BLM

Stillwater Field Office, Nevada

ENVIRONMENTAL ASSESSMENT

Invenergy Solar Development LLC

Luning Solar Energy Project

DOI-BLM-NV-C010-2015-0020-EA

U.S. Department of the Interior
Bureau of Land Management
Carson City District
Stillwater Field Office
5665 Morgan Mill Road
Carson City, NV 89701
775-885-6000

April, 2015

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

DOI-BLM-NV-C010-2015-0020-EA

Table of Contents

LIST OF ACRONYMS iii
1.0 INTRODUCTION/PURPOSE AND NEED 1
1.1 Introduction 1
1.2 Background 1
1.3 Purpose and Need 1
1.4 Land Use Plan Conformance Statement 2
1.5 Relationships to Statutes, Regulations, Other Plans and Environmental Analysis Documents 3
1.5.1 Relationship to the Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States 4
1.5.2 Relationship to the Luning Solar Energy Right-of-way Grant Environmental Assessment (Luning Solar EA) 4
1.5.3 Variance Review 5
1.6 Decisions to Be Made 6
2.0 THE PROPOSED ACTION AND ALTERNATIVES 7
2.1 Proposed Action 7
2.1.1 Project Components 7
2.1.2 Construction 11
2.1.3 Post Construction Site Stabilization, Protection, and Reclamation 14
2.1.4 Operation of Solar Facility 14
2.1.5 Decommissioning and Final Reclamation 15
2.1.6 Applicant Committed Mitigation Measures 15
2.2 ALTERNATIVES 16
2.2.1 No Action Alternative 16
2.2.2 Alternatives Considered but Eliminated From Detailed Analysis 17
3.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES 18
3.1 Supplemental Authorities 18
3.2 Resources or Uses Other Than Supplemental Authorities 20
3.2.1 Additional Rationale 22
3.3 Resources Present and Brought Forward For Analysis 26
3.4 Cumulative Effects Overview 26
3.5 General Setting 27
3.6 Minerals 27
3.7 Noxious, Invasive, and Non-native Species 28

3.8 Socioeconomics 32
3.9 Soils 35
3.10 Vegetation 41
3.11 Visual Resource Management 43
3.12 Water Quality, Surface/Ground 51
3.13 General Wildlife 54
3.14 Migratory Birds 59
3.15 Special Status Species 65
3.16 Cumulative Effects of the No Action Alternative 69
3.17 Summary of Recommended Mitigation Measures 70
4.0 PERSONS, GROUPS OR AGENCIES CONSULTED 75
4.1 List of Preparers 75
5.0 LIST OF REFERENCES 77

LIST OF ACRONYMS

AO	Authorizing/Authorized Officer
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
AUM	Animal Unit Month
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
BMP	Best Management Practice
CCDO	Carson City District Office
CEQ	Council on Environmental Quality
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
CRMP	Consolidated Resource Management Plan
DoD	Department of Defense
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPC	Engineering, Procurement, and Construction contractor
ESD	Ecological Site Description
FLPMA	Federal Land Policy Management Act of 1976, as amended
FONSI	Finding of No Significant Impact
FPST	Fallon Paiute-Shoshone Tribe
GHG	Greenhouse Gas
HVAC	Heating and Ventilation and Air Conditioning
IBA	Important Bird Area
ID	Interdisciplinary
IM	Instruction Memorandum
KEC	Kautz Environmental Consultants, Inc.
KOP	Key Observation Point
kV	Kilovolt
LSEP	Luning Solar Energy Project
MAAT	Mean Annual Air Temperature
MAP	Mean Annual Precipitation

MBTA	Migratory Bird Treaty Act of 1918
MFP	Management Framework Plan
MW	Megawatt
NCCAC	Nevada Climate Change Advisory Committee
NDEP	Nevada Department of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Department of Water Resources
NEPA	National Environmental Policy Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NTP	Notice to Proceed
PEIS	Programmatic Environmental Impact Statement
P.L.	Public Law
POD	Plan of Development
PV	Photovoltaic
RFFA	Reasonably Foreseeable Future Action
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-way
SFO	Stillwater Field Office
SWCA	SWCA Environmental Consultants
SWPPP	Stormwater Pollution Prevention Plan
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VRI	Visual Resource Inventory
VRM	Visual Resource Management
VTS	Vertical Transition Structure
WRPT	Walker River Paiute Tribe
YST	Yomba Shoshone Tribe

1.0 INTRODUCTION/PURPOSE AND NEED

1.1 Introduction

Invenergy Solar Development LLC (Invenergy Solar) is proposing to develop a 50 megawatt (MW) name-plate capacity solar photovoltaic (PV) generating facility (solar facility), referred to as the Luning Solar Energy Project (LSEP), in Mineral County, Nevada. Invenergy Solar is a subsidiary of Invenergy LLC, an international power generation company with projects in North America and Europe. Invenergy LLC currently has one 20 MW solar facility in operation in Illinois, two 10 MW facilities in Ontario, Canada, and a 6.5 MW facility in California. The LSEP would be developed on public lands administered by the Bureau of Land Management (BLM), Carson City District Office (CCDO), Stillwater Field Office (SFO). The proposed location is approximately 3 miles north of Luning, Nevada, along State Highway 361. Luning is a small, unincorporated town on U.S. Highway 95 between Hawthorne and Tonopah, Nevada (Appendix B, Map B-1 Vicinity Map).

This Environmental Assessment (EA) is a site-specific analysis of potential impacts which may result by implementing the Proposed Action or an alternative. This EA will allow the Authorizing Officer (AO) to determine whether implementing the Proposed Action or an alternative may cause significant impacts to the human environment. If the AO determines no significant impacts would occur, a Finding of No Significant Impact (FONSI) would be prepared and a Decision Record (DR) would be issued. If significant impacts are likely to occur, or a FONSI cannot be reached, an Environmental Impact Statement (EIS) would be prepared with a subsequent Record of Decision (ROD). This EA has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) following the guidance provided in BLM Handbook H-1790-1 (National Environmental Policy Act, Rel. 1-1710, January 2008), hereafter referred to as H-1790-1.

1.2 Background

The solar facility would be constructed on approximately 560 acres in section 15, S½SW¼; section 16, S½S½; section 21, N½N½; and section 22, N½N½, T. 8 N., R. 34 E., MDM. The SFO previously prepared the Luning Solar Energy Right-of-way Grant EA (DOI-BLM-NV-C010-2009-0017-EA) in July 2009 in response to a solar energy right-of-way (ROW) application from Luning Solar Energy LLC for a similar project in the same location. A FONSI was reached and the BLM issued a ROW grant (serial no.: N-85215) on July 15, 2010 to Luning Solar Energy LLC. The company constructed a small solar measurement station within the project area in early 2011, but did not develop a solar energy generating facility. The ROW was voluntarily relinquished in January, 2013 after the solar measurement station was removed. A new SF-299 ROW application was received from Invenergy Solar on July 31, 2013 which closely matched the Luning Solar Energy LLC ROW in terms of project area size and facilities.

1.3 Purpose and Need

In accordance with Section 103(c) of the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, public lands are to be managed for multiple use that takes into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant ROWs on public lands for systems of generation,

transmission, and distribution of electric energy (Section 501(a)(4)). Taking into account the BLM's multiple use mandate, the purpose and need for the Proposed Action is to respond to the FLPMA right-of-way application submitted by Invenergy Solar to construct, operate, maintain, and decommission a solar energy generating facility and associated infrastructure on public lands.

This Proposed Action would, if approved, assist the BLM in addressing the management objectives in the Energy Policy Act of 2005 (Title II, Section 211) which establish a goal for the Secretary of the Interior to approve at least 10,000 MWs of electricity from non-hydropower renewable energy projects located on public lands. This Proposed Action, if approved, would also further the purpose of Secretarial Order 3285A1 (March 11, 2009) which establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior.

It is BLM's policy to make mineral materials such as construction aggregates, or sand and gravel available to the public and local governmental agencies whenever possible and wherever it is environmentally acceptable. The major federal law governing mineral materials is the Materials Act of 1947 (July 31, 1947), as amended (30 US Code 601 et seq.). This law authorized the BLM to sell mineral materials at fair market value and to grant free-use permits for mineral materials to Government agencies or nonprofit organizations. Regulations governing contract and permits for mineral materials are contained in 43 Code of Federal Regulations (CFR) 3600.

1.4 Land Use Plan Conformance Statement

Land Use Plan conformance determinations are based on the decisions and information contained in the Carson City Field Office Consolidated Resource Management Plan (Carson City CRMP), approved in May 2001. The Proposed Action is in conformance with the Carson City CRMP, even though it is not specifically provided for, because it is clearly consistent with Administrative Actions listed on page ROW-4 of the Right-of-way Corridors section and would comply with the Standard Operating Procedures listed on pages ROW-4 through ROW-6. Specifically:

- All applicants for right-of-way grants, whether or not they are within corridors, are subject to standard approval procedures as outlined in the right-of-way regulations (43 CFR 2802). These procedures include: 1) Preparation of an environmental assessment in accordance with the National Environmental Policy Act of 1969, 2) A determination of compliance of the applicants proposed plan with applicable federal and state laws, 3) Consultation with federal, state, and local agencies, and 4) Any other action necessary to fully evaluate and make a decision to approve or deny the application and prescribe suitable terms and conditions for the grant or permit. Consultation with the public, including adjacent landowners, will occur throughout the process.

In addition, the Proposed Action and Alternatives described below are in conformance with the Visual Resource Management (VRM) section of the Carson City CRMP on pages VRM-1 through 4. Specifically:

- Interim visual management objectives are established where a project is proposed and there are no RMP (or Management Framework Plan (MFP)) approved VRM objectives. These objectives are developed using the guidelines in Manual Section 8410 and must conform to the land use allocations set forth in the RMP which covers the project area. The establishment of interim VRM objectives will not require a plan amendment unless the project itself requires one.

Finally, the Proposed Action and alternatives are in conformance with the saleable minerals related decisions in the Minerals and Energy section of the Carson City CRMP on pages MIN-1 through 5. Specifically:

- <u>Administrative Actions</u>
  1. Continue to provide mineral material commodities to the using public, following these general criteria:
     A. Avoid duplication of pits within the same general area.
     B. Examine hauling distances and place sites according to acceptable VRM classification where possible.
     C. Use existing sites to the greatest extent possible.
     D. For major transportation ROWs, place sites a minimum of 10 miles apart.
     E. Determine life expectancy of sites and set rehabilitation requirements in advance.

- <u>Standard Operating Procedures</u>
  Salable Minerals
  1. Each mineral material disposal is a discretionary action with appropriate terms and conditions implemented to guard against undue or unnecessary degradation of existing resources.

1.5 Relationships to Statutes, Regulations, Other Plans and Environmental Analysis Documents

The LSEP, as proposed, is consistent with Federal laws and regulations, plans, programs and policies of affiliated tribes, other Federal agencies, State and local governments including, but not limited to, the following:

- Federal Land Policy Management Act of 1976 (43 United States Code (U.S.C.) §§ 1701-1782, October 21, 1976, as amended 1978, 1984, 1986, 1988, 1990-1992, 1994 and 1996);
- Title 43 of the CFR Subpart 2800 – Rights-of-Way Under the Federal Land Policy Management Act;
- Energy Policy Act of 2005 (Public Law (P.L. 109-58)
- The Endangered Species Act of 1973 (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984, and 1988);
- Migratory Bird Act – Executive Order (EO). 13806;
- Native American Graves Protection and Repatriation Act, 1990;
- American Indian Religious Freedom Act of 1979;
- National Historic Preservation Act (P.L. 89-665; 16 U.S.C. 470 as amended through 2000);

- Archaeological Resources Protection Act of 1979, As Amended (P.L. 96-95; 16 U.S.C. 470aa-mm);

- Wild Free-Roaming Horse and Burro Act, as amended, of 1971;
- Clean Water Act of 1972;
- Materials Act of 1947 (July 31, 1947), as amended (30 U.S.C. 601 et seq.)

1.5.1 Relationship to the Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States

The Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (Solar PEIS) was prepared jointly by the BLM and the U.S. Department of Energy to evaluate actions to facilitate utility-scale solar energy development in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah). Utility-scale facilities are defined as projects with capacities of 20 MW or greater that generate electricity that is delivered into the electricity transmission grid. The Approved Resource Management Plan Amendments/ROD for the Solar PEIS was published on October 24, 2012; Appendix A, Table A-1, of the ROD specifically lists the Carson City CRMP as one of the land use plans amended.

The ROD identifies three categories of BLM-administered lands related to utility-scale solar energy development. According to the ROD, Solar Energy Zones are lands well suited for utility-scale production of solar energy where the BLM will prioritize development. Exclusion areas are lands known or believed to be unsuitable for utility-scale solar development and are not available for location of ROWs under any conditions. The remaining lands are considered variance areas. Variance areas are open to application for utility-scale solar energy ROWs, however applications must successfully pass the variance process outlined in Appendix B, Section B.5, of the ROD. The LSEP is located within a variance area identified in the Solar PEIS ROD and is subject to the variance review requirements.

The ROD specifies new solar applications within variance areas, filed after October 28, 2011, are subject to the decisions in the document. BLM Field Offices are required to review new applications in variance areas to determine if environmental considerations, coordination with appropriate Federal, state, and local agencies and tribes; and public outreach indicate the project is impractical or would cause undue degradation to resources. Responsibility rests with the applicant to demonstrate, to the BLM and other coordinating parties, their proposal would avoid, minimize, and/or mitigate, as necessary, impacts to sensitive resources. The applicant is also expected to demonstrate the project is compatible with state and local plans, and is capable of acquiring all required permits or authorizations for development.

This site-specific EA tiers to the decisions contained in the ROD and will focus on impacts from implementation of the proposed LSEP. Applicable portions of the Solar PEIS will be incorporated by reference. The Solar PEIS and ROD are available to the public on the Solar Energy Development Programmatic EIS Information Center website (http://solareis.anl.gov/).

1.5.2 Relationship to the Luning Solar Energy Right-of-way Grant Environmental Assessment (Luning Solar EA)

The Proposed Action in the Luning Solar EA (DOI-BLM-NV-C010-2009-0017-EA, July 2009) was to authorize a solar facility which would utilize a selection of different solar energy

technologies, including PV panels and concentrating solar power parabolic troughs. The generating facilities were located within the same area as LSEP, with the same power line route. Following completion of the Luning Solar EA, the BLM arrived at a FONSI and a DR was issued on August 6, 2009 authorizing the proposed solar project. The Luning Solar EA was completed prior to the Solar PEIS and was not originally subject to the decisions in the Solar PEIS ROD.

1.5.3 Variance Review

The SFO reviewed the ROW application from Invenergy Solar, beginning in September 2013, for conformance with the variance area policies in the Solar PEIS ROD. A preliminary meeting with the applicant was held to discuss the status of BLM land use planning in the area, potential land use and siting constraints, potential environmental issues in the area, cost recovery requirements, application requirements, project description requirements, associated timelines, and other topics affecting the proposal.

Initial review of the proposal by the SFO interdisciplinary (ID) team found the location does not have major resource conflicts or other known issues which would make the project infeasible. The area has adequate direct normal solar insolation levels to support a utility-scale solar facility, according to Geographic Information System data provided by the National Renewable Energy Laboratory. Insolation is defined in the Draft Solar PEIS as the solar power density incident on a surface of stated area and orientation, usually expressed as watts per square meter or British Thermal Units per square foot per hour. The location is also near an existing transmission line and substation; new transmission line construction to connect to the electrical grid would be minimal. The proposed location would not conflict with landscape conservation strategies, nor would there be conflict with landscape protection, conservation, or restoration objectives established in documents such as the Carson City CRMP.

The BLM contacted the Federal, state, local, and tribal agencies consulted during the preparation of the Luning Solar EA to gain their input on the new application:

- The U.S. Fish and Wildlife Service (USFWS)
- Mineral County Board of Commissioners
- Walker River Paiute Tribe
- Yomba Shoshone Tribe
- Nevada Natural Heritage Program

Rather than scheduling a formal preliminary meeting, the SFO contacted the agencies individually to provide notification of the new proposal, which would essentially replace the proposal from Luning Solar Energy LLC.

The Department of Defense (DoD) was not on the list of agencies consulted during the preparation of the previous EA. The nearest DoD-administered lands are approximately 14 miles to the west at the Hawthorne Army Depot. The SFO contacted the DoD to provide notification of the new proposal; no conflicts or issues have been communicated to the BLM. There are no National Park Service (NPS) administered lands or resources near the proposed location, therefore the NPS was not contacted during the variance review.

The SFO contacted the Nevada Division of State Lands to have the new proposal sent, via electronic notice by the Nevada State Clearinghouse, to state agencies for review. Comments received as a result of this notice pertained to managing facility lighting to reduce effects from stray light on the surrounding landscape at night.

The variance area policies require a minimum of one public meeting to sufficiently gather information on potential issues, barriers, and/or opportunities related to a ROW application in a variance area. The SFO Field Manager attended the Mineral County Board of Commissioners meeting on February 19, 2014 to present the new proposal to the board. The SFO Field Manager was included in the agenda for the board meeting, which was adequately noticed by the Mineral County Board of Commissioners in the local newspaper and several locations around Hawthorne (Appendix A, Board of Mineral County Commissioners Meeting Agenda, February 19, 2014).

Internal review, coordination with other government agencies, and public outreach did not indicate a need to recommend changes to the proposal during the variance review. The location does have natural resource values which need to be considered; none were at a level to suggest the LSEP should be rejected at the variance review stage without completing the NEPA process.

Following review of the variance process documentation submitted by the SFO, the BLM Director gave concurrence for the SFO to process the ROW application from Invenergy Solar on July 14, 2014. The variance review documents are attached in Appendix A of this EA.

1.6 Decisions to Be Made

The BLM will decide whether or not to authorize the LSEP, and, if so, under which terms and conditions. In addition, the BLM will establish interim VRM classes for the locations where the LSEP would be developed. BLM will also decide whether or not to establish two mineral material pits for use during construction and operations of the LSEP and to make these materials available to the public, after construction of the LSEP, by designating the sites as community pits.

2.0 THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

Invenergy Solar proposes to construct, operate, and decommission a utility-scale PV solar generation facility on approximately 560 acres of BLM-administered public land in Mineral County, Nevada. The LSEP would be located approximately 3 miles north of the unincorporated town of Luning, on public lands administered by the BLM. The project would use ground-mounted PV panels with single axis trackers which rotate to follow the sun. Associated with the PV panels would be an electrical collection system to connect power inverters and transformers to a substation within the solar facility (project substation). A control house next to the project substation would house protective relays and communications infrastructure. A 120 kilovolt (kV) generation-tie transmission line (gen-tie line) would connect the project substation to the existing Table Mountain substation, owned by NV Energy. Two 40-acre mineral material sites, with access roads, are proposed as potential sources for aggregate and borrow material; the two sites would be designated as BLM community pits for future use by Mineral County, private citizens, and other users (Appendix B, Map B-2, Proposed Action).

