW biologist can arrive for documentation purposes. Despite the fact that a Gila monster is venomous and can deliver a serious bite, its relatively slow gait allows for it to be easily coaxed or lifted into an open bucket or box, carefully using a long-handled instrument such as a shovel or snake hook. A clean 5-gallon plastic bucket with a secure, vented lid or something similar may be used for safe containment. Additionally, written information identifying the capture location, date, time, and circumstances (e.g., biological survey or construction) and habitat description (e.g., vegetation, slope, aspect, and substrate) will also be provided to NDOW.
- Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. If

Table 2-4. Proposed Mitigation Measures (Continued)

of appropriate treatment. Rehabilitation or euthanasia expenses are not covered by NDOW. However, NDOW shall be immediately notified during normal business hours. If an animal is killed or found dead, the carcass shall be immediately frozen and transferred to NDOW with a completed written description of the discovery and circumstances, habitat, and mapped location.

- Should NDOW's assistance be delayed, biological or equivalent acting personnel on the site may be requested to remove and release the Gila monster out of harm's way. Should NDOW not be immediately available to respond for photo-documentation, a digital camera shall be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The images shall be provided to NDOW and include the following information: (1) encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale; and (3) a clear, overhead close-up of the head.

MM BIO-13. Reduced Night Lighting. The Applicant and its contractors shall reduce night lighting in the proposed Project area and the surrounding non-developed areas to avoid unnecessary visual disturbance to wildlife. Night lighting during construction, operations, and maintenance shall be reduced in the proposed Project area and the surrounding non-developed areas using directed lighting, shielding methods, and or/reduced lumen intensity. The Applicant shall indicate anticipated measures to resource agencies for approval prior to construction.

MM BIO-14. Cover Steep-Walled Trenches or Excavations during Construction. To prevent entrapment of wildlife, all steep-walled trenches, auger holes, or other excavations shall be covered at the end of each day. Fencing shall be maintained around the covered excavations at night. For open trenches, earthen escape ramps shall be maintained at intervals of no greater than 0.25 miles. An Applicant-funded biological monitor shall inspect all trenches, auger holes, or other excavations a minimum of twice per day and also immediately prior to back-filling. Any wildlife found shall be safely removed and relocated out of harm's way. For safety reasons, biological monitors will, under no circumstance, enter open excavations. Tools such as a pool net may be used to retrieve wildlife, as necessary.

MM BIO-15. American Badger and Desert Kit Fox Impacts Reduction Measures. To reduce impacts to American badger and desert kit fox, the following shall be done:

- The qualified biological monitor shall be notified if badgers or foxes are observed within the proposed Project area during construction activities. Work shall be immediately stopped in the area if the biologists find occupied burrows within 100 feet of construction activities during preconstruction surveys. Notification of these sightings shall be provided within 24 hours to appropriate agencies (BLM, USFWS, and NDOW).
- Use of passive and active relocation techniques (if necessary) shall be developed, implemented and reviewed in coordination with NDOW.

MM BIO-16. Desert Bighorn Sheep Measures. Although not anticipated, if desert bighorn sheep are identified on or immediately adjacent to the Project site, the Applicant shall consult with the BLM, USFWS, and NDOW regarding conservation measures to avoid impacts on desert bighorn sheep during construction. Avoidance and minimization measures could include such elements as preconstruction surveys, biological monitoring, and timing construction activities to avoid bighorn sheep active seasons.

MM BIO-17. Desert Tortoise Measures. The BLM and USFWS ~~are currently proceeding with~~ completed Section 7 Consultation under the ESA. ~~At this time, the Biological Opinion has not been developed.~~ The Biological Opinion (BO) ~~will~~ includes information such as the translocation location(s) and stipulations associated with that activity. The measures provided in the BO are provided below. ~~Additional specific conditions and requirements based on the findings of this consultation may supersede the mitigation measures provided below.~~

- *Monitoring Program.* The Applicant shall fund monitoring studies analyzing demographic and genetic connectivity home range and distribution of tortoises in the area surrounding the Project area encompassing a 13,000-acre research area in the Ivanpah Valley in both California and Nevada ($3,500,000.00).
- *Exclusion Fencing.* Prior to initiation of clearance surveys, desert tortoise exclusion fencing shall be constructed in accordance with the provisions of the Biological Opinion and BLM and USFWS guidelines.
- *Effects of Dust Palliatives.* The Applicant shall fund a study to understand the effects of dust palliatives on the health of desert tortoises ($100,000).
- *Desert Tortoise Monitoring.* During construction of linear features (transmission lines, fencing, and access roads) or until the desert tortoise exclusion fencing is complete, all construction activities shall be conducted under the observation of Applicant-funded USFWS-approved desert tortoise biologists. These biologists shall meet all requirements of the USFWS and shall monitor all ground-disturbing activities associated with fence

Table 2-4. Proposed Mitigation Measures (Continued)

meet all requirements of the USFWS and shall monitor all ground-disturbing activities associated with fence installation or that are conducted prior to completion of the tortoise exclusion fencing.
In addition, after initial fencing and clearance, an Applicant-funded biological monitor shall be available during all ground-disturbing activities. The biologist shall be available to ensure the conditions of the Biological Opinion are being met, including worker education guidelines, avoidance and minimization measures, and construction monitoring requirements.

- *ACEC Restoration and Protection. The Applicant shall contribute funds for restoration of 400 acres of roads and disturbed area within the proposed ACEC ($400,000), and funding for BLM law enforcement within the proposed ACEC ($350,000).*
- *Pre-construction Clearance Surveys.* It is anticipated that the Project area would be fenced in segments of approximately 700 acres to facilitate efficient and thorough clearance surveys. Clearance surveys shall be conducted per the USFWS Desert Tortoise Field Manual and current translocation guidance (USFWS 2009 and 2011). All tortoise burrows shall be excavated and eggs and tortoises translocated to the translocation area to be determined through agency consultation. Two complete passes in the fenced segment shall be completed without a desert tortoise being found before construction may commence within that area.
- *Translocation Plan.* A Desert Tortoise Translocation Plan shall be prepared for the Project. The purpose of the Plan is to describe the process of translocation and minimize mortality of desert tortoises. Injured tortoises shall be transported to a rehabilitation facility approved by the USFWS and NDOW. Recently killed tortoises found shall be salvaged and transported to a veterinary pathologist familiar with desert tortoise and approved by the USFWS and NDOW. Procedures for salvaging and transport shall follow the Guidelines for the Field Evaluation of Desert Tortoise Health and Disease (Berry and Christopher 2001). Detailed health assessment on all live tortoises shall be conducted prior to translocation per current USFWS guidance by individuals approved and permitted by the USFWS to conduct such assessments. Any individual tortoise that exhibits clinical signs of upper respiratory tract disease (URTD) shall be transported to the Desert Tortoise Conservation Center near Las Vegas, Nevada for further evaluation. *The Applicant shall fund a study to determine the suitability (health and genetics) of the tortoise population in the LSTS site to determine if restoring connectivity would meet USFWS recovery objectives ($200,000).*
- *Avoidance during Operation and Maintenance.* During the operation phase of the Project, all applicable desert tortoise protection measures identified under construction shall be implemented. This may include the need for a biological monitor outside the fenced facility during activities involving ground disturbance, annual WEAP refresher, and actions to take if a tortoise is encountered. The monitor shall be on site during all Project maintenance activities to ensure compliance with the desert tortoise measures included in the Biological Opinion. The monitor would have the authority to halt all non-emergency activities that are in violation of the measures. Work shall proceed only after hazards to desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by an USFWS-authorized biologist. A compliance report would be submitted to the BLM annually.
- *Compensatory Mitigation.* To compensate for desert tortoise habitat loss, the Applicant *and SCE* shall pay the *standard* remuneration fees *of $824 per acre of disturbance for their respective disturbances* to the BLM ~~*based on the total acres of disturbance*~~ to partially offset the potential adverse effects of the Project. *The exact acreage amounts and corresponding payment will be based on final design of the Project components as approved by BLM.* Fees would be collected following guidance in BLM's August 17, 2010, instruction memorandum (NV-2011-079) as listed in the Biological Opinion for the Silver State Solar Project and a separate Work Breakdown Structure (WBS) code would be established for these funds to accomplish on-site mitigation. Initial on-site mitigation would be to evaluate the health and genetics of the desert tortoises located within the LSTS to determine if the LSTS fence can be partially removed to allow the tortoises to move throughout the Ivanpah Valley. This evaluation would be coordinated with the USFWS and the Desert Tortoise Recovery Office. If the analysis proves feasible, the BLM in consultation with the Clark County Department of Aviation, the Nevada Department of Transportation, and the Union Pacific Railroad, will initiate separate NEPA analysis to evaluate the impacts to reconfiguring the current LSTS. LSTS reconfiguration could include installation of additional fencing on highways, culverts under Hwy 161 and eventually removing parts of the existing tortoise fence, removing cattle guards and working with the Railroad to repair underpasses to allow for tortoise movement. This would remove an identified linkage corridor pinch point on the west side of the Ivanpah Valley. If initial testing results or subsequent adaptive management strategies indicate that removal or reconfiguration of the LSTS perimeter fence is feasible, *the Applicant* ~~*First Solar*~~ will fund removal or