Commercial operation of the solar facility is expected to last for 30 years. Invenergy Services LLC operates most projects owned by Invenergy LLC affiliate companies in the United States, and it is anticipated Invenergy Services LLC would also operate the solar facility. Project management, including remote monitoring and control, is performed from Chicago, Illinois. Additional information regarding project components is contained in Appendix B of this EA.

When describing the components of the Proposed Action, the term "solar facility" refers to the field of PV panels and associated infrastructures (project substation, control house, etc…), gen-tie line, and modifications at the Table Mountain substation. The term "LSEP" refers to all project components, including the two proposed mineral material sites. These terms are used as such when describing the potential effects in Chapter 3 (Affected Environment and Environmental Consequences). The total area which could be entirely or partially disturbed by the LSEP is approximately 677 acres (PV field, gen-tie line, and mineral material sites).

2.1.1 Project Components

2.1.1.1 Solar Facility

PV Modules

The proposed solar panel specification is a 72-cell, 300-watt multicrystalline module. Each module measures 6.42 × 3.25 feet and would be placed in a rack with 10 to 30 other modules; the resulting assembly would be mounted approximately 2 feet off the ground on a single axis tracker which rotates 45 degrees to the east and west to optimize energy production. Each rack would be supported by steel posts driven into the ground. Post depth would vary depending on soil conditions but are typically 10 to 15 feet below the surface. If soil conditions require, concrete foundations would be used. Concrete foundations would range from 10-24 inches in diameter and would range from 54-78 inches deep. The use of concrete foundations is anticipated to be minimal.

Approximately 4,200 modules would be installed to form 1MW blocks (each block would measure approximately 726 × 456 feet). Racks of modules would be installed with enough spacing between rows to minimize row-to-row shading; the planned ground coverage is approximately 33%. The solar panel arrays would be oriented north to south and track the sun from east to west to optimize energy production. Associated with each block would be perimeter and interior service roads, inverters, and transformers. The combined area of all the solar panel arrays would create two large fields, separated by Highway 361 (PV field).

Power from within each block would be routed to inverters within the blocks that would convert the DC current to AC current. The inverter output voltage would then be stepped up to 34.5kV by transformer boxes mounted next to the inverters. The 34.5kV output would be connected to a central substation via buried collector cables. Collector cables would be buried approximately 3 feet below the surface.

Roads

New roads would consist almost exclusively of service roads within the PV field. State Highway 361 passes through the PV field, so major access roads would be limited to two short driveways, one on each side of the highway. Invenergy Solar would coordinate with the Nevada Department of Transportation (NDOT) to obtain encroachment permits to connect to the highway.

Service roads within the PV field would typically have a 20-foot wide travel surface and would be covered with aggregate adequate to support construction, maintenance, and rescue vehicles. Aggregate for roads and other areas would be purchased from existing local sources or may be purchased from BLM from the proposed mineral material sites. Ditches, culvert pipes, and other drainage control structures would be incorporated as needed. Locations for drainage structures would be determined based on a water flow analysis during final project engineering.

Structures

The project substation would collect power from each of the individual inverter boxes. The collection system voltage would be increased to 120kV so power can be transmitted to the electrical grid via the proposed overhead gen-tie line. The project substation would be approximately 150 feet by 150 feet (approximately 22,500 square feet) and would contain equipment to provide electrical power to operate the substation equipment, control house, and other equipment within the PV field.

A control house would sit next to the project substation to store protective relay and communications equipment, as-well-as project documents for technicians. The control house would be a custom designed weatherproof structure with exterior walls and interlocking roof panels, approximately 300 square feet in size. The structural base and floor would be designed for applicable loading allowing the structure to be lifted and transported with most of the interior equipment installed. The control house would have fire and safety equipment such as smoke detectors, fire extinguishers, and an eyewash station. The control house would come with a heating and ventilation and air conditioning (HVAC) system. The HVAC system and other

equipment in the control house would be powered with station power. Both the control house and project substation would be located near the southeast corner of the PV field where the gen-tie line would begin.

Portable toilets would be located outside the control house to be used by maintenance technicians and visitors. A 300-square-foot storage trailer would be located next to the control house to store spare parts, consumables and tools for ongoing operations and maintenance as well as potable water for technicians. Maintenance trucks and personal vehicles would park adjacent to the control house.

Other Solar Facility Infrastructures and Systems

A 6-foot-high chain link security fence would be installed around facilities as they are constructed and access to the site would be controlled by gates. The project substation would be separately fenced with warning signage. Motion-activated lighting would be installed on the control house, on the access gates, and throughout the PV field for access during non-daylight hours. A motion-activated security camera system would be installed with the lighting to monitor the collector substation, control house, and the PV field. During construction, temporary lighting facilities may be used if necessary.

A 15,000-square-foot laydown yard for staging and storage during construction would be located next to the collector substation. In addition to providing a temporary storage space for equipment and vehicles during construction, the laydown yard would be used to house approximately five office trailers during construction for project management purposes. Portable toilets would be used by construction workers and visitors.

On-site telecommunications during the construction and operations phases would be accomplished with cellular telephones and two-way radios. Air horns may also be used for emergency communications as necessary. A Supervisory Control and Data Acquisition system would allow Invenergy Solar on-site and remote personnel to operate the solar facility and gen-tie line. Communications between the project substation and the Table Mountain substation during the operations phase would use primary and secondary digital circuits (communications lines) located within the gen-tie line ROW.

Gen-Tie Line

Approximately one mile of new overhead transmission line would be constructed to connect the project substation to the Table Mountain substation. The new gen-tie line would consist of 10-15 single wood or metal poles, between 60 and 90 feet tall, with conductors strung between; an optical ground wire would be installed as a shield wire. A primitive two-track road, created by driving over the surface, would be created to deliver materials to constructions sites and to service the power line while it is in operation. NV Energy is currently authorized to access the Table Mountain substation via an existing improved road which begins in Luning. The road would be used to access the east end of the gen-tie line as well.

The gen-tie line would connect to the existing electrical grid at the Table Mountain substation, which is part of an existing ROW held by NV Energy (N-39910). A vertical transition structure (VTS) would be constructed on the last pole outside the Table Mountain substation to isolate the

substation from the gen-tie line when needed. The VTS would serve as the point where ownership of the facilities changes from Invenergy Solar to NV Energy. Expansion of the Table Mountain substation is not expected; all new equipment to connect the gen-tie line would be contained within the existing footprint of the substation.

Preliminary designs and specifications for the PV modules, PV field, gen-tie line, vertical transition structure, and other related infrastructures are contained in Appendix B.

2.1.1.2 Material Sites

Two 40-acre mineral material sites are proposed as potential sources of aggregate and borrow material for the LSEP. Material Site 1 is approximately 1 mile north of the PV field in the E½SE¼SE¼ of section 10, and the W½SW¼SW¼ of section 11, T. 8 N., R. 34 E., Mount Diablo Meridian. The site is on the east side of State Highway 361, directly north of an existing NDOT material site ROW (CC-021185). The site would be accessed from the highway using a new road to avoid the NDOT material site (Appendix B, Map B-3, Material Site 1).

Material Site 2 is located approximately 4 miles west-northwest of Luning in the SW¼NE¼ of section 25, T. 8 N., R. 33 E., MDM. The site is on the south side of U.S. Highway 95, directly east of another existing NDOT material site ROW (N-38418). The site would be accessed from the highway using a new access road to avoid the NDOT material site (Appendix B, Map B-4, Material Site 2).

When aggregate or borrow material is needed, Invenergy Solar could apply for mineral material sale contracts (sale contracts), under the regulations in 43 CFR 3600, at either of the two proposed mineral material sites. The amount of material authorized under sale contracts would be set according to the needs for construction or operation. The 40-acre mineral material sites are intended to allow flexibility to locate the specific types and sizes of material needed. Geotechnical drilling could be used by the operator to locate the desired material types within the material site boundaries.

Geotechnical drilling is typically completed using a small drill rig capable of driving over the land with minimal disturbance. A series of boreholes, dependent on the size of the area being surveyed, are drilled and the cuttings analyzed to show the mineral material composition (e.g. quantities and types of fines, sands, gravels, cobbles, boulders, etc.) which may be obtained through developing a pit. The main surface disturbances would typically be the actual borehole (4-6” in diameter), a small cuttings pile next to the borehole, and marks from tires or tracks; track mounted drill rigs may cause deeper ruts or scraping of the topsoil in locations where sharp turns are performed.

Excavation of material from material pits may be completed by standard construction equipment. Possible equipment used to develop and operate a pit could include a screen or crushing plant, loaders, conveyors, a water truck and haul trucks. Vegetation would be removed and topsoil would be salvaged, where possible, for use during reclamation. Equipment would occasionally occupy the pit during the duration of sale contracts. All processing of mineral materials would remain within the boundaries of pit areas. Excavated material may be stockpiled onsite before being transported to its authorized use area. Materials would be hauled from the pit area using existing roads or short access roads (up to ½ mile in length) constructed to connect to existing

roads or highways. Roads would typically be maintained to keep a flat surface and minimize dust. Maintenance would include adding aggregate and regular blading to maintain a durable surface. Water would be used to aid with blading and to suppress dust. There would be no permanent equipment stored onsite after the expiration of sale contracts.

Potential uses for the mineral materials include aggregate for capping access roads and general fill for construction work at the different project components. Sale contracts would contain terms and conditions to specify the amount of material to be removed within a specific time period, provide for protection of natural resource values, and set standards for reclaiming disturbed areas. Reclamation would consist of leveling unused material stockpiles, reducing slopes within the pit to a maximum of 3:1, removing all equipment, trash, and debris, and reseeding disturbed areas if practicable. Material would be sold at appraised fair market value in accordance with agency regulations. Other parties, such as the public or local governments, could apply for sale contracts within the two mineral material sites as well. If there is sufficient demand, the BLM could also designate the locations as community pits for use by Mineral County or local citizens in the future.

If the areas do not contain enough material to meet the needs of the LSEP, Invenergy Solar could purchase material from other local sources or identify alternate locations on BLM-administered lands. New locations on BLM-administered lands may require additional environmental analysis before sale contracts would be issued.

2.1.2 Construction

Final Engineering and Notice to Proceed

ROW grants authorizing the different components of the LSEP would contain a condition prohibiting ground-disturbing activities prior to receiving a written Notice to Proceed (NTP) from the BLM. Prior to construction and after receiving ROW grants from the BLM, Invenergy Solar would select an engineering, procurement, and construction (EPC) contractor to design and complete construction of the solar facility and gen-tie line.

After final engineering is complete and the construction plan is prepared, Invenergy Solar would submit the information to the BLM for review and would request a NTP. The BLM would evaluate the information for conformance with the grant, consistency with the Plan of Development (POD), and consistency with the Proposed Action. The BLM would either issue a NTP or request additional information from Invenergy Solar. Major deviations from the POD or new resource concerns may require additional environmental analysis before a NTP can be issued.

Following issuance of a NTP, Invenergy Solar would be required to develop the LSEP in accordance with the policies described in Instruction Memorandum (IM) 2011-003 (Solar Energy Development Policy). Specifically, IM 2009-003 requires holders of ROW grants to begin construction of solar energy projects within 12 months after receiving a NTP and to complete construction within the timeline described in the POD, but no later than 24 months after the issuance of the ROW grant.

Solar Facility Construction

Construction of the solar facility would begin with surveying and staking the construction limits. Construction of the gen-tie line would be completed last, before the facility is energized. Pre-construction, construction, and post-construction activities, some of which would occur concurrently, includes:

- Finalize project design;
- Soil borings, testing, and analysis for proper foundation design and materials;
- Ordering of all necessary components, including solar modules, inverters, and pad-mount transformers;
- Survey to establish locations of structures and roadways;
- Construction of access roads to be used for construction and maintenance;
- Installation of rack foundations (vibratory or pile driving);
- Installation of racks;
- Installation and stringing of modules;
- Installation of underground cables;
- Construction of underground feeder lines;
- Installation of inverters and padmount transformers;
- Design and construction of project substation;
- Commissioning of modules and inverters; and
- Commencement of commercial operation

Approximately 100 workers per day would be required for construction of the solar facility and associated facilities. Construction personnel would be from both the local labor force and from outside regions, with an emphasis placed on using local labor, contractors, and suppliers when possible. Temporary facilities, including office trailers and portable toilets, would be installed in the laydown area. Construction would generally occur between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Equipment and vehicles which may be used during construction include:

Table 2-1: Construction Equipment

Equipment	Use
D7 bulldozer	Road and pad construction
Grader	Road and pad construction
Water trucks	Compaction, erosion, and dust control
Roller/compactor	Road and pad construction
Backhoe	Digging foundations and trenches for utilities
Trenching machine	Digging trenches for underground utilities
Truck-mounted drill rig	Drilling pole foundations
Concrete trucks and pumps	Pouring pole and other structure foundations
Dump trucks	Hauling road and pad material
Flatbed trucks	Hauling towers and other equipment
Pickup trucks	General use and hauling minor equipment
Small hydraulic cranes and forklifts	Loading and unloading equipment

Equipment	Use
Four-wheel-drive all-terrain vehicles	Rough grade access and underground cable installation
Rough terrain forklifts	Lifting equipment
Crane	Framing and erecting poles
Pulling/braking equipment	Stringing and anchoring guy wires and conductors

Once site preparation is complete, the project footprint would be cleared and grubbed of vegetation and debris using D7 or similar bulldozers. All disturbances associated with the PV field would be confined to the 560 acre project area. Cleared vegetation and debris suitable for compaction would be incorporated and/or stockpiled for later use while unsuitable materials, such as large rocks and boulders, would be stockpiled and disposed of as authorized by the BLM. These materials would either be buried onsite or hauled off-site for disposal. The site would then be graded and fenced with security fencing prior to installation of service roads, solar panels, inverters, collector substation, and control house.

During construction, a temporary 15,000-square-foot construction laydown yard would be located within the 560 acre project area to stage equipment and materials. Fueling and servicing of equipment would be completed onsite in the laydown yard by the construction contractor. Appropriate spill prevention and containment measures would be implemented as required. The construction contractor would use the laydown yard to inspect and clean equipment to reduce the spread of invasive weeds. Weed prevention methods would be coordinated and approved by the BLM.

Minimal grading is proposed in order to maintain existing stormwater drainage patterns. Any erosion during construction would be controlled by implementing a Stormwater Pollution Prevention Plan (SWPPP), as required by the Nevada Department of Environmental Protection (NDEP), Bureau of Water Pollution Control, for projects disturbing more than one acre. Grading may require both excavation and soil compaction to achieve desired grades and elevations, and ensure proper soil compaction. Grading would be most extensive in areas for the access roads, control house, collector substation, and laydown yard.

During construction and interim reclamation, an estimated 3 million gallons (9.2 acre feet) of water would be needed to control dust, aid in soil compaction, prepare concrete foundations, hydroseeding, and stabilizing loose soil. All water for site preparation, grading, concrete, dust control and interim reclamation would be purchased from private, off-site sources and hauled to the location using 3,500-gallon water trucks. The amount of water needed for dust control would be minimized through reduced driving speeds within work areas. The construction contractor would post signs instructing construction personnel to maintain reduced speeds.

Gen-Tie Line Construction

During construction, a 200-foot wide temporary ROW would be needed to construct the gen-tie line. Each monopole would require a 100-foot-radius area for construction. Cable pulling and tensioning sites for the gen-tie line would be within the 200-foot ROW. A primitive road would be created to transport construction materials to the pole sites and to string cables. The road would be established by driving over the open ground to create a two-track approximately 10

feet wide. Some areas may require minor blade work to create a passable driving surface. Bladed areas would be approximately the same width as a two-track and surfaced with aggregate, if needed, to prevent the road from deteriorating due to vehicle traffic.

Table Mountain substation
Construction of the VTS would follow a similar methodology as the gen-tie line. A 300-foot wide temporary ROW would be needed outside the Table Mountain substation for cable pulling and tensioning. A new 120 kV breaker would be installed within the existing substation. The need to expand the fenced area or relocate the entrance to the substation is not anticipated. Equipment and materials would be brought to the substation using the existing improved access road that begins in Luning. The access road would require additional blading and aggregate to support the increased traffic. Blading and gravelling would be allowed within the existing footprint of the road without separate approval from the BLM.

2.1.3 Post Construction Site Stabilization, Protection, and Reclamation

Solar Facility
After construction of the project facilities is completed, disturbed areas no longer needed for operations would be reclaimed as described in a Decommissioning and Site Reclamation Plan (reclamation plan) to be submitted and finalized when the NTP is requested. The reclamation plan would include a reclamation cost estimate to ensure compliance with the terms and conditions of a ROW grant and agency policies. Invenergy Solar would post the bond prior to receiving a NTP.

The reclamation plan would contain a seed mix, approved by the BLM, to be used for reseeding disturbed areas. Reseeding may be accomplished using a range drill, hydroseeding, or hand spreading. The greatest area to be reclaimed would be along the gen-tie line route. Some water may be used during reclamation for stabilization of loose soil, hydroseeding, or other purposes to be described in the reclamation plan.

Gen-Tie Line and Table Mountain Substation
Following construction of the gen-tie line, the permanent disturbance would be approximately 3 feet around each monopole. Once construction equipment and materials are removed from the gen-tie line route, disturbed areas no longer needed for operation of the line would be reclaimed as appropriate. The temporary 200 foot ROW would be reduced to a permanent width of between 60 and 90 feet for operation. If extensive work is required to maintain or repair pole sites in the future, disturbed areas created during construction of the line could be used again and reclaimed after the work is complete. Reclamation following construction of the VTS would be similar to the gen-tie line.

2.1.4 Operation of Solar Facility

The control house and associated facilities (i.e., parking, storage trailer, and portable toilets) would accommodate operation and maintenance needs. On-site maintenance activities would include inspections, planned and unplanned maintenance, and panel washing. Inspections of the project's electrical facilities, roads, and grounds would be conducted approximately 4 times per

year or as needed. Solar facility equipment would be modular and could be removed and replaced if necessary. Given the relatively small size, modules could be easily picked up with a small loader and placed on a flatbed truck.

Preventative maintenance on the PV modules and inverters would be conducted a minimum of twice per year. PV panel washings would occur as needed to increase the average optical transmittance of the flat panel surface. Service road maintenance and weed control would be performed as needed.