Table 2-4. Proposed Mitigation Measures (Continued)

reconfiguration of the perimeter fence as appropriate in consultation with the USFWS *($700,000.00)*. If testing indicates that improving connectivity through the LSTS is not feasible for genetic, disease, or other reasons, *the Applicant* ~~*First Solar*~~ shall fund BLM efforts to fence portions of Highway 93 to reduce the mortality of desert tortoises. Additional mitigation would be used for restoration and law enforcement for three years to help protect the newly restored areas. Any remaining funds would be used for management actions expected to provide a benefit to the desert tortoise over time. Actions may involve habitat acquisition, population or habitat enhancement, increasing knowledge of the species' biological requirements, reducing loss of individual animals, documenting the species current status and trend, and preserving distinct population attributes (USFWS 2010).
Cultural Resources (Section 4.7) MM CULT-1. Protection of Cultural Resources. In the event that cultural materials, including human remains, are discovered during Project activities, they shall be protected by all Project personnel and construction crew members. The Proponent shall 1) notify the BLM authorized contracting officer and archaeologist immediately; 2) cease all construction activities within a 100 meter radius buffer area; and 3) ensure protection of the discovery from further damage or vandalism until a BLM authorized archaeologist evaluates the nature of the materials. The BLM will develop mitigation procedures following consultations with the SHPO and culturally affiliated Indian tribes. *The Applicant* ~~*First Solar*~~ is responsible for all costs associated with consultations as well as the stabilization, treatment, reporting, curation, and/or reburial of discoveries.
Paleontological Resources (Section 4.8) MM PALEO-1. Paleontological Mitigation. Results of the data inventory and impact assessment confirm that the sediments present within the boundaries of the proposed Project area have a low potential to contain significant paleontological resources. Mitigation measures shall be implemented if significant subsurface paleontological resources are identified during construction. The BLM requires the following stipulation: The Proponent shall immediately notify the BLM authorized officer of any paleontological resources discovered as a result of operations under this authorization. The Proponent shall suspend all activities in the vicinity of such discovery until notified to proceed by the authorized officer, and shall protect the locality from damage or looting. The authorized officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 5 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the authorized officer after consulting with the Proponent. The Proponent is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures, including museum curation. The Proponent may not be required to suspend operations if activities can avoid further impacts to a discovered locality or be continued elsewhere.
Lands and Realty (Section 4.9) MM LANDS-1. Ensure Compatibility with Airport Projects. The Applicant shall work closely with the Clark County Department of Aviation to ensure that all planning, construction, and operation remains compatible with airport projects and future airport operations.
Special Management Areas (Section 4.10) *No mitigation required.*
Recreation (Section 4.11) MM REC-1 Signage Plan for Trail Identification. In order to reduce new, unauthorized OHV trails due to the restriction of existing trails on the Project footprint, informational signs shall be placed by the Applicant in the areas surrounding the Project. The sign locations and designs will be determined by BLM to direct the public to the appropriate access to the Lucy Gray Mountains and will be identified in the traffic management plan. MM REC-2 Use of Project Access Road Outside of the Perimeter Fence. In order to maintain public access, the proponent shall allow access to the Lucy Gray Mountains through the use of their Project access road, located outside of the Project fence. This road will be open to the general public for dispersed use and access to the Lucy Gray Mountains. This access would also be available to organized competitive OHV races, if the races have obtained necessary permits and are approved.
Visual Resources (Section 4.12)

Table 2-4. Proposed Mitigation Measures (Continued)

MM VIS-1 Reduce Visual Contrast. The following selective mitigation measures shall be implemented by the Applicant to reduce visual contrast:

- Solar field access ways shall be offset at appropriate intervals to minimize the appearance of straight lines within the solar field.
- An experimental treatment with Permeon or a similar type of contrast-reducing product of the portions of the Project drainage control basins that are visible from Key Observation Points (KOPs). Treatment shall be conducted in test plots, with efficacy determined by the BLM. Depending on the outcome of the experimental treatment, Applicant shall treat the remaining portions of the drainage control basins visible from KOPs, according to BLM guidance.
- The exterior of the inverter boxes and the exterior of the O&M building, walls or fences surrounding switchyard/ substation facilities, PCS stations, and lighting fixtures and poles, will be factory treated with a non-specular dull finish or using the BLM-standard environmental color Shadow Gray or Covert Green to minimize contrast with the existing landscape. If a fixed-tilt design is chosen, the PV panel mounting clips shall be treated with a non-specular dull finish or using the BLM-standard environmental color Shadow Gray or Covert Green. Whatever finish is chosen shall be used consistently for all structures to be color treated, not including transmission towers and fencing. The fence and weather station towers will be a non-specular dull finish to be approved by BLM prior to procurement and installation. Steel transmission or distribution towers or poles will be color treated of the rust exterior type (Corten or similar) *if feasible, or shall use a dull galvanized finish consistent with the existing Ivanpah Eldorado Transmission Project.* Other panel support structures (i.e., posts, tables), temporary water tanks and other temporary construction support facilities, will not be color treated.
- A Revegetation Plan shall be prepared and implemented to revegetate areas temporarily disturbed by construction including access roads that are not needed for operation, with a focus on softening harsh lines associated with clearings.
- Where possible, use drive and crush access during construction and operation to avoid soil disturbance and need for revegetation.
- The perimeter road shall be located at a variable distance from the perimeter fence to allow for feathering of the footprint and selective vegetation removal, with the intent to result in an organic or irregular line but shall not result in more disturbance than the original engineered design. Revegetation shall be delayed until after the post-Project drainage is evident and revisions to the drainage design, if necessary, have been made. With BLM approval, Applicant may re-plant salvaged native vegetation in such a way as to screen Project structures.
- If a fire break is not required and topographic and vegetation conditions allow, till and roll techniques would not be used in the following locations:
    - Construction area for the perimeter fence
    - Construction area for the desert tortoise exclusion fence

  Instead, vegetation would be cut to a height of 6 inches prior to fence construction.

Transportation/ Motorized Vehicle Access (Section 4.13)

MM TRAN-1. Traffic Management Plan. The Applicant shall produce a Traffic Management Plan that identifies BMPs to minimize construction-related traffic impacts. Specifically, the BMPs shall ensure an adequate flow of traffic in both directions by providing sufficient signage to alert drivers of construction zones, notifying emergency responders prior to construction, conducting community outreach, and control traffic around impacted intersections. The Traffic Management Plan shall include the following:

- Schedule deliveries of materials for off-peak hours to reduce effects during periods of peak traffic;
- Truck traffic shall be phased throughout construction;
- Truck traffic shall use designated truck routes when arriving to and departing from the proposed work sites;
- The Applicant shall encourage the construction workforce to carpool, rideshare or vanpool;
- Information on available local and regional programs shall be made available to the workforce through bulletin board postings and training programs;
- Signs and public notices regarding construction work shall be distributed 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;

North. Four sites with permitted water rights are within 0.5 mile to the west of the ROW application area (NDWR 2009a). One site is sourced by effluent from the Primm Wastewater Treatment Plant and permitted for power and water storage at the adjacent NV Energy Walter M. Higgins Generating Station. The re-use of the treated effluent is also authorized for construction purposes and dust suppression (NDWR 2009b, NDEP 2009b). The remaining sites are sourced by wells for quasi-municipal use (NDWR 2009a).

The Applicant obtained access in 2010 to water from LVVWD for use in construction of the Silver State Solar North Project and the potential construction and operation of Silver State Solar South Project (LVVWD 2010). A modified water agreement was obtained in June 2011 (LVVWD 2011). To obtain the water, LVVWD required the Applicant to fund the treatment and recharge of 270 acre-feet per year (afy) of wastewater into the groundwater basin. The current modified agreement between the Applicant and LVVWD allows:

- Water for construction of Silver State Solar North – 300 afy in 2011 and 200 afy in 2012;
- Water for potential construction of Silver State Solar South – minimum of 200 afy available between 2013 and 2017; and
- Water for operation and maintenance after completion of Silver State Solar North and potential completion of Silver State Solar South – maximum of 21 afy after the Project is complete and power is delivered to a customer.