2.1.5 Decommissioning and Final Reclamation

At the end of the useful life of the solar facility, or upon expiration or termination of the ROW grant, whichever comes first, all solar panels, ancillary equipment, and facilities (including the control house, portable toilets, collector substation, gen-tie line, etc.) would be removed from the site. Any support structures would be demolished and all debris would be removed. After removal of all equipment and structures, the ground and roads would be recontoured and reseeded with a seed mix approved by the BLM in the reclamation plan. A grant would contain a condition requiring the holder (Invenergy Solar or an approved assignee) to contact the BLM at least six months prior to the expiration of the ROW to arrange for a joint inspection of the site and review the reclamation plan.

2.1.6 Applicant Committed Mitigation Measures

Air Quality

- A surface area disturbance permit would be obtained from the NDEP Bureau of Air Pollution Control to construct and operate the site in accordance with permit conditions.

- Water would be applied to roads, parking areas, staging areas, and other disturbed areas, as needed, to reduce dust.

- Signs would be posted throughout the project area to remind workers to maintain slow speeds to reduce dust and promote safety.

Cultural Resources

- Cultural (historic or prehistoric site or object) or paleontological resources or Native American human remains, funerary items, sacred objects, or objects of cultural patrimony discovered by the holder, or any person working on their behalf, during the course of activities on federal land would be immediately reported to the Authorized Officer by telephone, followed by written confirmation. All operations in the immediate area, generally within 100 meters, of such discovery would be suspended and the discovery protected until an evaluation can be made by the Authorized Officer.

- For cultural resources other than Native American human remains, funerary items, sacred objects, or objects of cultural patrimony, this evaluation would determine the significance of the discovery and what mitigation measures would be necessary to allow the activities to proceed. The grant holder would be responsible for the cost of evaluation and mitigation. Any decision on treatment and/or mitigation would be made by the Authorized Officer after consulting with the grant holder. Operations may resume only upon written authorization to proceed from the Authorized Officer.

- Invenergy Solar would inform all persons working in the project area that knowingly disturbing cultural resources or collecting artifacts is prohibited.

Native American Religious Concerns

- For Native American human remains, funerary items, sacred objects, or objects of cultural patrimony the holder would stop activities in the immediate vicinity of the discovery and protect it from activities for 30 days or until notified to proceed by the Authorized Officer. The grant holder would be responsible for the cost of consultation, evaluation, and mitigation. Any decision on treatment and/or mitigation would be made by the Authorized Officer after consulting with the grant holder.

Sensitive Plants

- Cactus and yucca plants would be avoided if possible. With BLM and State of Nevada approval, cactus and yucca plants that cannot be avoided would be transplanted to nearby suitable habitat.

Visual Resources

- To the extent practicable, solar modules, inverters, transformers, buildings, and other structures would be manufactured or painted a complimentary color to reduce the visual contrast with the surrounding landscape in coordination with BLM recommendations.

- To the extent practicable, aggregate and borrow material would match the color of the existing surface.

- Motion-activated lighting would be installed on the control house, on the access gates, and throughout the PV field for access during non-daylight hours. Lighting would be directed downwards towards the project facilities to limit area light pollution.

Weeds

- New infestations of invasive, non-native weeds would be treated promptly to prevent them from being spread off-site.

2.2 ALTERNATIVES

2.2.1 No Action Alternative

In accordance with Chapter VI, Section 6.6.2 of H-1790-1, this EA evaluates the No Action Alternative, which is a reasonable alternative to the Proposed Action. The objective of the No Action Alternative is to describe the environmental consequences that may result if the Proposed Action were not implemented. The No Action Alternative forms the baseline from which the impacts of the Proposed Action can be measured.

Under the No Action Alternative, the BLM would not approve the LSEP. Invenergy Solar would not be authorized to construct the solar energy generating facility and gen-tie line, and NV

Energy would not be authorized to expand the Table Mountain substation. The proposed material sites would not be developed.

2.2.2 Alternatives Considered but Eliminated From Detailed Analysis

Internal scoping and completion of the variance area review process did not identify unresolved conflicts about the Proposed Action with respect to alternative uses of available resources, therefore no additional alternatives are considered for analysis in this document.

3.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This chapter identifies and describes the current condition and trend of elements or resources in the human environment which may be affected by the Proposed Action and the anticipated environmental consequences. Per the Council on Environmental Quality (CEQ) regulations found at 40 CFR 1508.8, 'effects' and 'impacts' are synonymous in this EA. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes the effect will be beneficial.

Scoping and Issue Identification

In accordance with the H-1790-1 internal scoping was conducted by the SFO ID team beginning in September 2013 to identify potential resources which may be impacted by implementation of the Proposed Action. Public scoping included the Mineral County Board of Commissioners meeting on February 19, 2014 and public input from the previous Luning Solar EA (DOI-BLM-NV-C010-2009-0017-EA).

Per 36 CFR Part 800 and 43 CFR Part 8100 (BLM), as amended, a consultation letter with a general summary of the current proposed project, including a map, was sent to the regional tribes whose traditional cultural boundary has been determined to be within the vicinity of the LSEP. The BLM consulted with the following tribes: Fallon Paiute-Shoshone Tribe (FPST), Walker River Paiute Tribe (WRPT), and Yomba Shoshone Tribe (YST). The FPST were sent a letter on July 7, 2008 and again on June 12, 2014. The WRPT were sent a letter on July 15, 2009 and again on June 12, 2014. The YST were sent a letter on July 23, 2009 and again on June 12, 2014. Correspondence, face to face meetings and phone calls in the past with the Tribes have provided opportunity to document any Tribal concerns with the location of the LSEP since July of 2000. The public scoping period ended on June 28, 2014. No comments were received during the scoping period.

The following resources were identified by the SFO ID team as not being present or are present but not affected (see Table 3-1 and 3-2 below):

- Areas of Critical Environmental Concern
- Environmental Justice
- Farm Lands (Prime and Unique)
- Native American Religious Concerns
- Threatened or Endangered Species
- Wetlands/Riparian Zones
- Wild and Scenic Rivers
- Wilderness
- Forestry Resources
- Lands with Wilderness Characteristics
- Paleontological
- Recreation
- Travel Management
- Wild Horses and Burros

3.1 Supplemental Authorities

BLM Nevada IM NV-2009-030 (Supplemental Authorities to Consider in National Environmental Policy Act (NEPA) Documents) provides guidance to BLM District and Field Offices on how supplemental authorities outlined in Appendix 1 of H-1790-1 should be

considered in NEPA documents. Attachment 1 to IM NV-2009-030 provides the Supplemental Authorities list as a screening tool for review and documentation of relevant authorities (laws, regulations, executive orders, directives, etc.) in NEPA documents.

The Supplemental Authorities list is organized by elements of the human environment; the elements and corresponding legal authorities are collectively referred to as "Supplemental Authorities." The list expands on Appendix 1 of H-1790-1 to include other legal authorities, with requirements specified by statute or executive order, which must be considered in all Nevada BLM EA documents. The table below lists the Supplemental Authorities, their status in relation to the Proposed Action, and rationale for whether the topic will be carried forward for detailed analysis. Supplemental Authorities determined to not be present or present, but not affected by the Proposed Action need not be carried forward or discussed further. Supplemental Authorities determined to be present and may be affected may be carried forward in the document if there are issues which necessitate a detailed analysis.

Table 3-1: Supplemental Authorities

Resource or Issue	Present Yes/No	Affected Yes/No	Rationale
Air Quality	Yes	Yes	See Section 3.2.1 for background information and rationale.
Areas of Critical Environmental Concern	No	No	None present.
Cultural Resources	Yes	Yes	See Section 3.2.1 for background information and rationale.
Environmental Justice	No	No	No minority or low income populations would be adversely or disproportionately affected by implementation of the Proposed Action. Therefore this resource will not be carried forward for further analysis.
Farm Lands (Prime and Unique)	No	No	None present.
Floodplains	No	No	None present.
Migratory Birds	Yes	Yes	Carried forward for analysis in Section 3.14.
Native American Religious Concerns	Yes	No	See Section 3.2.1 for background information and rationale.
Noxious and Invasive, Non-native Species	Yes	Yes	Carried forward for analysis in Section 3.7.
Threatened or Endangered Species	No	No	After consulting with the BLM wildlife biologist and the USFWS website for Nevada, there are no federally listed threatened or endangered species within the affected area (http://www.fws.gov/nevada/protected species/species by county.html). Therefore this resource will not be carried forward for further analysis.

Resource or Issue	Present Yes/No	Affected Yes/No	Rationale
Wastes, Hazardous or Solid	Yes	Yes	Small quantities of hazardous and/or solid wastes could be generated by the Proposed Action. All hazardous materials would be transported, used, and stored in accordance with local, state, and federal regulations. All wastes would be disposed of offsite following local, state, and federal regulations. Any spill of hazardous materials would be contained, remediated, and disposed of following local, state, and Federal regulations. Therefore this resource will not be carried forward for further analysis.
Water Quality, Surface/Ground	Yes	Yes	Carried forward for analysis in Section 3.12.
Wetlands/Riparian Zones	No	No	None present.
Wild and Scenic Rivers	No	No	None present.
Wilderness	No	No	None present.

3.2 Resources or Uses Other Than Supplemental Authorities

The following resources or uses, which are not Supplemental Authorities outlined in Attachment 1 of IM NV-2009-030, are evaluated by the SFO ID team in all NEPA documents. Resources or uses determined to not be present or are present, but not affected by the Proposed Action need not be carried forward or discussed further. Resource or uses determined to be present and may be affected may be carried forward in the document if there are issues which warrant a detailed analysis.

Table 3-2: Resources or Uses Other Than Supplemental Authorities

Resource or Uses	Present Yes/No	Affected Yes/No	Rationale
BLM Sensitive Species (wildlife)	Yes	Yes	Carried forward for analysis in Section 3.15 (Special Status Species).
BLM Sensitive Species (plant)	Yes	Yes	Carried forward for analysis in Section 3.15 (Special Status Species).
Forestry Resources	No	No	None present.
General Wildlife	Yes	Yes	Carried forward for analysis in Section 3.13.
Land Use Authorization	Yes	Yes	The Master Title Plat shows a notation for a transmission line ROW (Nev-065524) granted to the Western Area Power Administration which crosses the area in which the solar facility would be located. The Western Area Power Administration did not object to the Proposed Action and would

Resource or Uses	Present Yes/No	Affected Yes/No	Rationale
			design their transmission line to accommodate the PV field, gen-tie line, and Ft. Churchill to Millers transmission line when the line is constructed. The only other ROW in the area is held by the NDOT for State Highway 361. Invenergy Solar would obtain encroachment permits from the NDOT. There are no other authorized or pending land use authorizations that would be affected by the Proposed Action. Therefore this resource will not be carried forward for further analysis.
Lands with Wilderness Characteristics	No	No	Subject to Washington Office IM WO-IM-2011-154 and in accordance with BLM Manuals 6310 and 6320 the location was found not to contain wilderness character. See Report on Lands with Wilderness Characteristics, November 2014. Therefore this resource will not be carried forward for further analysis.
Livestock Grazing	Yes	Yes	See Section 3.2.1 for background information and rationale.
Minerals	Yes	Yes	Carried forward for analysis in Section 3.6.
Paleontological	No	No	None have been observed in the area and the potential in the area is minimal. Therefore this resource will not be carried forward for further analysis.
Recreation	Yes	No	Dispersed recreation activities or opportunities would not be affected by the Proposed Action or Alternatives; therefore this resource will not be carried forward for further analysis.
Socioeconomics	Yes	Yes	Carried forward for analysis in Section 3.8.
Soils	Yes	Yes	Carried forward for analysis in Section 3.9.
Travel Management	Yes	No	Travel routes would not be affected by the Proposed Action; therefore this resource will not be carried forward for further analysis.
Vegetation	Yes	Yes	Carried forward for analysis in Section 3.10.
Visual Resources	Yes	Yes	Carried forward for analysis in Section 3.11.
Wild Horses and Burros	No	No	None present.
Global Climate Change/Greenhouse Gas Emissions	Yes	Yes	See Section 3.2.1 for background information and rationale.

3.2.1 Additional Rationale

Air Quality

The LSEP is located in the Soda Spring Valley, Eastern Part, Hydrographic Area (121A) and Soda Spring Valley, Western Part, Hydrographic Area (121B). These areas are considered "unclassified" by the NDEP relative to attainment of applicable state and Federal air quality standards (Appendix C, Map C-1, Hydrographic Basins). As of October 14, 2014, the U.S. Environmental Protection Agency website does not list Mineral County, NV, as a nonattainment county for any pollutant criteria (http://www.epa.gov/oaqps001/greenbk/ancl.html). The main existing sources of air pollutants near the LSEP are from vehicles traveling U.S. Highway 95 and State Highway 361. Fugitive dust and internal combustion engine exhaust, during construction of the LSEP and operating material processing plants at the proposed mineral material sites, would be sources of potential air quality impacts. These impacts expected from implementation of the LSEP, would be short-term in nature and at no time are expected to exceed National Ambient Air Quality Standards levels. Potential air quality impacts would be minimized through applicant-committed measures and compliance with state and Federal regulations. Therefore this resource will not be carried forward for further analysis in this document.

Cultural Resources

While planning for solar energy development on Federal public lands, the SFO has prioritized the protection of any outstanding historic and cultural resources, including significant concentrations of prehistoric and historic archaeological sites, historic trails and Native American traditional cultural properties and sacred sites, but no significant resources have been identified. The background research for the LSEP compiled information about the prehistory and history of the area through literature search and documentation analysis, which was used to help identify previously-recorded sites and form expectations about site density in the area. General Land Office plats and other historical maps, historical indices, and land patents were also consulted prior to the fieldwork to identify potential historic features. To date, no significant cultural sites have been discovered within the LSEP.

The entire 624 acre project area, or area of potential effect (APE), had Class III cultural resources inventories conducted in the PV field and gen-tie line areas by Kautz Environmental Consultants, Inc. (KEC) in June and July 2008 and April 2009. The Class III cultural resources inventory conducted by KEC resulted in the recordation of 19 isolated finds and a total of 11 archaeological sites. It has been recommended the 19 isolated finds recorded during the present survey are not eligible for the National Register of Historic Places (NRHP). Therefore, these isolated finds require no further management consideration prior to implementation of the Proposed Action. Of the 11 archaeological sites recorded, all are historic in age. They include eight trash scatters, two roads with refuse (one also includes a rock cairn feature), and one dump site. One of the roads is a segment of the Wadsworth to Columbus Freight Road. Ten of the 11 sites recorded are recommended as not eligible for nomination to the NRHP. Therefore, it is further recommended these 10 sites require no further management consideration prior to implementation of the Proposed Action. The eleventh site is the Wadsworth to Columbus Freight Road, which is recommended eligible under Criterion A. However, the segment located within this APE has been recommended as a non-contributing element. As such, this site requires no further management consideration prior to the implementation of the LSEP.

Additional class III cultural resources surveys were conducted in the proposed material site locations in October and December 2014 by SFO Resource Specialists. The inventories resulted in the recordation of six non-eligible isolated finds and no sites. No historic properties were identified during the surveys.

As part of the design features of the Proposed Action (see Section 2.1.6, Applicant Committed Mitigation Measures), Invenergy Solar has committed to avoiding cultural resources of significance, or would mitigate impacts in a manner acceptable to the BLM. These design features would reduce, and likely eliminate, the noted impacts commonly experienced during surface disturbing activities. Therefore this resource will not be carried forward for further analysis in this document.

Native American Religious Concerns

Native American resources are sites, areas and materials important to Native Americans for religious, spiritual or traditional reasons. These resources include but are not limited to villages, burials, petroglyphs, rock features, or spring locations. Fundamental to many Native American religions is the belief in the sacred character of physical places, such as mountain peaks, springs, or burials. Traditional rituals often prescribe the use of particular native plants, animals or minerals. Activities which may affect sacred areas, their accessibility, or the availability of materials or natural resources used in traditional practices, are also considered when evaluating these areas.

Ethnographic information indicates the Northern Paiute and Western Shoshone occupied the study area, and their way of life is characterized by the concept of living in harmony with the natural environment. Rituals and ceremonies address the need to ensure plants, animals and physical elements flourish. The continued welfare of the people depends on these rituals and ceremonies being performed properly. The manner of performing the rituals and ceremonies, the places at which they are performed and perhaps even the time of their performance are often prescribed.

The traditional lands of the Paiute and Western Shoshone encompass the majority of the State of Nevada (including the BLM SFO administrative area). The BLM will remain flexible and open to productive and proactive communication with affected Tribes in order to assist each other in making decisions which may reduce or eliminate any adverse effects to all party's interests, resources, and/or activities.

Native American consultation with the Tribes is ongoing, and to date no traditional cultural properties or sacred sites have been identified within the LSEP. Ongoing consultation could result in new information and additional mitigation measures. If previously unidentified and/or undiscovered gravesites, traditional cultural properties, artifacts, or similar occur, Invenergy Solar would implement the stipulations and environmental protection measures described in this document. These measures and stipulations include following procedures set forth in 43 CFR Part 10, Native American Graves Protection and Repatriation Regulations. Therefore this resource will not be carried forward for further analysis in this document.

Livestock Grazing

The LSEP would be located on lands within the Pilot-Table Mountain and Garfield Flat grazing allotments. Material Site 2 is the only portion of the LSEP within the Garfield Flat allotment, which consists of 214,841 acres of BLM-administered lands available for grazing. The stocking rate is 50 acres per Animal Unit Month (AUM) in the location of the material site. If fully developed, the material site would remove less than 1 AUM from the allotment, which would not affect grazing operations or numbers. The remainder of the LSEP is completely within the 512,449 acre Pilot-Table Mountain Allotment, which is a water-based allotment supporting year-round cattle grazing with 7,900 AUMs (Appendix C, Map C-2 Livestock Grazing Water Service Areas). The PV field would remove approximately 560 acres of land available for cattle grazing in the Pilot-Table Mountain Allotment for the life of the LSEP. According to the 1956 range survey, this acreage could support 11 AUMs of livestock grazing. Therefore a reduction of the active permitted AUMs is not warranted.