3.5.2 Jurisdictional Waters, Drainages, and Riparian Areas

The scope of potential jurisdictional waters of the US for the project analyzed in the 2010 Final EIS was addressed by the USACE in two related jurisdictional determinations (JD): (1) July 8, 2010 JD; and (2) September 10, 2010 JD (both designated as SPK-2010-00222-SG) (refer to Appendix F for the JD documents).

The July 8, 2010 JD (the "Ivanpah Dry Lake JD") focused on waters in the southern portion of the ROW application area (the area encompassing what is identified in this Supplemental EIS/PRMPA as Alternative C (southern portion), as shown on Figure 3.5-1. The USACE determined that the ephemeral drainages in this area – which flow towards Ivanpah Dry Lake – constitute interstate waters because these waters cross an interstate boundary and are therefore jurisdictional and subject to regulation under Section 404 of the Clean Water Act.

The September 10, 2010 JD (the "Roach Dry Lake JD") focused on waters in the northern portion of the ROW application area (the area encompassing what is identified in this Supplemental EIS as Alternatives B, C [northern portion], D, and the BLM Preferred Alternative). The USACE determined that the ephemeral drainages in this area – which flow towards Roach Dry Lake – constitute intrastate waters because these waters drain to an isolated, intrastate water with no apparent interstate or foreign commerce connection and are therefore non-jurisdictional under Section 404 of the Clean Water Act.

The ROW application area analyzed in this Supplemental EIS/PRMPA also includes lands north of the area previously considered by the USACE in the Roach Dry Lake JD. To account for that new ROW application area, *the Applicant* ~~*First Solar*~~ requested an updated JD for the Roach Dry Lake area to cover the additional area to the north (Applicant letter dated September 24, 2012). On May 20, 2013, the USACE issued a JD finding that all of the ephemeral drainages that drain

- Impacts candidate or special status species populations or habitat so as to contribute to or result in the Federal or State listing of the species.

4.6.2.3 Direct and Indirect Effects by Alternatives

Alternative A - No Action Alternative

Under this alternative, the BLM would not approve the Applicant's ROW application and would not amend the RMP. The BLM would continue to manage land encompassing the Project area consistent with the existing RMP.

Because there would be no amendment and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition with no new structures or facilities constructed or operated on the site. As a result, none of the impacts to wildlife resources from the proposed Project would occur. In the absence of this Project, other renewable energy projects may be constructed to meet State and Federal mandates and those projects would have similar impacts in other locations.

Alternative B – Applicant's Proposed Project

Effect BIO-3: Adversely affect wildlife populations or remove wildlife habitat.

Clearing and disturbance of up to 3,881 acres of vegetation would directly impact wildlife resulting in loss and fragmentation of habitat for cover, breeding, traveling, and foraging. Equipment and vehicles can also collide with slower-moving species, species in subsurface burrows, and ground-nesting birds resulting in mortality. Some species such as American badgers are vulnerable to crushing as they are unlikely to leave their burrows when cornered. Most wildlife species are susceptible to visual and noise disturbances caused by the presence of humans and construction equipment. Such disturbances can result in the alteration of species' foraging and breeding behavior.

Impacts to avian species could result from nest abandonment or loss of chicks or eggs in active nests, mortality of adults due to collision, or reduction of potential forage and nesting habitat. For most bird species, direct impacts would be limited to areas within the Project footprint or immediately adjacent to it. Active bird nests in shrubs or near the ground would be vulnerable to crushing during ground-disturbing activities. Many bird species rely on vocalization during the breeding season to attract a mate within their territory. Noise levels from certain construction, operations, and decommissioning activities could reduce the reproductive success of nesting birds. *Impacts to avian species could also result from collisions with Project features such as solar panels, transmission lines and towers, and fences.*

The most common wildlife responses to noise and human presence are avoidance or accommodation. Avoidance would result in displacement of wildlife from an area larger than the actual disturbance area. The total extent of habitat lost as a result of wildlife avoidance response is impossible to predict since the degree of this response varies from species to species, and can even vary between different individuals of the same species. Also, after initial avoidance of human activity and noise producing areas, certain wildlife species may acclimate to the activity and begin to reoccupy areas formerly avoided. Wildlife avoiding habitat in the vicinity of the