Under the Proposed Action, the PV field would be fenced to prevent unauthorized access. Since the PV field would be split by Highway 361 and would be fenced into two sections (Appendix C, Map C-3, Solar Facility Fences), trailing livestock could be funneled onto the highway as they seek the shortest route between forage and water. In addition, livestock may seek out the shade provided by the fences on the northern aspects. Both scenarios would encourage livestock to congregate on or near the highway increasing the likelihood of livestock being struck by vehicles. A mitigation measure to reduce the likelihood of livestock congregating near the highway in the gap between the two sections of the PV field is stated below:

- Cattleguards would be installed on the highway and the two separate sections of the PV field would be connected by additional fencing to prevent livestock from funneling into the gap and potentially being struck by vehicles. Fencing not intended to exclude access to the PV fields would be designed to meet BLM and NDOT requirements for wildlife passage and highway safety.

The affected area represents an insignificant percentage of the total active AUMs (0.139%) and the total area of the allotment (approximately 0.109%). Additional water sources, which have not been adjudicated, are located throughout the allotment and have resulted in more forage being available, which would make up for the 11 AUMs lost. Additionally, no impacts to livestock grazing are expected as a result of the two mineral material pits.

Global Climate Change and Greenhouse Gas Emissions

There is a public and scientific debate about human-caused contributions to global climate change from greenhouse gas (GHG) emissions. Section 3.1.2 of the Final Supplemental Environmental Impact Statement for the Silver State Solar South Project and Proposed Las Vegas Field Office Resource Management Plan (DOI-BLM-NV-S010-2012-0067-EIS) (Silver State Solar South SFEIS) contains a detailed description of human-caused climate change from GHG emissions associated with a similar solar energy project within the region. The information is applicable the LSEP and is included below for reference.

"On-going scientific research has identified the potential impacts of GHG emissions (including carbon dioxide, CO_2; methane; nitrous oxide; water vapor; and several trace gases) on global climate. Through complex interactions on a regional and global scale, these GHG emissions cause a net warming effect of the atmosphere (making surface temperatures suitable for life on Earth), primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO_2 concentrations also lead to preferential fertilization and growth of specific plant species.

PV solar energy systems do not directly generate GHG emissions, but the equipment manufacturing process does emit GHGs. In addition, on-site construction and operations using combustion engines can generate CO_2 and methane, although at levels much lower than equivalent coal, oil, or natural gas-fired electrical generation facilities.

Currently, there are no emission limits for GHG, and no technically defensible methodology for predicting potential climate changes from GHG emissions. However, there are and will continue to be several efforts to address GHG emissions from Federal activities.

The principal sources of Nevada's GHG emissions are electricity use (which excludes electricity exports to other states) and transportation, accounting for 42 percent and 32 percent of Nevada's gross GHG emissions, respectively. The next largest contributor to emissions is the residential, commercial, and industrial fuel use sector, accounting for 13 percent of the total State emissions (Nevada Climate Change Advisory Committee [NCCAC] 2008).

According to the NCCAC Final Report (NCCAC 2008), the predicted changes in the climate would impact public health through: (1) the direct effects of heat and frequent heat waves; (2) exacerbated air pollution as increased ground level O_3; (3) increases in infectious diseases, such as dengue fever and malaria; and (4) a decrease in general public health due to economic/social changes from climate change. Section 4.19.3.1 of the Silver State Solar South SFEIS determined the Silver State Solar South Project, which is 5-7 times larger than the LSEP, would have negligible long-term GHG emissions and a detailed analysis of cumulative impacts from GHG emissions was not necessary. Therefore this resource will not be carried forward for further analysis."

3.3 Resources Present and Brought Forward For Analysis

The potential impacts to the Supplemental Authorities, resources, and resource uses listed in Table 3-1 and Table 3-2 were evaluated by the SFO ID team to determine if detailed analysis would be necessary. Through this process, the SFO ID team determined the following resources warrant detailed analysis in this EA:

- Minerals
- Noxious, Invasive, and Non-native Species
- Socioeconomics
- Soils
- Vegetation
- Visual Resources
- Water Quality, Surface/Ground
- Migratory Birds
- Special Status Species (BLM Sensitive Species)
- General Wildlife

3.4 Cumulative Effects Overview

The CEQ regulations defines cumulative impacts as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

For the purposes of this EA, the cumulative impacts are the sum of all past, present (including proposed actions), and reasonably foreseeable future actions (RFFAs) resulting primarily from mining, commercial activities, and public uses. The purpose of the cumulative analysis in this EA is to evaluate the significance of the Proposed Action's contributions to cumulative environment.

As required under the NEPA and the regulations implementing NEPA, this chapter addresses those cumulative effects on the environmental resources in the Cumulative Effects Study Areas (CESAs) which could result from the implementation of the Proposed Action and No Action Alternative, past actions, present actions, and RFFAs. The extent of the CESA varies by resource based on the geographic or biological limits of the specific resource and is specified for each resource analysis below. The time frame considered to be most appropriate for evaluating the incremental effects of RFFAs is 30 years, which is the projected lifetime of the solar facility. The reasonable scope of the cumulative analysis would be restricted to connected, cumulative, and similar actions to the Proposed Action within the CESA.

Past, Present Actions, and Reasonably Foreseeable Future Actions

Past actions considered are those whose impacts to one or more of the affected resources have persisted to present day. Present actions are those occurring at the time of this evaluation and during implementation of the Proposed Action. RFFAs constitute those actions that are known or could reasonably be anticipated to occur within the analysis area for each resource, within a time frame appropriate to the expected impacts from the Proposed Action. The past, present, and RFFAs applicable to the assessment area are identified in the following Table 3-3.

Table 3-3: Past, Present and RFFAs Applicable to the CESA

Project -- Name or Description	Status (X)		
	Past	Present	Future
Livestock grazing	X	X	X
Dispersed Recreation Activities	X	X	X
Invasive weed inventory/treatments	X	X	X
ROW Authorizations	X	X	X
Mining Exploration and Development	X	X	X
Sand and Gravel Operations	X	X	X

3.5 General Setting

The LSEP is located south and west of the Gabbs Valley Range in the northern portion of Soda Spring Valley. The Soda Spring Valley begins at the divide between Walker Lake in the north, running east-southeast between the Gillis Range to the north and the Garfield Hills to the south, then turns to the south near Luning, with the Gabbs Valley Range and Pilot Mountain to the east, ending at the Rhodes Salt Marsh. The surface elevation over the LSEP ranges from approximately 4,600 near the Table Mountain substation to 4,700 feet near the northern edge of the PV field.

The LSEP would be constructed on the lower slopes of the alluvial fan leading up to the Gabbs Valley Range near Calvada Summit and Rhyolite Pass. The area is a high-desert environment characterized by arid to semiarid conditions, bright sunshine, low annual precipitation, and wide daily ranges in temperature (Luning Solar EA).

3.6 Minerals

Affected Environment

The two proposed 40-acre mineral material sites are within the Soda Spring Valley. The material sites consist entirely of alluvium deposits of Quaternary age. The material eroded from the adjacent mountain bedrock and was deposited down gradient as alluvial fans. The material deposited closer to the mountain front is typically coarser (i.e. larger and/or heavier) than material deposited farther away, depending upon the depositional environment. Each proposed material site contains varying amounts of boulders, cobbles, gravels, sands, and fines (clay and silts).

Material Site 1 along State Highway 361 (Appendix B, Map B-3, Material Site 1) is farther from the mountain front of the Gabbs Valley Range, which lies to the north of the site. The material deposited farther from the range is dominated by a higher percentage of sand than gravel material. The NDOT conducted soil testing on an existing material site ROW (CC-021185) adjacent to Material Site 1. According to the soil tests, the sieve data indicates more than 50% of the material sampled passes the No. 4 sieve. The Unified Soil Classification System uses the number 4 sieve screen as the breakoff point between sand to gravel classification. If more than 50% of coarse fraction passes the number 4 sieve, the material is classified as sand and if less than 50% of the material passes the number 4 sieve, the material is classified as gravel. The classification system can further refine the material based upon the percentage of fines. The high percentage of sand material in the pit means there is not as much coarse aggregate (gravels,

cobbles, boulders) which can be crushed to a specified size to meet certain design parameters. If an operator needed to meet a designed aggregate mix, such as Type II material, a higher volume of material may need to be processed to meet the specifications and more waste material (by product of processing, typically sands and fines) could be generated in the process.

Material Site 2 is located approximately 4 miles west-northwest of Luning, NV, alongside U.S. Highway 95 (Appendix B, Map B-4, Material Site 2). Material deposited at the site eroded from the Garfield Hills and Mable Mountain to the south. The site is closer to the mountain front and the material deposited in the alluvial fan is coarser than material found at Material Site 1 off of State Highway 361. The NDOT conducted soil testing on an existing material site ROW (N-38418) adjacent to Material Site 2. According to soil test results conducted by NDOT, the material in this area contains a high percentage of crushable aggregates. Crushable aggregates would be the boulders, cobbles, and gravels that can be crushed to a smaller diameter material. An operator could use a small crusher, screen decks and conveyor belts to process and stockpile the material. The high percentage of crushable aggregates would allow an operator more flexibility in processing the material to a desired aggregate mix design with minimal waste.

Environmental Consequences

Proposed Action
Under the Proposed Action, mineral material resources would be the only ones affected. Within the material sites, potentially several hundred thousand cubic yards of sand and gravel material could be permanently removed from the site, depending upon the demand in the area and suitability of the material. Removal of sand and gravel material would result in a depressed geomorphological feature. If the material sites were developed storm water diversion channels may need to be constructed around the site to divert meteoric water from entering the pit. Meteoric water flowing down the slopes of pits could erode pit walls creating small gullies and then deposit the eroded material into the bottom.

No Action
Under the No Action Alternative, the mineral material sites would not be developed and the resource would remain as it is today.

Cumulative Effects
The CESA for mineral material resources is the Soda Springs Valley. The abundant mineral material deposits contained in the alluvial fans in the Soda Springs Valley far exceeds the quantity of mineral materials which may be removed from the two material sites, therefore the cumulative impacts to mineral materials in the CESA would be negligible. The mineral material site disturbances would be reclaimed once sand and gravel resources have been exhausted further minimizing the cumulative impacts to other resources.

3.7 Noxious, Invasive, and Non-native Species

Invasive species are defined by Executive Order 13112 as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health”. Alien refers to a species which did not evolve in the environment in which it is found or in other words, non-native. This includes plants, animals, and microorganisms. The definition makes a clear distinction between invasive and non-native species because many non-natives are not harmful

(i.e. most U.S. crops). However, many invasive species have caused great harm (National Invasive Species Council 2005).

Noxious weeds in Nevada are classified by the Nevada Department of Agriculture and the Plant Protection Act (2000) and are administered by the United States Department of Agriculture's Animal and Plant Health Inspection Service. Table 3-4 gives examples and definitions of noxious weeds in Nevada.

Table 3-4: Examples of Noxious Weeds

Type	Definition	Examples
Category A	Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations.	Dyer's woad *(Isatis tinctoria)* Spotted Knapweed *(Centaurea masculosa)*
Category B	Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur	Russian Knapweed *(Acroptilon repens)* Scotch Thistle *(Onopordum acanthium)*
Category C	Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer	Hoary cress *(Cardaria draba* Saltcedar (tamarisk) *(Tamarix spp)*
For more information on noxious weeds visit: http://agri.nv.gov/nwac/PLANT_NoxWeedList.htm		

The spread and increase of noxious and other invasive, non-native weeds contributes to a decrease in the quantity and quality of other renewable resources, including forage quantity and quality. Noxious and other invasive, non-native weeds complicate native plant community management and can adversely affect listed or sensitive species.

Affected Environment

SWCA Environmental Consultants (SWCA) completed field surveys of the solar facility and gen-tie line areas from July 15 to 18, 2014 and characterized the prevalence of noxious and invasive species. No noxious weed species were observed in the solar facility area or surrounding 150-m (492-foot) buffer. Russian thistle (*Salsola tragus*) is an invasive species and was abundant throughout the area and surrounding buffer. Other invasive species of the goosefoot family (*Chenopodiaceae*), such as halogeton (*Halogeton glomeratus*) and smotherweed (*Bassia sp.*), were also present throughout the area and buffer in varying densities. None of these weedy and invasive species are designated or regulated as noxious by the State of Nevada (NDA 2014).

Environmental Consequences

Proposed Action
Ground disturbing activities would create opportunities for the introduction and/or spread of non-native plant species. In addition, vehicles brought to the LSEP from other areas could introduce new non-native species if they are not properly washed. Invasive species can out-compete native species for water and space. Soil disturbance can also reduce the native seed bank associated with a site, further limiting the ability of native plants to reestablish. A mitigation measure to reduce potential impacts from noxious and invasive weeds, and ensure adequate monitoring for new infestations, is stated below:

- A weed abatement plan would be submitted prior to any surface disturbance associated with the LSEP, to insure weeds are identified and managed in the appropriate manner. The plan should include the following:
    - A pre-disturbance survey of the project area to identify existing invasive species;
        - Locations would be marked with a Global Positioning System (GPS) and mapped, followed by locations being flagged;
    - Appropriate treatment methods would be identified by the applicant;
    - Weed-free staging areas would be identified for project construction;
    - Best Management Practices (BMPs) to prevent erosion of the job site and the potential transport of weedy material on to, or off of, the job site during rainfall and storm-water events;
    - Procedures for insuring seed and other plant materials would be checked and certified weed-free (weed count in compliance with State and Federal seed laws);
    - Monitoring methods for treated areas and new infestations over the life of the LSEP, including final reclamation, would be identified;
    - A treatment/monitoring schedule.

Halogeton and other invasive species have become naturalized in this environment and can readily capitalize on any soil disturbance. Invasive species would continue to have an economic and environmental impact for the foreseeable future. Invenergy Solar would be required to monitor for new weed infestations throughout the life of the LSEP. The BLM would be notified of any weed infestations found during monitoring. Infestations would be evaluated and treated, using BLM-approved herbicides and plant removal, in coordination with the SFO weed coordinator. Treatment methods could include BLM-approved biological, cultural/mechanical, and chemical controls. When applicable, several of these methods may be combined into an integrated pest management program in order to reduce costs and risks to humans and the environment.

Where chemical control is the chosen treatment method, a Pesticide Use Proposal (PUP) would be submitted to the BLM for approval prior to treatment. Herbicide selection and application rates would be in conformance with Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS and ROD (BLM 2007).

In addition to controlling weed infestations that may occur within the LSEP, an off-site mitigation measure to further reduce potential impacts from noxious and invasive weeds in the general vicinity of the LSEP is stated below:

- Invenergy Solar would develop a plan to address noxious and invasive weeds on approximately 560 acres (the same size area as where the PV panels would be installed) in the vicinity of the solar facility. The plan would be targeted to address areas where the most benefit would be realized, such as along public roads and other areas where existing weed infestation may be spread from. Specific treatment areas, treatment methods, targeted noxious and invasive weed species, and monitoring periods would be identified by Invenergy Solar and included in the plan in coordination with BLM specialists and local cooperating agencies who manage weeds in the area, prior to receiving a Notice to Proceed. Funding for the plan would be provided by Invenergy Solar when commercial operations begin.

No Action

Under the No Action Alternative, 560 acres would not be disturbed by the construction of the solar facility, reducing the risk of a new weed infestation. The area would continue to be surveyed along roadways and other disturbed areas for new infestations as a part of the SFO's weed monitoring program. The SFO weed coordinator would be notified of any weeds found and provided with the species, size of the infestation, cover class, distribution of plants (linear or irregular), and location. Treatment methods could include biological, cultural/mechanical, and chemical control. When applicable, several of these methods would be combined into an integrated pest management program in order to reduce the costs and risks to humans and the environment. Areas previously treated with herbicides would continue to be monitored.

Cumulative Effects

The CESA for invasive, non-native, and noxious species consists of the 560 acres of the PV field, and possibly, a distance outside the area which cannot be precisely determined, due to the physical characteristics of weeds and their ability to spread. When combined with the effects from past, present, and RFFAs, cumulative effects would be negligible. Under the Proposed Action, there could be a slightly increased risk of spreading weeds throughout the LSEP, as well as off-site as a result of opening up space for weed seeds to become established; however, this area of disturbance would be monitored for weeds, and they would be promptly treated to prevent an infestation. Also, the area would be reseeded with native plant species during decommissioning which would improve the current area conditions as the area is lacking in vegetative cover. Any short term and long term effects that may be considered negative from herbicide application to control any invasive, non-native, and noxious species would be negligible since the herbicides would be applied as per label instructions thus reducing impacts to other plants, animals and humans in the area.

3.8 Socioeconomics

Affected Environment

Mineral County

Mineral County is a rural county located in western Nevada. Mineral County was carved out of Esmeralda County in 1911 shortly after the county seat of Esmeralda was moved to Goldfield in 1907. Its name came from the surrounding area, which is heavily mineralized. The county seat of Hawthorne was established in 1911. The land area of Mineral County is approximately 3,756 square miles and there are 56.6 square miles of water area in the county. The Federal Land Ownership within the county is approximately 86.5% with BLM administering approximately 65.2% of the land within Mineral County (City Data 2013, Headwaters Economics 2014).

POPULATION AND INCOME

As of 2013, the population of Mineral County is estimated at 4,614 people. The county seat of Hawthorne has a population of approximately 3, 269 people. From 1970 through 2013 the county has seen a -33.5% change in population and a -27.3% change in employment.

The population density of the county is 1 person per square mile. The median resident age in Mineral County is 50.1 years vs. the Nevada median age of 36.6 years. The gender of the population within the county is 2,326 males and 2,374 females. The racial makeup of the county was 70.8% White, 1.8% Black or African American alone, 15.3% American Indian alone, 4.0% Asian alone, 0.0% Native Hawaiian and other Pacific Islander alone, 3.1% some other race alone, 5.0% from two or more races and approximately 11.5% identified themselves as Hispanic or Latino (Headwaters Economics, 2014).

EMPLOYMENT

Total employment for Mineral County as of 2013 was at 1,660 persons age 16 and over. From 1970 through 2013 there has been a -27.3% change in employment, indicating there are fewer jobs available in the county than in the past. As of 2013, approximately 5.0% of the economy within the County was employed within the agriculture, hunting, fishing, forestry and mining sector, 20.6% of the economy within the County was employed within the Public Administration sector, this is the largest sector followed by 18.2% within the Education, healthcare and social assistance sector and the lowest being 1.0% in the Wholesale trade sector. There is a strong military presence in the town of Hawthorne as the nearby Hawthorne Army Depot is the primary economic base (2010 Census; Headwaters Economics 2013-2014; City Data 2013).

Median income for a household in the county in 2013 was $38,708. The per capita income for the county was $35,073. About 20.5% of the population was below the poverty level in 2013. Earnings by place of work have seen a decline since 1970 of approximately 20% (Bureau of Economic Analysis, 2014; Headwaters Economics 2014). The unemployment rate is 12.4% for the County which is higher than the state's unemployment rate of 9.8% and the US as a whole of 7.4%. From 2000 through 2013 the unemployment rate has gone up 4.1% from 8.3% to 12.4%. The population and employment are trending downward which indicates this is a stressed economy with fewer jobs available now than in the past 30+ years (Headwaters Economics 2014).

HOUSING

There were approximately 2,820 households in 2013 within Mineral County. Approximately 2,147 of these households were occupied and 673 were considered vacant, of which approximately 110 were for rent and 0 were for sale only with 0 for migrant workers. Of the households in the county, 18.4% had children under the age of 18 living with them, 39.0% were married couples living together, 11.2% had a female householder with no husband present, and 43.8% were non-families. Approximately 36.7% of all households were made up of individuals. The average household size was 2.11 and the average family size was 2.70. The median age was 49.3 years. The majority of the population is males at 53.6% and 46.4% for females within the county (Headwaters Economics, 2014; US Census Bureau 2010).

Nye County

Nye County is a large county located in south-central Nevada. Nye County is the largest county by area in the state and the third largest county in the continental United States. The county seat of Nye County is Tonopah but the largest community in the county is Pahrump with approximately 36,411 people which equates to approximately 84% of the population of the county. The first county seat was Ione in 1864, followed by Belmont in 1867, and finally by Tonopah in 1905 (City Data, 2013). The land area of Nye County is approximately 18,199 square miles and there are 17 square miles of water area in the county. The Federal Land Ownership within the county is approximately 97.2% with BLM administering approximately 56.3% of the land within Nye County (City Data 2013; Headwaters Economics 2014).

POPULATION AND INCOME

As of 2013, the population of Nye County is estimated at 43,368 people. The county seat of Tonopah has a population of approximately 2,478 people which equates to approximately 6% of the county's population. From 1970-2013 the county has seen a 674.5% population change and a 120.4% change in employment. (City Data, 2013; Headwaters Economics 2014)

The population density of the county is 2.4 persons per square mile. The median resident age in Nye County is 49.7 years vs. the Nevada median age of 36.6 years. The gender of the population within the county is 21,954 males and 21,414 females. The racial makeup of the county was 89.0% White, 2.6% Black or African American alone, 1.8% American Indian alone, 1.5% Asian alone, 0.3% Native Hawaiian and Pacific Islander alone, 3.1% Some other race alone , 5.0% two or more races and approximately 13.8% identified themselves as Hispanic or Latino (Headwaters Economics 2014).

EMPLOYMENT

Total employment for Nye County as of 2013 was at 13,846 persons age 16 and over. From 1970 through 2013 there has been a -120.4% change in employment, indicating there are more jobs available in the county than in the past. As of 2013, approximately 7.8% of the economy within the County was employed within the agriculture, hunting, fishing, forestry and mining sector, 19.4% of the economy within the County was employed within the Arts, entertainment, recreation, accommodation and food sector, this is the largest sector followed by 15.2% within the Education, healthcare and social assistance sector and the lowest being 1.6% in the Information sector (2010 Census; Headwaters Economics 2013-2014; City Data 2013).

Median income for a household in the county in 2013 was $39,876. The per capita income for the county was $34,392. About 18.9% of the population was below the poverty level in 2013. Earnings by place of work have seen an increase since 1970 of approximately 11.2% (Bureau of Economic Analysis, 2014). The unemployment rate is 11.9% for the County which is higher than the state's unemployment rate of 9.8% and the US as a whole of 7.4%. From 2000 through 2012 the unemployment rate has gone up 6.7% from 6.8% to 13.5%. (Headwaters Economics 2014).

HOUSING

There were approximately 21,957 households in 2013. Approximately 18,046 of these households were occupied and 3,911 were considered vacant, of which approximately 362 were for rent and 526 were for sale only with 16 for migrant workers. Of the households in the county, 26.40% had children under the age of 18 living with them, 56.30% were married couples living together, 7.40% had a female householder with no husband present, and 31.90% were non-families. 25.70% of all households were made up of individuals and 10.30% had someone living alone who was 65 years of age or older. The average household size was 2.42 and the average family size was 2.90 (US Census Bureau 2010).

Environmental Consequences

Proposed Action

Implementation of the Proposed Action would provide minor economic benefits to the local economy. The LSEP would create approximately 110 additional jobs, income and tax revenues within the County during the construction phase (approximately 6 months). In the long term, there would be approximately 3 full time workers to operate the solar facility. The company proposes to put an emphasis on hiring local laborers and contractors and purchasing of supplies when possible. Other workers from outside the area would likely eat, dine, and purchase supplies and lodging in the towns of Hawthorne and Tonopah during construction.

There are enough available housing/rental units in the communities of Tonopah, Hawthorne, and surrounding smaller communities that the temporary increase in workers for construction should not strain the local communities or stress their resources. An emphasis would be on hiring workers in these local communities which would further reduce the impacts to housing resources in these local communities.

Due to the short-term nature of the construction activities, there may be a small social disruption to local communities for their housing, goods, and services. However with the emphasis on hiring local workers, this impact would be lessened. In the long-term the housing and services in the local communities would be adequate as a very small long term population increase would not occur since there would only be approximately 3 full time workers in the long-term.

Local businesses could realize increased revenue from the purchase of supplies, meals and rooms within the local area. After use of the mineral material pits (for the LSEP construction and roads), the pit would be available for mineral materials to the local communities and the county

which would be beneficial to the county and reduce fuel costs hauling the materials to local areas. Therefore impacts to socio-economics under the Proposed Action would be minor and should not have any long-term impacts to population, jobs or demand for goods and services.

No Action
Under the No Action Alternative, no additional jobs would be created and additional revenues would not occur within Nye or Mineral County. There would be no disruption to local services, no increased demand for goods or lodging at this time. Additional projects could occur in the future which would have impacts on socioeconomics within these counties; however those would be subject to further environmental analysis at the time they are proposed.

Cumulative Effects
The CESA for the Socioeconomic analysis is northern Nye County and Mineral County as these are the areas that will be affected by any increase in population or need for services and goods. The Proposed Action would not induce a substantial growth or concentration of population, nor would it cause a substantial net increase in county expenditures or revenues. The majority of the impacts would occur during construction and decommissioning activities as these are when there would be the highest number of workers at the site. During operations of the facility, few workers (approximately 3) would be permanent at the site. The LSEP would not create a substantial demand for public services as only 3 full-time workers are expected throughout the project life and local communities have the available resources (housing, goods and services) to support these workers. There would not be a major increase in impacts to socioeconomics as a result of the implementation of the LSEP. Cumulative impacts to socioeconomics from the past, present, and RFFAs when combined with the Proposed Action are considered negligible.

3.9 Soils

Affected Environment
Information regarding soils within the LSEP (Appendix C, Map C-4, Soils) was obtained from the United States Department of Agriculture, National Resources Conservation Service (NRCS) Soil Survey of Mineral County Area, Nevada (NRCS 1991; NRCS 2015). The following soil map units have been identified within the LSEP (Table 3-4): *Gynelle-Izo* (1155), *Luning-Sundown* (1870), *Izo, rarely flooded-Izo* (1910), *Sodaspring-Izo* (2002), *Inmo-Nuahs-Luning* (3092) associations, and *Nuahs loamy sand, 0 to 4 percent slopes* (2011). The location of the LSEP does not contain mapped hydric soils (NRCS, 2015).

MAP UNIT 1155 – *Gynelle-Izo Association*
This map unit is comprised of 50 percent Gynelle very gravelly loamy sand, 4 to 8 percent slopes and 35 percent Izo extremely gravelly loamy sand, 4 to 8 percent slopes; the remainder of the map unit is made up of contrasting inclusions. This association occurs in approximately 75 acres of the LSEP and is found on fan piedmonts and fan skirts between 4,000 and 6,000 feet elevation. The mean annual precipitation (MAP) is about 3 to 7 inches; mean annual air temperature (MAAT) is about 52 to 57 degrees F. Gynelle soils consist of very deep, somewhat excessively drained soils that formed in alluvium derived from mixed rocks. Izo soils consist of very deep, excessively drained soils that formed in alluvium derived from mixed rocks.

MAP UNIT 1870 – *Luning-Sundown Association*
This map unit is comprised of 75 percent Luning loamy sand, 2 to 4 percent slopes and 15 percent Sundown loamy fine sand, 2 to 4 percent slopes; the remainder of the map unit is made up of contrasting inclusions. This association occurs in approximately 24 acres of the LSEP and is found on fan skirts between 4,300 and 5,000 feet elevation. MAP is about 3 to 5 inches; MAAT is about 53 to 55 degrees F. Luning soils consist of very deep, somewhat excessively drained soils that formed in alluvium or eolian sand over alluvium derived from mixed rocks. Sundown soils consist of very deep, somewhat excessively drained soils that formed in eolian deposits with a strong pyroclastic influence of volcanic glass over alluvium derived from mixed rocks.

MAP UNIT 1910 – *Izo, rarely flooded-Izo Association*
This map unit is comprised of 55 percent Izo very gravelly sand, rarely flooded, 2 to 15 percent slopes and 35 percent Izo very stony loamy sand, 2 to 8 percent slopes; the remainder of the map unit is made up of contrasting inclusions. This association occurs in approximately 5 acres of the LSEP and is found on alluvial fans between 4,400 and 6,000 feet elevation. MAP is about 5 to 7 inches; MAAT is about 52 to 54 degrees F. Izo soils are discussed in detail above.

MAP UNIT 2002 – *Sodaspring-Izo Association*
This map unit is comprised of 70 percent Sodaspring loamy sand, 2 to 4 percent slopes and 15 percent Izo very gravelly sand, 2 to 4 percent slopes; the remainder of the map unit is made up of contrasting inclusions. This association occurs in approximately 288 acres of the LSEP and is found on fan skirts between 4,000 and 6,200 feet elevation. MAP is about 3 to 6 inches; MAAT is about 52 to 55 degrees F. The Sodaspring series consists of very deep, well drained soils that formed in alluvium derived from mixed rocks. Izo soils are discussed in detail above.

MAP UNIT 2011 – *Nuahs loamy sand, 0 to 4 percent slopes*
This map unit is comprised of 90 percent Nuahs loamy sand; the remainder of the map unit is made up of contrasting inclusions. This association occurs in approximately 264 acres of the LSEP and is found on fan skirts between 4,400 and 5,400 feet elevation. MAP is about 3 to 5 inches; MAAT is about 53 to 55 degrees F. Nuahs soils consists of very deep, well drained soils that formed in mixed alluvium derived from dominantly granitic and rhyolitic rocks.

MAP UNIT 3092 – *Inmo-Nuahs-Luning Association*
This map unit is comprised of 40 percent Inmo sand, overblown, 2 to 8 percent slopes, 30 percent Nuahs gravelly loamy sand, 2 to 8 percent slopes, and 15 percent Luning gravelly loamy sand, gravelly substratum, 2 to 8 percent slopes; the remainder of the map unit is made up of contrasting inclusions. This association occurs in approximately 20 acres of the LSEP and is found on fan skirts between 4,400 and 5,000 feet elevation. MAP is about 3 to 5 inches; MAAT is about 53 to 55 degrees F. Inmo soils consists of very deep, excessively drained soils that formed in alluvium derived from granitic, volcanic, and metamorphic rocks. Nuahs and Luning soils are discussed in detail above.

Table 3-5: Soil Map Units

Association	# of acres in analysis area	% of acres in analysis area	Landscape position/% Slope	Surface Texture	Erosion Hazard	
					Wind	Water
Gynelle-Izo (1155)	75	11	Fan remnants and channels/4 to 8%	Very gravelly loamy sand	Highly susceptible	Slight
Luning-Sundown (1870)	24	3.5	Fan skirts and sand sheets/2 to 4%	Loamy sand	Highly susceptible	Slight
Izo, rarely flooded-Izo (1910)	5	<1	Alluvial fans and inset fans/2 to 15%	Very gravelly sand	Highly susceptible	Slight
Sodaspring-Izo (2002)	288	42.5	Fan skirts and channels/2 to 4%	Loamy sand	Highly susceptible	Slight
Nuahs loamy sand, 0 to 4 percent slopes (2011)	264	39	Fan skirts/0 to 4%	Loamy sand	Highly susceptible	Slight
Inmo-Nuahs-Luning (3092)	20	3	Fan skirts/2 to 8%	Gravelly loamy sand	Highly susceptible	Slight

Soil Erosion

The soils within the LSEP have been classified by NRCS for soil erosion susceptibility by wind or water. The wind erodibility group consists of soils which have similar properties affecting their susceptibility to wind erosion, and are classified on a scale between 1 and 8. A rating of 1 is given to soils that are highly susceptible to wind erosion and a rating of 8 is given to soils that are the least susceptible to wind erosion. Gynelle-Izo association has a rating of 3, and all other soil types have a rating of 2; all soil types have been classified as being highly susceptible to wind erosion.

The susceptibility of a soil to sheet and rill erosion by water was also classified and rated by NRCS. There are two rating estimates; the soil K factor (whole soil) and the erosion hazard. Soil K factor estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity, and indicates the erodibility of the whole soil

(including the presence of rock fragments). The ratings for erosion hazard indicate the hazard of soil loss caused by sheet or rill erosion in areas where 50 to 75 percent of the soil surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The ratings for erosion hazard are based on slope and soil erosion K factor. The hazard for both ratings are described as "slight", "moderate", "severe", or "very severe". A rating of "slight" indicates erosion is unlikely under ordinary climatic conditions (NRCS, 2015). The hazard of soil loss to sheet and rill erosion by water is slight for all soil types within the LSEP.

Fugitive Dust Potential

The soils within the LSEP have been rated by NRCS for their ability to resist the formation of fugitive dust emissions. This interpretation rates the vulnerability of a soil for eroded soil particles to go into suspension during a windstorm.

The NRCS has rated soils for fugitive dust resistance to indicate the extent to which all of the soil features affect the formation of dust. "Low resistance" indicates the soil has features very favorable for the formation of dust; "moderate resistance" indicates the soil has features favorable for dust formation; and "high resistance" indicates the soil has features unfavorable for dust formation. All soils within the LSEP have a rating class of moderate resistance; therefore all soils within the LSEP are favorable for dust formation.

Soil Compaction

The soils within the LSEP have been classified by NRCS for soil compaction. Soil compaction is an important factor related to soil erosion as it tends to reduce water infiltration and increase runoff, which generally increases soil erosion rates. Each soil is rated for its resistance to compaction, which is predominantly influenced by moisture content, depth to saturation, percent of sand, silt, and clay, soil structure, organic matter content, and content of coarse fragments. A rating of "high resistance" indicates the soil is very favorable to resisting compaction; "moderate resistance" indicates the soil is favorable to resisting compaction; and "low resistance" indicates the soil has one or more factors which favor the formation of a compacted layer (NRCS, 2015). The hazard of resistance of soil compaction for *Gynelle-Izo*, *Inmo-Nuahs-Luning*, and *Sodaspring-Izo* associations, and *Nuahs loamy sand*, 0 to 4 percent slopes are rated as having "high resistance"; these soils are very favorable to resisting compaction. *Luning-Sundown*, and *Izo, rarely flooded-Izo* associations are rated as having "moderate resistance"; these soils are favorable to resisting compaction.

Soil Restoration Potential

Soils within the LSEP have been rated for their restoration potential and their inherent ability to recover from degradation, which is often referred to as soil resilience. The ability for a soil to recover from degradation means the ability to restore functional and structural integrity after a disturbance. Some soil functions important for restoration include sustaining biological activity, diversity and productivity; capture, storage and release of water; storing and cycling nutrients and other elements; and providing support for plant and animal life. Restoration goals may include re-establishment of a preferred natural plant assemblage of the site. Soil resilience is dependent upon adequate stores of organic matter, good soil structure, low salt and sodium levels, adequate nutrient levels, microbial biomass and diversity, adequate precipitation for recovery, and other soil properties (NRCS, 2015).

Rating class terms for soil restoration potential indicate the extent to which the soils are made suitable by all of the soil features which affect the soil's ability to recover. "High potential" indicates the soil has features very favorable for recovery, and good performance should be expected; "moderate potential" indicates the soil has features generally favorable for recovery, and fair performance can be expected; "low potential" indicated the soil has one or more features unfavorable for recovery, and poor performance can be expected. The ratings for all soil types within the LSEP have a "low potential" for soil recovery, due to low amounts of precipitation.

Environmental Consequences

Proposed Action

The Proposed Action could result in several effects on soils by (1) increasing erosion rates from grading and clearing of site, and/or (2) reducing soil productivity and potential restoration success, by compacting the soil to a level which prevents successful rehabilitation and eventual reestablishment of vegetative cover to the recommended or preconstruction composition and density.

The LSEP has approximately 15 percent ground cover/vegetation, by visual inspection, with very few to no biological soil crusts present. The soils have relatively low surface rock fragment content (approximately 34%); surface rock fragments are composed mainly of fine (2 to 5 millimeter) gravel, medium to coarse (5 to 76 millimeter) gravel, and (76 to 250 millimeter) cobbles. Soil surface textures are predominately loamy sand and soil structure is moderate medium blocky. Soil structure, vegetation, and surface rock fragments are the major components maintaining soil stability and aiding in reduced erosion rates and soil loss. Soil features which favor resistance to compaction are identified and include soil structure, rock fragment content, surface structure size, and vegetative productivity.

Ratings of soils within the LSEP suggest the susceptibility to sheet and rill erosion by water is slight, however the susceptibility of these soils to wind erosion is high and favorable to dust formation. The soils within the LSEP have soil features favorable to resisting compaction; however these soils also rate low for their potential for soil recovery due to low amounts of available precipitation received annually.

The Proposed Action would disturb soil through clearing and grading during construction; protective vegetation, surface rock fragments, and soil structure would be removed and/or disturbed. Removal of vegetation and soil surface during construction would expose soil and increase the potential for wind- and water-driven erosion and soil compaction. The solar facility would be located on a relatively flat alluvial fan (approximately 0 to 8 percent slopes); however the area has the potential for high winds and infrequent strong rains which could lead to increased erosion rates and soil loss. The use of vehicles and equipment on these disturbed areas could further increase the potential for wind- and water-driven erosion, as well as contributing to soil compaction, thus reducing restoration potential. In addition, some of the soft alluvial soils which compose the solar facility may be lost during clearing and grading. The remaining lower quality soil would be less productive and support fewer organisms resulting in poor site conditions for restoration.

To reduce the potential for water-driven erosion susceptibility within the solar facility and down gradient areas, minimal grading is recommended to maintain existing storm water drainage patterns and allow storm water flow to pass through the site naturally. Any erosion during construction would be controlled by implementing a SWPPP, as required by the NDEP, Bureau of Water Pollution Control, for projects disturbing more than one acre.