Special Status Wildlife

Desert Tortoise

Impacts to the desert tortoise under Alternative D would be similar to those under Alternative B. The primary difference would be that the connectivity corridor between the Project footprint and the Lucy Gray Mountains would be approximately 0.5 miles wide at its narrowest point with most of the linkage having a width of 0.8 mile. This remaining corridor would be intermediate to the corridors formed by Alternatives B and C, and would be less than half the width of the narrowest portion of the existing corridor at the northern end of the ROW application area. However, current research does not indicate whether these further reductions in the width or configuration of the corridor would reduce or eliminate its ability to maintain the genetic linkage between populations north and south of the Project area.

BLM Preferred Alternative

Impacts to wildlife and special status wildlife species under the BLM Preferred Alternative would be similar to those of Alternative B, C, or D except that less acreage would be disturbed than under the other alternatives and construction activities would likely occur over a shorter period. Under the BLM Preferred Alternative, up to 2,427 acres of wildlife habitat would be cleared and graded to accommodate Project-related facilities. Impacts related to designation of the ACEC would be as described for Alternative D. All other impacts to wildlife would be comparable to those described for Alternative B, C, or D.

Special Status Wildlife Species

Desert Tortoise

Impacts to the desert tortoise under the BLM Preferred Alternative would be similar to those under Alternative B. The primary difference would be that the connectivity corridor between the Project footprint and the Lucy Gray Mountains would be approximately ~~*1.26*~~ *1.39* miles wide at its narrowest point~~*with most of the linkage having a width of approximately 1.53 miles*~~. This remaining corridor would be greater than the corridors formed by Alternatives B, C, or D, and would be generally consistent than the existing 1.3-mile corridor at the northern end of the ROW application area. However, current research does not indicate whether reductions in the width or configuration of the corridor compared to existing conditions would reduce or eliminate its ability to maintain the genetic linkage between populations north and south of the Project area. Impacts related to designation of the ACEC would be as described for Alternative D.

4.6.2.4 Mitigation Measures

Detailed mitigation requirements and Applicant Proposed Environmental Protection Measures can be found in this document in *Section 2.7 Applicant-Proposed Measures and Mitigation Measures*, Table 2-3 and Table 2-4. Specific mitigation measures include:

MM BIO-1: *Preconstruction Surveys.*

MM BIO-2: *Best Management Practices.*

In the Southern Nevada Public Land Management Act of 1998 (Public Law 105-263), as amended, the Ivanpah Valley Airport Public Lands Transfer Act of 2000 (Public Law 106-362), and Title V of the Clark County Conservation of Public Land and Natural Resources Act of 2002 (Public Law 107-282), Congress recognized the need for a supplemental commercial service airport to serve the Las Vegas metropolitan area and found that the Ivanpah Valley was the best location for a new airport. The Acts collectively authorized the sale of a 6,000-acre Airport Site to the CCDOA, identified a 17,000-acre Noise Overlay District for transfer to the CCDOA upon a final decision by the Federal Aviation Administration and BLM to approve the airport, and directed the BLM to establish a transportation and utilities corridor connecting the Las Vegas Valley to the SNSA site to provide for the utilities and transportation infrastructure needed to serve the airport. In addition; CCDOA has identified off-airport sites necessary for flood control infrastructure to be constructed to protect the SNSA. These sites are identified in right-of-way grant applications identified in Table 3.9-2.

The proposed Project intersects the 17,000-acre Ivanpah Airport Environs Overlay in the northwest corner of the Project site. The proposed Project has been designed to minimize impacts to the Overlay or the SNSA. *The Applicant* ~~*First Solar*~~ has worked closely with CCDOA to ensure that the Project and the proposed SNSA are compatible. It is anticipated that portions of the ROW application area not required for the Project would be relinquished back to the BLM. The ACEC proposed under Alternative D and in BLM's Preferred Alternative contains lands identified by the CCDOA as necessary for flood control infrastructure for the SNSA. In addition, the ACEC would directly abut the SNSA Airport Environs Overlay District defined by Congress in Public Law 107-282. Likely impacts of the construction and operation of the SNSA, as contemplated by Public Law 107-282, would include, among other things, noise impacts and construction of airport infrastructure, including flood control facilities.