Some potential effects of fugitive dust emissions are visibility reductions during severe windstorms, transport of potentially harmful chemicals adhering to the soil particles, loss of soil nutrients at the site, and, nutrient enrichment where fugitive dust is deposited. To reduce the potential for wind-driven erosion and aid in stabilization of loose soil, posted reduced speeds on service roads and periodic watering of the exposed surface would aid in keeping dust emissions and soil loss to a minimum. Reduced speeds on graded roads would lessen the impacts of soil compaction and aid in potential soil recovery. Graded service roads within the solar facility would be covered with aggregate material, providing an alternate protective surface layer and aid in resistance to wind- and water-erosion by promoting soil stability, and reducing soil loss and dust propagation; however, localized loss of topsoil from wind- and water-driven erosion would still be expected.

No Action

Under the No Action alternative there would be no construction or operational activities associated with the LSEP and the ROW application area would not be disturbed. Because there would be no solar project approved, 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 soil resources from the Proposed Action would occur.

Cumulative Effects

The CESA for soil resources is the combined area of hydrographic basin 121A (Soda Springs Valley, Eastern Part) and hydrographic basin 121B (Soda Springs Valley, Western Part). Ground disturbing activities associated with the construction, operation, maintenance, and decommissioning of the Proposed Action, along with other past, present, or RFFAs, could result in a cumulative effect on soil resources. Under the Proposed Action, ground disturbing activities would increase the potential for localized flooding and down gradient soil loss through wind- and water-driven erosion. While soil erosion BMPs would be in place for the LSEP, localized soil erosion can be expected, given the large acreage disturbed, typically dry soil conditions, and occurrence of high winds in the development area. These residual impacts would be most prevalent on dry, windy days, when wind-driven erosion underneath the panels would be most likely to occur, and during flash flood events larger than the 100-year flood, when water volume may exceed the capacity of the flood control system. When combined with other RFFAs in the CESA, the Proposed Action would result in an incremental addition to soil resource related impacts. It is assumed all reasonably foreseeable development on BLM lands near the LSEP and surrounding public lands would be subject to similar design considerations and site-specific environmental analysis to reduce the potential cumulative impacts to soil resources.

3.10 Vegetation

Affected Environment

Vegetation within and immediately adjacent to the LSEP (Soda Springs Valley) is typical of the Intermountain Cold Desert Shrub community and consists of two ecological site descriptions (ESDs). The first ESD occurs in a Sandy 3-5" precipitation zone (27XY060NV) with the main vegetation at the site being Four-wing saltbush and Indian ricegrass. This ESD represents 21 acres of the PV field and approximately 15,108 acres of the analysis area. The second ESD occurs in a Course Gravely Loam 3-5" precipitation zone (27XY043NV). This ESD represents the remaining 540 acres of the PV field and 26,395 acres of the analysis area.

The plant species present within and out to 150 m (492.13 ft) from the proposed LSEP include spiny hopsage (*Grayia spinosa*), fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus baileyi*), Indian ricegrass (*Achnatherum hymenoides*), winterfat (*Krascheninnikovia lanata*), globemallow (*Sphaeralcea sp.*), Russian thistle (*Salsola tragus*), and halogeton (*Halogeton glomeratus*). In general, the plant community within the area is characterized as having low diversity and a lack of vertical structure (SWCA 2104). Furthermore, invasive species are prevalent throughout the site, while native grasses and forbs are uncommon. Two vegetation transects were used to quantify density and the species composition as they relate to relative density (Table 3-6).

Table 3-6: Vegetation Attributes of the PV Field

Species[1]	Density[2]	Relative Density (%)
Indian ricegrass	125	2
Four-wing saltbush	50	1
Shadscale	1,725	27
Greenmolly kochia	175	3
Spiny hopsage	4,125	63
Budsage	225	3
Bailey's greasewood	75	1

[1]Since monitoring took place in January, only perennial species were recorded.
[2]Plants per hectare

Spatial distribution of species within Intermountain Cold Desert Shrub communities often consists of clumps of species with large canopy gaps between them. Most canopy gaps of perennial species were found to be between two and eight meters apart at the site. Approximately 11% foliar cover of perennial species was also measured.

Environmental Consequences

Proposed Action

Impacts from removal of vegetation would have a minimal effect on the overall vegetation community at the large scale of analysis. The ecological sites associated with the Sandy 3-5pz and the Course Gravely Loam 3-5pz are relatively large and the PV field footprint would affect 0.14% and 2.05% of the communities respectively. In addition, the majority of the analysis area can be broadly classified as Intermountain Cold Desert Shrub community with the interactions of

soil type, precipitation zones, and historic disturbances affecting which species are most abundant. When looking at the whole of the Intermountain Cold Desert Shrub community as a habitat type, in the analysis area, impacts of the LSEP becomes even less at 0.38%.

The existing perennial vegetation creates a favorable microhabitat which provides several functions to improve nutrient cycling. These functions include providing a source of organic material for soil input, increased water infiltration, and persistence of soil moisture through shading. In addition, perennial species intercept and retain particles suspended in the wind. These particles further augment soils by increasing soil and organic inputs at the site. The established perennial vegetation also resists further expansion of nonnative invasive annuals by reducing the available nutrients through competition.

Blading and complete removal of the vegetation would impact these processes at the site, causing the area to be less desirable for native species to become reestablished. Success rates of reclamation in the Intermountain Cold Desert Shrub ecosystem are typically low. Reclamation at the site would be further hampered by low annual precipitation (3-5 inches) and saline and/or sodic soils. The site has a high likelihood of becoming dominated by nonnative invasive species, such as halogeton and Russian thistle, as a result. A mitigation measure to improve the likelihood of preserving ecosystem processes, even at a reduced level, and increase the success of reclamation of the PV field is stated below:

- Where practicable, vegetation would not be cleared from the PV field prior to construction. Post construction, an appropriate seed mix of low posture perennial vegetation could be seeded in areas where minimal disturbance by operation and maintenance activities occurred.

Seeding low posture perennial vegetation in conjunction with preserving existing vegetation could maintain ecosystem processes and resist colonization of invasive species. Vegetation not cleared from the site would likely be crushed during construction activities. Many of the species present at the site are capable of either root sprouting or sprouting from basal buds of the plant. Individual mortality would depend on the level of trauma experienced however it is likely individuals would persist after construction is completed.

Net vegetative production could be increased under the panels in the PV field for several reasons. Soil temperatures, in shaded areas created by the panels, are expected to be lower due to reduced solar radiation. This could have a positive effect on available soil moisture under the panels by reducing evaporation. Also the panels could reduce wind speeds in the PV field which could further slow evaporation. Shading and reduced wind speed could also decrease the amount of water plants transpire to complete photosynthesis. In addition to these environmental changes, the panels would be washed 1 to 4 times a year artificially increasing annual precipitation. The net result could be a large increase in available soil moisture within the PV field. Having desirable perennial vegetation established on the site, throughout the life of the LSEP, would aid in the success of the reclamation of the site and reduce the risk of invasive species colonizing the site.

As described in Chapter 2, Section 2.1.3 (Post Construction Site Stabilization, Protection, and Reclamation), Invenergy Solar would develop a reclamation plan for the LSEP which would be approved by the BLM prior to issuing a NTP. Among other items, the reclamation plan objectives should be to provide adequate density of perennial species to provide for proper ecological processes and resist further invasion by exotic species. These methods may include seed bed preparation, such as pitting, furrowing, and/or mulching to create microhabitat for seedlings; transplanting, irrigating, and/or soil amendments to insure seedlings persist; and/or using native seeds collected adjacent to the site. A contingency seeding mix may include drought tolerant non-native species adapted to competing with halogeton.

No Action
Under the No Action alternative, the LSEP would not be approved and the disturbances associated with the project would not occur. Impacts to vegetation would continue to occur at their current levels from existing uses.

Cumulative Effects
The vegetation CESA is defined as those portions of hydrographic basins 121A and 121B within the Pilot-Table Mountain Allotment (Appendix C, Map C-5, Grazing Allotments and Vegetation CESA). Past, present, and RFFAs which have or could have a cumulative effect on the impacts to vegetation associated with the Proposed Action are any anthropogenic soil disturbance.

Like much of the public lands BLM administers, the area has been impacted from overland travel, utility corridors, mining claims, settlements and livestock grazing since the mid-19th century. These disturbances have altered the ecological processes which maintained the biological integrity of the rangelands and has provided for the introduction and expansion of exotic invasive species. Currently species like halogeton, Russian thistle, and cheatgrass are not economically feasible to eradicate from the landscape.

The BLM is tasked to manage the public lands to meet or make significant progress towards meeting the Standards of Rangeland Health developed by the Resource Advisory Committees. Although some invasive species have become common on the public rangelands, by managing for the improved ecological condition there is an opportunity to reduce the further degradation of the rangelands and the spread of invasive species.

3.11 Visual Resource Management

Section 102(a)(8) of the FLPMA establishes the policy that public lands be managed in a manner that protect the quality of scenic values (43 USC §1701(a)(8)). To meet this responsibility, the BLM utilizes the VRM system which is described in Manual 8400, with additional guidance provided in Manual H-8410-1 (Visual Resource Inventory) and H-8431 (Visual Resource Contrast Rating).

The VRM system is used to manage visual resources in a manner which protect the quality of the scenic (visual) values, maintain the existing visual quality, and protect unique visual resources on public lands. A Visual Resource Inventory (VRI), which is considered baseline data to establish VRM objectives, was conducted in the CCDO in 2011 and established the VRI classes for visual ratings (Appendix C, Map C-6, VRI Classes). These ratings describe an area in terms of visual or scenic quality and viewer sensitivity to the landscape (the degree of public concern

for an area's scenic quality). The VRI evaluates scenic quality, sensitivity level, and distance zones in a map overlay analysis to assign a VRI Class (Class I are most highly valued visual landscapes while Class IV are the least). The VRI classes describe the existing conditions on the ground and are used in conjunction with the management objectives to determine the VRM objectives:

- **VRI Class I:** Assigned to all special areas where the current management situation requires maintaining a natural environment essentially unaltered by man, such as Wilderness Areas or Wilderness Study Areas.
- **VRI Class II:** Highest visual value assigned through the inventory process and based on the combination of Scenic Quality, Visual Sensitivity Levels, and Distance Zones.
- **VRI Class III:** Moderate visual value based on the combination of Scenic Quality, Visual Sensitivity Levels, and Distance Zones.
- **VRI Class IV:** Low visual value based on the combination of Scenic Quality, Visual Sensitivity Levels, and Distance Zones.

VRM class designations are assigned based on a combination of the area's scenic quality, visual sensitivity, and distance zones (from the VRI) in combination with land use allocations and management objectives outlined in the land use plan. Visual resources (the landscape) consist of landform (topography and soils), vegetation, and human-made structures (roads, buildings, and modifications of the land). These elements of the landscape are described in terms of their form, line, color, and texture. The more variety of these elements, the more interesting or scenic the landscape becomes and the greater the importance to protect the visual resources. Once an area has been assigned a VRM class, the management objectives can be used to analyze and determine if the visual impacts of proposed activities would be within the prescribed amount of change allowed to the characteristic landscape. The Visual Contrast Rating system is used to determine the amount of change which may occur to the landscape from a proposed project.

The VRM system uses four classes to describe different degrees of modification allowed to the landscape and are used to gauge the amount of disturbance an area can tolerate before it exceeds the visual management objectives of the assigned VRM class:

- **Class I:** The objective of this class is to preserve the existing character of the landscape. The level of change by the activity to the characteristic landscape should be very low and must not attract attention.
- **Class II:** The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- **Class III:** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape can be moderate. Management activities may attract attention, but should not dominate the view of the casual observer.
- **Class IV:** The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

The BLM manages landscapes for varying levels of protection and modification, giving consideration to other resource values, land uses, and the scenic quality of the landscape. The analysis area for visual resources includes lands where potential changes to the landscape from the LSEP may occur.

Affected Environment

The LSEP is located on alluvial fans on the east side of the Garfield Hills and the west side of the Gabbs Valley Range. The landscape within the alluvial fans is dominated by desert scrub brush with a gentle, concave slope heading towards the bottom of the Soda Spring Valley. The landscape at the higher elevations is dominated by trees, such as pinyon pine and juniper (pinyon-juniper), and low shrubs, such as big sage and rabbit brush, with sporadic rocky outcrops and sparse vegetation along rugged slopes. At higher elevations, colors are comprised of dark greens from the pinyon-juniper, as-well-as grays and whites from the sporadic rock outcrops and talus slopes. The lower elevations are dominated by dark browns and greens from Bailey's greasewood, and tans and yellows from exposed mineral soils and the predominant cheat grass vegetation.

The area surrounding the LSEP is largely unnatural in character due to two major highways passing through the area, transmission lines, private property development, and mining disturbances. U.S. Highway 95 is a major two-lane highway connecting the I-80 corridor east of Reno, Nevada, with the Las Vegas, Nevada, area. State Highway 361 is a connector route which links Highway 95 with Highway 50 to the north. Highway 361 begins just north of Luning, Nevada, and provides access to the eastern Mineral County, western Nye County, the town of Gabbs, Nevada, and east-southern Churchill County near Middlegate, Nevada. Highway 361 crosses through the location where the PV field would be installed. A 120kV transmission power line roughly parallels Highway 95, just north of the solar facility, and several smaller distribution power lines have been constructed in the area as well. The town of Luning, Nevada, is approximately 3 miles to the southeast of the location of the PV field. The surrounding hills are virtually covered with historic mining operations, ranging from small prospects with rough-bladed roads leading to them, to a large open-pit mine (Santa Fe mine, no longer in operation) approximately 4 miles to the north-northeast.

<u>Visual Contrast Rating</u>

The degree to which a project adversely affects the visual quality of a landscape relates directly to the amount of visual contrast between project components (e.g. PV modules, gen-tie line, roads, buildings, etc…) and the existing landscape character. The degree of contrast is measured by separating the landscape into major features (land, water, vegetation, structures) then assessing the contrast introduced by the project in terms of the basic design elements of form, line, color, and texture (BLM Manual 8431, Visual Contrast Rating). The degree of contrast introduced by a proposed project to landscape elements is then rated as none, weak, moderate, or strong, as defined in Table 3-7 (Degree of Contrast Ratings). The purpose of this method is to reveal elements and features which cause the greatest visual impact, and to guide efforts to reduce the visual impact of a proposed activity. This process is described in detail in Handbook H-8431-1, Visual Resource Contrast Rating, and documented using BLM Form 8400-4. Refer to Appendix D (Visual Contrast Ratings Worksheets and Photo Logs) for the analysis of the LSEPs impacts on visual quality.

Table 3-7: Degree of Contrast Ratings

Degree of Contrast	Criteria	Conformance with VRM Class
None	The element contrast is not visible or perceived.	VRM Class I - IV
Weak	The element contrast can be seen but does not attract attention.	VRM Class II - IV
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.	VRM Class III - IV
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.	VRM Class IV only

Source: BLM Manual 8431, Visual Contrast Rating

Key Observation Points (KOPs)

Maps C-7 (KOPs and Photo Points) and C-8 (KOP 4 Highway View) in Appendix C show the locations of the four KOPs selected for the visual contract rating analysis. Table 3-8 (KOP Location and Description) provides information on KOP location and distance from the approximate center of the solar facility. Four KOPs were chosen for this analysis and are located along the primary transportation routes where the LSEP would be most visible to the casual observer. From the KOPs, the viewshed can be divided into three distinct distance zones: the foreground, middle-ground and background. For each of the KOPs, the foreground consists of flat sandy soils sparsely populated with salt desert scrub with predominate colors of yellow and light tans. The middle-ground is comprised of rolling hills covered with cheat grass, with a smooth texture, and yellow and tan colors. The background consists of rugged terrain comprised of small ridges and canyons which provide dark and light contrasts from shadows with predominant colors of dark greens and grays. In addition to the three stationary KOPs, the LSEP was also assessed from a linear visual perspective of a motorized traveler on both Highway 95 and Highway 361.

KOP 1 is located along State Highway 361 north of the solar facility near the mouth of the canyon leading to Calvada Summit. This location would provide the first view of the LSEP from travelers heading south along Highway 361 towards Highway 95. This viewpoint would provide the greatest impact to the visual resources since the viewer would be elevated slightly above the LSEP and looking down into it for approximately two miles.

KOP 2 is located at the north end of the rest area at the western edge of the town of Luning. Motorized travelers using Highway 95 stop at this location and would be exposed to the visual impacts of the LSEP for a longer period of time than they would traveling on the highways. However, due to the number and location of structures, transmission lines and associated poles, discarded objects and vehicles in the rest area, the view of the LSEP is anticipated to be obstructed most of the time.

KOP 3 is located near Material Site 2 along Highway 95, west of the solar facility, and is elevated slightly above the highway. From this KOP, the PV field and gen-tie line would be visible and would create a contrast with the surrounding landscape. Similar to the existing adjacent NDOT material site, Material Site 2 would be visible to travelers along Highway 95 for a relatively short period of time. The NDOT material site consists of a large pile of gravel,

excavated pit, cleared area for parking and turning haul trucks, and an access road leading to Highway 95. Construction and operation of a new material site adjacent to the existing NDOT site would likely contain similar features and is expected to have similar visual impacts.

KOP 4 is a linear view of the motorized traveler from Highway 95 and Highway 361. This observation point considers the amount of time the LSEP would be viewable from a vehicle traveling along the highway at the posted speed limits. Heading southbound on Highway 95, the solar facility would come into view near the old settlement of Kinkaid, approximately 13 miles west of the center of the solar facility, and would be near the middle of the field of view of vehicle passengers for approximately 11½ miles until the highway turns to the south approaching Luning. The solar facility would slowly fade into the peripheral view of the driver for approximately 1 mile when it would be almost directly out the driver side window. While traveling along this segment, Material Site 2 would be visible on the passenger side. The material site would likely appear to be a part of the neighboring NDOT material pit.

Heading northbound on Highway 95, the solar facility would be intermittently visible from the crest between Mina and Sodaville, approximately 13 miles south, to approximately 5 miles south of Luning. From this point to the town of Luning, the solar facility would be near the middle of the field of view of vehicle passengers. In Luning, Highway 95 begins to curve to the north. The view of the solar facility through town would be obscured by trees and buildings. Once past the rest area at the north end of Luning, the solar facility would be in the peripheral view on the passenger side for approximately 2½ miles until the highway starts turning to the west heading towards Hawthorne. While traveling along this segment, Material Site 2 would be visible on the passenger driver's side. The material site would likely appear to be a part of the neighboring NDOT material pit, similar to what is seen heading south/east bound.

Heading northbound on Highway 361, the solar facility would be directly in front of the vehicle for approximately 2¼ miles. The PV field would be on either side of vehicles for approximately ½ mile. Approximately ¾ mile north of the PV field, Material Site 1 would be visible on the passenger side. Equipment and material stockpiles would be visible for approximately one mile after passing through the solar facility.

Southbound vehicles on Highway 361 would first observe the solar facility coming around a left-hand curve while exiting the wash leading from Calvada Summit. The curve takes vehicles from an enclosed canyon to the broad alluvial fan leading to the bottom of Soda Spring Valley. The solar facility would almost immediately be directly in front of the vehicle. Material Site 1 would be visible on the driver's side, but would not attract attention as much as the solar facility. Travelers would look directly at the solar facility for approximately 3 miles, and then another ½ mile driving through the PV field.

Table 3-8: KOP Location and Description

KOP	Location	Distance From Solar Facility Center	Primary Viewer	Comments
1	Hwy 361 point	2.95 miles	Highway traveler	First view of LSEP from the north on Hwy 361
2	Luning Rest Area point	2.75 miles	Rest area visitor	Rest stop north of Luning on Hwy 95
3	Hwy 95 point	3.48 miles	Highway traveler	First view of LSEP from the west on Hwy 95
4	Hwy 95 & 361 (Linear)	Varies	Highway traveler	View of travelers along Hwys 95 and 361

*Approximate distance

Visual Resource Inventory

The VRI, which provides the baseline data used in establishing VRM objectives, was completed for the CCDO in 2011 and used to establish interim VRM objectives for the LSEP (Appendix C, Map C-6, VRI Classes). Within the area encompassed by the LSEP, the VRI inventory class acreages are identified in Table 3-9.

Table 3-9: VRI Class Acreage of LSEP

VRI Class	Approximate Acreage Occupied
Class III	.95 acres
Class IV	676.24 acres

Visual Resource Management Objectives

The assignment of VRM objectives in the Carson City CRMP was not completed for all lands in the planning area, including the more remote eastern and southern areas of the CCDO. Due to this fact, these lands are considered to be unclassified. When no VRM objectives exist, the Carson City CRMP standard operating procedures state an interim VRM objective is to be assigned at the time a project is proposed. The VRM objectives are to be developed using the guidelines established in BLM Manual H-8410-1 and must conform to land use allocations set forth in the Carson City CRMP.

The SFO ID team reviewed the VRI and assessed the current management activities in the area, then provided a recommendation to the SFO Field Manager to assign an interim VRM Class IV objective to allow for management decisions consistent with the resource allocations for the area. Since the primary resource use within the LSEP is grazing and energy development, establishing an interim VRM Class IV objective would be in compliance with current guidelines and policy for VRM.

Environmental Consequences

Proposed Action

The Proposed Action for visual resources is to establish interim VRM objectives for the LSEP until such time as permanent objectives are permanently designated in the ongoing Carson City District Resource Management Plan revision (Carson City RMP). Once the Carson City RMP is final, the management decision regarding VRM would supersede the interim VRM objectives established through this EA should they vary.

The visual contrast rating analyses for all four KOPs selected for the LSEP found the solar facility would be visible and would create a strong contrast with the surrounding landscape. The Applicant Committed Mitigation Measures in Section 2.1.6, which include the use of complimentary colors on as many surfaces as practicable, matching aggregate and borrow material color to the surrounding landscape to the extent practicable, and the use of directional, motion activated nighttime lighting, would reduce the contrast. However, the PV field and gen-tie line would still create a strong contrast even with the suggested mitigation measures.

The disturbance area of the two material sites would be much smaller than either the PV field or the gen-tie line, with no associated buildings or structures, and would therefore create less visual contrast on the landscape. The material sites would be located adjacent to existing material sites which would minimize new visual disturbances as well. The LSEP is located on the northwest edge of development for the town of Luning so, in essence, the project would be extending existing modifications to the landscape rather than introducing new modifications not in the same area.

The visual contrast rating analysis from each of the KOPs determined surface disturbing activities associated with the Proposed Action, including clearing of vegetation, smoothing the ground surface, installing PV modules, constructing the gen-tie line, and creating two new material sites, would result in a substantial modification of the existing character of the landscape. The LSEP would dominate the view along Highway 95 and Highway 361 for the short period of time travelers would be passing by. However, since the degree of contrast and the modification imposed on the landscape by the LSEP would fall within the parameters of VRM Class IV objectives, the LSEP would be in conformance with VRM guidelines and policy.

To ensure compliance with guidelines for VRM Class IV designated areas, the following mitigation measures are proposed:

- Where practicable, all new structures should be painted using dark greens, browns or tans similar to Beetle, Juniper Green, or Shadow Gray, as found on the BLM Standard Environmental Color Chart CC-001, to reduce visibility from areas most likely to be viewed by the public. Structures which cannot be painted or obtained in colors that are compatible with BLM Standard Environmental Color Chart CC-001 should be reported to the Authorized Officer, prior to installation, with justification.

- Vegetation removed during construction would be stockpiled and used as vertical mulching on areas with surface disturbance not needed for general operations of the facilities upon completion of the construction phase of the LSEP.

- The applicant would provide a Lighting Management Plan for review and approval. Motion-activated lighting should be installed on the control house, on the access gates, and throughout the solar arrays for access during non-daylight hours. Lighting would be directed downwards towards the project facilities to limit area light pollution. Light shields should be utilized on lighting units to deflect light away from the town of Luning, Highway 95 and Highway 361. Safety and general security lighting should be limited to the minimum illumination needed to achieve safety and security objectives to avoid unnecessary light pollution into the night skies.

- Reclamation would be completed on all areas of surface disturbance within material sites when materials are depleted or the need for the site/s no longer exists. During excavation of material sites, topsoils and overburden would be placed in a low berm at the edge of the pits to provide screening from Highway 361 or 95 and would be used for surface reclamation when the material site is closed.

- If gen-tie line is constructed using metal poles, the surface finish would consist of self-weathering steel alloy or, if finished with galvanized coating, treated with weathering chemical. Where feasible, visual screening, such as using brown slats in chain-link fences or weathering chemicals on galvanized surfaces to reduce reflectivity and glare, would be utilized to reduce impacts to the viewshed.

No Action
Under the No Action Alternative, there would be no effect on visual resources because the LSEP would not be authorized.

Cumulative Effects
The CESA for visual resources is the viewshed along the Highway 95 and Highway 361 corridors and possibly the northern boundaries of the Luning Township. Current disturbances in the area include the two paved highways, residential and commercial structures, storage yards, a highway rest stop, off-highway travel routes included graded dirt roads, electrical transmission and distribution lines, and a substation where two electrical transmission lines meet. There are no reasonably foreseeable projects on public lands within the area at this time.

The Proposed Action would add to the existing disturbances which affect visual resources but would be contiguous and consistent with existing disturbances in the area. The level of change to the visual character of the area would also be consistent with the impacts which currently exist, which are moderate in nature, and acceptable for a VRM Class IV designation.

3.12 Water Quality, Surface/Ground

Affected Environment

The 560-acre solar facility would be constructed on a broad alluvial fan in Soda Spring Valley which extends southwestward from the base of the Gabbs Valley Range toward an alkali flat southeast of Luning. The alkali flat is located approximately 3 miles southeast from the solar facility. Numerous ephemeral washes dissect the alluvial fan and are dry most of the year, with surface water only present following storm events. There are five springs mapped on the United States Geologic Survey (USGS) Luning and Mount Ferguson 7.5' quadrangles in the mountain ranges immediately surrounding the LSEP (USGS, 2011) (Appendix C, Map C-9, Hydrologic Features (Luning Vicinity)); Upper Benton spring, Benton spring, Bank spring, Canyon Spring, and Middle Spring. There are two springs mapped on the USGS Mina 7.5' quadrangle in the mountain ranges immediately surrounding the area where Hawthorne Utilities operates three municipal water wells which serve the towns of Mina and Luning; Southern Pacific spring and Tule spring (USGS, 2011) (Appendix C, Map C-10, Hydrologic Features (Mina Vicinity)). In addition, there are other named and unnamed springs located in Volcano, Cinnabar, and Dunlap Canyon, as well as the unnamed wash, which originates near Bettles Well, where two of the Hawthorne Utilities wells are located. Hawthorne Utilities is a department of the Mineral County government; Invenergy Solar plans to purchase water from Hawthorne Utilities to supply the LSEP.

There are five interconnected ephemeral washes and drainages identified within the LSEP which average approximately 5 feet in width. The active flow channels of the washes generally have little to no vegetation present and typically have a sandy-gravel substrate, although some washes also contain a few scattered cobbles and/or stones.

<u>Flooding Hazards</u>

Flood hazard zones are delineated by the Federal Emergency Management Act (FEMA) for the purpose of predicting the extent of the 100-year and 500-year flood hazards for insurance and floodplain management. There are no washes in the LSEP delineated by the FEMA as being flood hazard zones; however the washes present within the LSEP may be subject to flooding based on wash and drainage characteristics.

The hydrologic processes which typically occur on alluvial fans can be unpredictable due to sporadic but sometimes intense rainfall events. Sediments, which can range from clay to large boulders, are transported across alluvial fans by water in desert washes, debris flows, and sheet floods. Flood events on alluvial fans in arid climates are triggered by moderate to severe storms. These storms would include summer cloud bursts which occur infrequently but can supply a large amount of water to a localized area, or a larger storm, such as a tropical storm, which occurs on a 100-year time scale. Any of these storms, in relation to frequency, duration, and intensity of the storm event, could result in flooding hazards which could cause damage across the LSEP.

Groundwater

The Nevada Division of Water Resources (NDWR), led by the State Engineer, is the agency responsible for managing both surface water and groundwater resources in the State of Nevada. The LSEP is located in the Central Region of Nevada's Hydrographic Regions. The Central Region is the largest hydrographic region in Nevada covering approximately 46,783 square miles, and includes 78 hydrographic areas (NDWR, 2014). The LSEP is within hydrographic basin 121A (Soda Spring Valley, Eastern Part). Refer to Table 3-10 for details about this groundwater basin.

Table 3-10: Hydrographic Basin 121A

Groundwater Basin	Area (square miles)	Perennial Yield (acre-feet/year)	Committed Resources	
			Acre-Feet/Year	Designated?
121A	246	600	3,656	Yes
Source: NDWR, 2014				

The basin consists of alluvial basin-fill groundwater aquifers contained in unconsolidated deposits of suspected Pliocene through Holocene age sand and gravel (USGS, 2003). These aquifers receive groundwater recharge through infiltration of runoff from mountain and alluvial fan slopes, and from direct rainfall. The aquifer system includes coarser grained aquifer units containing the water and finer-grained confining units, retarding vertical and lateral groundwater flow.

Within the area of the LSEP, there are no existing or pending water rights applications. Invenergy Solar plans to obtain water from a standpipe in the town of Luning owned by Hawthorne Utilities. Hawthorne Utilities currently purchases water from an existing water right owner in hydrographic basin 121A. Currently, it is expected there would be no new wells or diversions established, and no additional pumping would be required in hydrographic basin 121A, to supply the water needs of the LSEP. If additional water is need by the applicant, which cannot be supplied by Hawthorne Utilities, the water would be hauled from an extra-basin source.

Environmental Consequences

Proposed Action

The Proposed Action could affect water resources in several ways if it would (1) decrease groundwater supply or interfere substantially with groundwater recharge; (2) degrade the quality of surface water by increasing erosion or increasing sedimentation; or (3) increase the potential for flood hazards.

Potential impacts to water resources may occur from land disturbance (such as construction related activities) and water use requirements during construction, operation, maintenance, and decommissioning/reclamation. Both land disturbance and use of groundwater can affect groundwater and surface water flows, cause drawdown of groundwater surface elevations, modify natural drainage pathways, obstruct natural recharge zones, and/or alter surface water—groundwater connectivity.

Surface Water Resources

Construction activities could affect natural surface water systems by diverting and/or channelizing on-site and off-site flows to accommodate access road and facility construction, which would disturb natural hydrologic processes relevant to surface waters. In desert valley regions, surface hydrologic features include intermittent and ephemeral stream channels, alluvial fans, springs, playas, and dry lakebeds, which all have functional value to both surface water and groundwater resources. Surface grading and removing vegetation disturbs these surface water features and alters the surface topography. This can affect groundwater recharge processes, disrupt flows in ephemeral stream channels, and alter drainage patterns with potential adverse impacts resulting from either an increase (e.g., erosion) or a decrease (e.g., loss of water delivery) in runoff. Potential water quality impacts could be caused by runoff, dust, and potential chemical releases.

Applicant-committed measures would avoid, minimize, and/or mitigate impacts associated with surface water hydrology and water quality identified in this analysis. Grading would be minimized to the extent practicable and would follow the existing profile of the land to maintain the existing hydrology. Minimal grading would largely maintain existing storm water drainage patterns. Runoff generated within the solar facility would be conveyed as sheet flow across the site, which would maintain existing terrain.

The LSEP would incorporate soil stabilization and erosion-control measures, as well as other measures selected by the EPC contractor hired by Invenergy Solar contractor to complete the final designs. Project-specific measures would be designed by the EPC contractor and included in an approved SWPPP. Further, water erosion and dust-control measures would be implemented to prevent an increased sediment load to ephemeral washes around construction sites. The final project design would take erosion and sediment transport into consideration and would incorporate measures to minimize impacts.

Flooding Hazards

The temporary or permanent alteration of natural drainage pathways during construction, operation, maintenance, or decommissioning could lead to increased flooding and flood risks on- and off-site due to changes in storm flow depth and velocity. Flash flooding can result in debris flow in desert environments and transportation of alluvium within and surrounding a site. Debris flows and alluvium transport could damage on-site structures, such as solar panels, fencing, etc. Potential impacts caused by flooding would be reduced by maintaining existing storm water drainage patterns through minimal grading, and by reducing erosion impacts through implementation of a SWPPP. Locations of ditches, culverts, pipes, and other drainage control structures would be determined based on water flow analysis during final engineering. Drainage control structures would minimize increases in storm flow depth and velocity, both on- and off-site, which would control erosion and avoid increased flood risks.

Groundwater

The NDWR oversees actions such as water right applications, appropriations, and inter basin transfers. The applicant would purchase up to 9.2 acre-feet of water for construction from existing water rights, held by a private entity, and as such would not exceed NDWR authorized pumping. Even under existing water rights, the withdrawal of groundwater for construction,

operation, maintenance, and decommissioning activities could result in very minor lowering of water levels of the source aquifer if it represents additional water pumping. Springs in the surrounding area may be impacted through groundwater drawdown if additional pumping is required. However, it is anticipated no new wells or diversions would be established and no additional pumping would be required, therefore the water needs for the Proposed Action would likely not withdraw groundwater to the extent of adverse effects occurring.

No Action
Under the no action alternative there would be no construction or operational activities associated with the LSEP. The water needed for construction, operation, maintenance, and decommissioning would not be used for these actions. As a result, none of the impacts to water resources or hydrology from the LSEP would occur.

Cumulative Effects
The CESA for water resources is the combined areas of hydrographic basin 121A (Soda Springs Valley, Eastern Part) and hydrographic basin 121B (Soda Springs Valley, Western Part). Under the Proposed Action, ground disturbing activities would increase the potential for localized flooding and down gradient soil loss through wind- and water-driven erosion. While soil erosion BMPs would be implemented, localized soil erosion can be expected, given the large acreage disturbed, typically dry soil conditions, and periodic occurrence of high winds in the development area. These impacts would be most prevalent on dry, windy days, when wind-driven erosion underneath the panels would be greatest, and during flash flood events larger than the 100-year flood, when water volume may exceed the capacity of the flood control structures constructed for the LSEP.

It is assumed all reasonably foreseeable development on BLM lands in the LSEP and surrounding public lands would be subject to similar design requirements and site specific environmental analysis to reduce potential cumulative impacts to water resources. Given the limited water needs for the Proposed Action and the use of existing water rights, no cumulative impacts to groundwater are anticipated.

3.13 General Wildlife

Affected Environment
The native vegetation within and immediately adjacent to the LSEP (Soda Springs Valley) is consistent with the Intermountain cold desert shrub key habitat type (this key habitat is described in the Nevada Wildlife Action Plan (WAPT 2012) and within this EA, Section 3.11 Vegetation). No riparian areas exist within or immediately adjacent to the LSEP. Consequently, the habitat cannot support a high density of wildlife and is currently not functioning as high quality habitat for the majority of wildlife potentially using the area.

Pronghorn (*Antilocapra americana*) is the only big game species occurring within the LSEP. The area within the LSEP, as well as the entire Soda Spring Valley, is categorized by the Nevada Department of Wildlife (NDOW) as pronghorn year-round habitat. The closest mule deer (*Odocoileus hemionus*) habitat occurs over 3.22 km (2 miles) away from the LSEP, to the north

and east, in the Gabbs Valley Range. Desert bighorn sheep (*Ovis canadensis nelsoni*) habitat occurs within the Gabbs Valley Range and the Garfield Hills surrounding the Soda Spring Valley (Appendix C, Map C-11, Wildlife Habitat).

Wildlife species, not discussed in other sections of the document, known to occur within and out to 1 mile of the LSEP include the mourning dove (*Zenaida macroura*), black-tailed jackrabbit (*Lepus californicus*), northern desert horned lizard (*Phrynosoma platyrhinos*), western whiptail (*Cnemidophorus tigris*), coachwhip (*Masticophis flagellum*), long-nosed leopard lizard (*Gambelia wislizenii*), zebra-tailed lizard (*Callisaurus draconoides*), and coyote (*Canis latrans*).

Environmental Consequences

Proposed Action

Clearing and disturbing up to approximately 677 acres would result in the loss and fragmentation of Intermountain cold desert shrub habitat wildlife could use for cover, foraging, breeding, and traveling. Furthermore, wildlife normally utilizing the location would likely be displaced and forced to utilize the neighboring habitat, which could put additional pressure on the resources within the neighboring habitat and result in the loss of some individuals. Due to the degraded state of the habitat (e.g. deficiency of native vegetation and prevalence of invasive plant species) within the LSEP, the vast amount of Intermountain cold desert shrub habitat within the Soda Springs Valley, and the low density of wildlife observed during baseline studies, it is unlikely the loss of habitat would impact local and regional populations.