Planning of the SNSA has been considerably slowed due to the economic downturn and resultant decrease in air traffic at the McCarran International Airport. Accordingly, in 2010, the FAA suspended environmental work on the SNSA without identifying a date certain at which work would resume. As of August 2013, ROW applications have been submitted to BLM for necessary storm water and flood control facilities. However, the precise location of any SNSA-related roadway, utility or other SNSA-related infrastructure would be subject to an approved Airport Final Environmental Impact Statement and Record of Decision and subject to compliance with the Endangered Species Act, 16 U.S.C. § § 1531-1544.

XpressWest Rail Project

On November 18, the BLM released the Record of Decision authorizing a ROW grant to DesertXpress Enterprises, LLC to construct and operate a high-speed passenger rail line between Victorville, California and Las Vegas, Nevada on public lands. The passenger rail line would be a fully grade-separated, dedicated double track passenger-only railroad along a 200-mile corridor that would generally follow the route of I-15. The majority of the right-of-way would fall on previously disturbed lands and within existing energy production and utility corridors.

The project would also include construction of a passenger station in Victorville, California; a passenger station in Las Vegas, Nevada; a maintenance and operation facility in Victorville; an overnight maintenance and storage facility in the Las Vegas area; and associated ancillary facilities needed to maintain and operate the proposed rail line.

Cumulative Impact Analysis

Use of Groundwater

The proposed Project would use ~~at least 600~~ *between 800 and 1,185* acre-feet of water during the three-year construction period, with no more than 200 acre-feet used in any one year. Following construction, O&M water requirements would be ~~21 AFY~~ *1 AFY* for the proposed 30-year life of the Project. The source of this water would be from two wells drilled on the proposed Project site. The foreseeable solar projects within the Ivanpah Valley are shown in this document on Figure 4.19-1 and described in Table 4.19-1.

Within the cumulative analysis area, the foreseeable electrical transmission and solar projects[3] would occupy over 10,700 acres, with up to 3,881 acres of disturbance from the proposed Project. The ISEGS and Silver State North are the only projects within the Ivanpah Valley that have completed environmental analyses; the Stateline Project has completed a Draft EIS. ISEGS, an almost 4,000-acre facility, has estimated that it would use 400 acre-feet of water during its four-year construction period (or approximately 100 AFY) and 77 AFY during operations. ISEGS would draw its water from two wells located close to its site (BLM and CEC 2009). Water requirements for Silver State North are estimated at about 21 AFY for the life of the project. Using 100 AFY per 1,000 acres as an estimate for dust control requirements, and assuming a comparable annual water usage per acre during construction of the foreseeable solar projects, these projects would need at least 500 AFY during construction.

As of 2009, the estimated perennial yield for Basin 164A was 700 AFY and the committed use as of 1992 was 2108 AFY (NDWR 2009, BLM 2010). Newer data on committed use in this Basin is not available. Without knowing the water sources for many of the foreseeable projects, it is not possible to assess the magnitude of the impacts; however, if all the water needed to support the foreseeable projects were drawn from the same water table, this would cause a cumulative impact. However, the water used for the proposed Project would be small in comparison to the withdrawal parameters from the LVVWD and would not alter groundwater volume within the local basins. Therefore, it would not contribute to a considerable cumulative impact under this criterion.

The proposed Project would result in less than 200 acres (0.3 square mile) of impervious surfaces. The proposed Project would be in the Ivanpah Valley groundwater basin which covers 637 square miles, which is largely undeveloped. The area covered by the impervious surfaces of the proposed Project would be less than 0.05 percent of these basins. There could be as many as 10,700 acres of new renewable energy facilities in the Ivanpah Valley, including the 3,881 acres that would be disturbed by the proposed Project, all built on previously undisturbed land. The other foreseeable projects could result in the construction of hundreds to thousands of acres of impervious or semi-impervious surfaces. This could result in substantial cumulative alteration of groundwater recharge locally. However, the area of new impervious surfaces of the proposed Project would be small in reference to the size of the recharge area and it would not alter groundwater recharge within the local basins, so it would not contribute considerably to the cumulative impact.

[3] Projects included: Silver State North, EITP, ISEGS, First Solar Stateline Project, and the proposed Project.

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