Vehicles and equipment used during construction, operation, and maintenance activities could impact wildlife. The majority of these impacts would be likely to occur during the construction phase due to the increased amount of activity. Vehicles and equipment could collide or crush a variety of wildlife, especially slower moving species, burrowing species, and ground nesting birds, resulting in direct mortality or injury. Furthermore, noise created by vehicles and equipment could alter wildlife behavior and result in wildlife avoiding areas larger than physical disturbance. The extent of habitat loss (either temporary or permanent) as a result of wildlife avoidance response would vary by species, as well as individuals within the same species. Wildlife avoiding habitat due to noise associated with the Proposed Action would result in additional pressure on resources in adjacent habitat and could result in the mortality of some individuals. After initial avoidance of noise impacted areas, certain wildlife species may acclimate to the human activities and begin to reoccupy areas formerly avoided.

Night lighting used during construction (if any construction is to occur at night), on the control house, on the access gates, and throughout the PV field could attract insects and foraging bats, confuse birds, and alter the behavior of other wildlife utilizing areas in the immediate vicinity of the lighting. For example, during increased nocturnal illumination, nocturnal rodents have been observed to decrease activity at night (Kramer and Birney 2001; Wolfe and Summerlin 1989; Clarke 1983) and alter foraging behavior (e.g. decreases in foraging duration and food consumed and increases in the number of trips from foraging patches to refuge) (Vasquez 1994). Also during increased nocturnal illumination, owl hunting effectiveness on nocturnal rodents can increase (Clarke 1983). Mitigation measures which should reduce the impacts of night lighting on wildlife are stated in Section 3.14 Migratory Birds and in Section 3.11 Visual Resources.

New man-made structures associated with the Proposed Action (e.g. gen-tie line, PV modules, substation, perimeter fencing, buildings, etc…) could impact wildlife utilizing the habitat in and around the solar facility. Specifically, avian species could be injured or killed as a result of electrocution from coming into contact with the gen-tie line or colliding with man-made structures (gen-tie line, perimeter fencing, PV modules, buildings, etc…). Suggested mitigation measures to reduce the likelihood of avian electrocutions and collisions with man-made structures are outlined in the Migratory Bird section (see Section 3.14). Bat species also may be prone to injury or fatality resulting from collisions with man-made structures associated with the Proposed Action. In addition, man-made structures may function as artificial perches for raptors and ravens, which could cause an increase in predation efforts on small mammals and ground nesting birds.

A potential impact associated with the Proposed Action would be increases in dust in and around the LSEP. Dust can reduce plant productivity (Sharifi et al.1997; Farmer 1993) and palatability for wildlife, thereby reducing the overall quality of wildlife habitat. Furthermore, if the exposure to dust is of sufficient magnitude and duration, there is potential for wildlife to develop dust pneumonia.

Implementing the Proposed Action could result in an increase in some scavengers and predators (e.g. ravens and coyotes) around the LSEP. Construction, operation, and maintenance activities would generate trash and debris which could attract scavenger and predator species. Furthermore, if there are increases in injured or dead wildlife associated with the Proposed Action, additional scavengers and predators could be attracted to the LSEP. The following mitigation measures would minimize conditions which may attract scavengers and predators:

- Trash and food would be stored in closed and secured containers, which would be removed as necessary, to reduce the attractiveness to scavengers and predators, particularly ravens.

- Road-killed wildlife on LSEP roads would be promptly removed to control scavenger and predator numbers, particularly ravens.

Implementing the Proposed Action could result in the spread of invasive plant species within and around disturbed areas. There is a high probability, based on the low average annual precipitation and high density of invasive plant species currently located in the area, surface disturbing activities could result in an increase in invasive plant species and a subsequent decrease in native plant species in and around the partially disturbed areas within the LSEP. In areas where vegetation would be completely cleared (e.g. PV field), there is a high probability native species would not re-establish, even with reclamation of the site. The following mitigation measures would reduce the potential for invasive plant infestations:

- To minimize the transport of vehicle-borne seeds, roots, or rhizomes, all vehicles and heavy equipment used for the completion, maintenance, inspection, or monitoring of ground disturbing activities would be free of soil and debris capable of transporting seeds. All such vehicles and equipment would be cleaned, either offsite in an approved

facility or in designated areas approved by the BLM, prior to entering the LSEP. Special emphasis would be applied to the axles, frames, cross members, motor mounts, on and underneath the steps, running boards, and front bumper/brush guard assemblies.

There is the potential of wildlife becoming entrapped within excavations associated with the construction of the proposed solar facility. The following mitigation measure would reduce the likelihood of this occurrence:

- To prevent entrapment of wildlife, all steep-walled trenches, auger holes, or other excavations would be covered at the end of each day or when long breaks in construction activity are expected. Fencing would be maintained around the covered excavations at night. For open trenches, earthen escape ramps would be maintained at intervals of no greater than ¼ mile. Any wildlife found would be safely removed and relocated by a trained wildlife biologist approved by the BLM.

Pronghorn
Clearing and disturbing up to approximately 677 acres of Intermountain cold desert shrub habitat in the Soda Springs Valley would result in the loss and fragmentation of year-round habitat for pronghorn. Pronghorn normally utilizing the location may be displaced and forced to utilize neighboring habitat, which could put additional pressure on the resources within the neighboring habitat and result in the loss of some individuals. Due to the degraded state of the habitat (e.g. deficiency of native vegetation and prevalence of invasive plant species) within the area, and the vast amount of year-round habitat within and around the Soda Springs Valley, it is unlikely the loss of habitat would impact local and regional populations.

Additional impacts to pronghorn associated with the Proposed Action may include displacement by noise, decreased forage due to potential increases of invasive plant species in and around disturbed areas, and the generation of dust which may cause respiratory irritation in individuals or degrade the palatability of vegetation used for forage. Appropriate mitigation measures to address these impacts are stated above.

No Action
Under the No Action alternative, the LSEP would not be authorized; therefore no impacts to general wildlife species would occur.

Cumulative Effects
The Wildlife CESA (Appendix C, Map C-11, Wildlife Habitat) is defined by a 10 mile buffer around the solar facility. This area encompasses portions of the Gabbs Valley Range, Gillis Range, Garfield Hills, and Soda Springs Valley. Past and present actions within the CESA which impact wildlife, including special status species and migratory birds, and wildlife habitat include ROWs (power lines, communication towers, roads, etc…), livestock grazing, mineral material pits, dispersed recreation, locatable mineral exploration and mining, range improvements, and invasive weed treatments. RFFAs within the CESA which could impact wildlife, including special status species and migratory birds, and wildlife habitat include mining, mining reclamation, livestock grazing, dispersed recreation, invasive weed treatments, and range improvements.

Approximately 243,212 acres of wildlife habitat, representing the sagebrush, cliffs and canyon, lower montane woodlands, and Intermountain cold desert shrub key habitat types, occurs within the CESA boundary. Furthermore, approximately 115,587 acres of Intermountain cold desert shrub habitat occurs within the CESA boundary. The approximate 677 acres of Intermountain cold desert shrub habitat which could be impacted by the LSEP comprises less than 0.3% of the total CESA boundary and 0.5% of the total amount of Intermountain cold desert shrub habitat (primarily within Soda Springs Valley) inside the CESA boundary. As such, the LSEP would impact an extremely small percentage of the available Intermountain cold desert shrub habitat within the CESA boundary used by wildlife (including migratory birds and special status species) for breeding, foraging, and traveling.

Approximately 169.6 km (105.4 miles) of existing overhead transmission/distribution power lines, all of which provide nesting/perching opportunities for avian species and present a collision risk to birds and bats, exist within the CESA boundary. The gen-tie line would contribute approximately 1% additional overhead transmission line to the overall quantity of power lines currently within the CESA boundary. In addition to power lines, 14 communication sites, ranging from small seismic array sites approximately 3.1 m (10 ft) tall to communication towers up to 15.2 m (50 ft) tall, occur within the CESA boundary. These sites also provide nesting and/or perching opportunities for avian species and present a collision risk to both birds and bats. Constructing the gen-tie line and project substation would result in a very minor increase in the amount of artificial perching/nesting opportunities for avian species and would not considerably increase the collision potential for birds and bats within the CESA.

Approximately 838.4 acres of existing NDOT mineral material sites, primarily within the Intermountain cold desert shrub key habitat, occur within the CESA boundary. The NDOT material sites are reserved for highway purposes and are spread along the two highways (U.S. Highway 95 and State Highway 361) within the CESA. The sites are typically 40 acres in size, and can be up to 80-160 acres. The existing level of disturbance within the sites ranges from almost entirely disturbed to containing only a few small sample pits. The NDOT is authorized to use the entirety of the mineral sites to obtain material for building and maintaining the two highways, so it is possible the entirety of the acreage may eventually be disturbed. The LSEP would contribute up to 80 additional acres of disturbance associated with the two material sites. The existing NDOT mineral material sites, in combination with the mineral material sites associated with the Proposed Action would comprise less than 0.5% of the total acres within the CESA boundary.

The NDOW considers hunt units 205-208 as the extent of the Mineral County pronghorn herd. The CESA covers portions of units 205-207; unit 208 is entirely outside the CESA boundary. In recent years, the population for this herd has remained relatively stable, despite marginal habitat quality (NDOW 2014). Implementing the Proposed Action, in combination with past, present, and reasonably foreseeable future actions, would most likely have negligible impacts on the Mineral County pronghorn herd.

Past, present and RFFAs such as constructing range improvements and conducting invasive weed treatments can be expected to increase the quantity and quality of habitat available to wildlife. Conversely, actions such as recreation, mining, creating mineral material pits, and

livestock grazing can either directly and/or indirectly (e.g. noise) have negative impacts on the quantity and/or quality of habitat available to wildlife. When analyzing the potential impacts of the Proposed Action in combination with past, present, and RFFAs, the incremental change in the quantity and quality of habitat available for wildlife (including migratory birds and special status species) in the CESA should be minimal.

3.14 Migratory Birds

Affected Environment

On January 11, 2001, President Clinton signed EO 13186 placing emphasis on the conservation and management of migratory birds. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918, and the EO addresses the responsibilities of federal agencies to protect them by taking actions to implement the MBTA. BLM management for these species is based on IM 2008-050 dated December 18, 2007.

The NV Comprehensive Bird Conservation Plan (2010) and the USFWS Birds of Conservation Concern (BCC) (2008), which have been classified as priority species by the USFWS and/or the state of Nevada, were used to determine which avian species known to occur, or could potentially occur, within and out to 1.61 km (1 mile) of the LSEP (Table 3-11). The ecological tenet underlying the process is actions focused on priority species would impact other avian species which utilize similar habitats.

Table 3-11: The NV Comprehensive Bird Conservation Plan (2010) and the USFWS BCC (2008) priority species occurring, or could potentially occur, within and out to 1.61 km (1 mile) of the LSEP.

Species	Notes
Brewer's Sparrow (*Spizella breweri*)	Though Brewer's sparrows primarily breed in sagebrush steppe habitats and are considered to be sagebrush steppe obligates, they are also associated with salt desert scrub habitats. Nests are usually constructed in the mid to upper canopy of tall, dense sagebrush or greasewood. Insects comprise the majority of the bird's diet in the spring and summer (GBBO 2010, WAPT 2012).
Burrowing Owl (*Athene cunicularia*)	Suitable habitat for the burrowing owl consists of shrubs spaced far apart or low stature vegetation that allows the bird to see for long distances. Ideal habitats are also closely associated with burrowing animals such as ground squirrels (*Spermophilus* spp.) and badgers (*Taxidea taxus*), as burrowing owls use holes created by these species as nest sites. Prey for burrowing owls consists of small rodents, reptiles, and insects (GBBO 2010, WAPT 2012).
Ferruginous Hawk (*Buteo regalis*)	Dispersed pinyon-juniper trees found at the ecotone of pinyon-juniper and desert shrub communities provide ideal nesting trees for ferruginous hawks. The hawk is also commonly observed nesting in cliffs. Ideal

Species	Notes
	ferruginous hawk hunting territory consists of sagebrush communities containing native grasses and forbs, as these communities generally support a high density of ground squirrels and lagomorphs (GBBO 2010, WAPT 2012).
Golden Eagle (*Aquila chrysaetos*)	The bird feeds on a variety of small mammals, snakes, birds, juvenile ungulates, and carrion. Nests are generally constructed on rock ledges or in large trees.
Loggerhead Shrike (*Lanius ludovicianus*)	Loggerhead shrikes nest in isolated trees or large shrubs. They use scattered, tall shrubs and fences as perches to feed on a variety of prey, which includes small birds, lizards, and mice (Neel 1999).
Prairie Falcon (*Falco mexicanus*)	Prairie falcons generally construct nests on the ledges of rocky cliffs, but they will also utilize old hawk and raven nests in trees. Prairie falcon populations are strongly correlated with populations of ground squirrels and other small mammals (GBBO 2010).
Sage Sparrow (*Amphispiza belli*)	Preferred habitat includes areas containing shrubs at least 45 cm (18 in) tall with 10-25% crown cover. A sparse grass and forb component is necessary within the shrub interspaces to support insects (Neel 1999, GBBO 2010).
Sage Thrasher (*Oreoscoptes montanus*)	Sage thrashers primarily inhabit sagebrush areas, but they can also be found in salt desert scrub habitat where it integrates with sagebrush or greasewood dominates. Nests are either constructed in the branches of sagebrush (occasionally greasewood) or placed underneath the shrub. Insects comprise the majority of a sage thrasher's diet, but the bird will also forage on fruits and berries (GBBO 2010, WAPT 2012).
Swainson's Hawk (*Buteo swainsoni*)	Swainson's hawks generally prefer to nest in isolated cottonwood trees; however, they will nest in junipers and aspen as well. The primary food sources for Swainson's hawks are small mammals and large insects (Neel 1999). The species would most likely only occur within and out to 1.61 km (1 mile) of the LSEP as a transient or migrant.

SWCA Environmental Consultants (SWCA) conducted various avian baseline surveys within and out to 16.09 km (10 miles) from the solar facility in May and July of 2014 (SWCA 2014). All distances given in this section, as well as the Special Status Species and General Wildlife sections, are measured from the perimeter of the solar facility (Appendix C, Map C-11, Wildlife Habitat) unless otherwise specified.

The only priority avian species (described in Table 3-11 above) observed within and out to 1 mile from the LSEP was the loggerhead shrike. Additional avian species observed within 1 mile were the black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), and Say's phoebe (*Sayornis saya*), all of which were observed at

low densities. No active raptor nests were observed within 1 mile, but two active common raven nests were found on power poles. An active prairie falcon nest was observed approximately 9.65 km (6 miles) to the northwest on cliffs within the Gillis Range, and an active red-tailed hawk nest was observed approximately 4.83 km (3 miles) to the northwest on a power pole. Multiple golden eagle nests were found within 10 miles, with the closest occupied nest being approximately 6.27 km (4 miles) away from the LSEP. More detailed information about golden eagles is contained within the Special Status Species section.

The area within and immediately adjacent to the LSEP functions as low quality habitat for the priority avian species listed in Table 3-11. Specifically, the vegetative conditions within and out to 1 mile will only support low densities of insects, small mammals, and seeds, thereby functioning as poor foraging habitat. The same area lacks trees and cliffs the priority avian species listed in Table 3-11 could use for nesting; however, a few shrubs (based on height), a communication tower to the southeast of the Table Mountain substation, and power poles within 1 mile could function as a nesting substrate for certain species. The area also functions as suitable burrowing owl nesting habitat; this species is discussed in more detail in the Special Status Species section.

Walker Lake, which is classified as an Important Bird Area (IBA), is approximately 41.84 km (26 miles) to the west-northwest of the LSEP and is the closest permanent, large body of water (capable of supporting a wide-array of waterbirds). IBAs are important places for bird populations and where conservation efforts are focused. These areas provide essential breeding, migration, or wintering habitat for one or more species of birds. Some waterbirds, such as terns (*Sterna spp.*) and American avocets (*Recurvirostra americana*), occasionally nest around the lake; however, the lake primarily functions as a resting point for waterbirds during spring and fall migrations (Jenni Jeffers, NDOW, Wildlife Diversity Biologist, personal communication October 2014). It is unknown if any waterbirds currently, or would in the future, fly over the LSEP in Soda Springs Valley on their way to access Walker Lake or other destinations. No waterbirds were observed flying over the LSEP during 2014 spring baseline surveys (SWCA 2014).

NDOW has record of three individual eared grebes and one ruddy duck being observed in 1994 in a pond associated with the Sante Fe Mine, which is approximately 6.08 km (3.78 miles) to the northeast of the solar facility in the Gabbs Valley Range near Calvada Summit. Presently, these ponds only contain water on an intermittent basis from natural precipitation.

Environmental Consequences

Proposed Action

Clearing and disturbing up to approximately 677 acres for the LSEP would result in the loss and fragmentation of low quality nesting and foraging habitat for migratory bird species (particularly the priority species listed in Table 3-11) utilizing the Intermountain cold desert shrub habitat. Migratory birds utilizing the location would likely be displaced and forced to utilize the neighboring habitat, which could put additional pressure on the resources within this habitat and result in the loss of some individual birds. Due to the degraded state of the Intermountain cold desert shrub habitat (e.g. deficiency of native vegetation and prevalence of invasive plant

species) in the area, the low density of migratory birds observed during baseline surveys (SWCA 2014), and the vast amount of similar habitat within and around the Soda Springs Valley, it is unlikely the loss of habitat would impact local and regional populations.

Vehicles and equipment used during construction, operation, and maintenance activities could result in the mortality to, or alter the behavior of, migratory birds within and around the LSEP (particularly the priority avian species listed in Table 3-11). Migratory birds may be killed or injured as a result of collisions, crushing, or destruction of active nests. Noise from vehicles and equipment, which would be the most prevalent during the construction phase, could result in increased energy expenditures (due to increased avoidance flights) and alter foraging and/or nesting behavior within the area of physical disturbance beyond. In regards to nesting behavior, adults disturbed by noise could temporarily abandon active nests, which could lead to missed feedings, predation on eggs or young, or overheating, chilling, or desiccation of eggs or young (Richardson and Miller 1997; Sutter and Joness 1981). If adults permanently abandon an active nest for the season, the nest would almost certainly fail (i.e. no young would be successfully produced that particular year). The following mitigation measure would reduce the likelihood of disturbance to nesting migratory birds:

- All surface disturbing activities should occur outside of the migratory bird nesting period (March 1 to July 31 for raptors and April 1 to July 31 for all other avian species). If surface disturbing activities are to occur during this period, pre-construction avian surveys would be conducted in appropriate habitats by qualified biologists (approved by the BLM) prior to surface disturbing activities commencing. The exact area to be surveyed would be based on the scope of the surface disturbing activities (as determined by the BLM). If ground disturbing activities do not take place within 14 days, the areas would need to be resurveyed. If nesting migratory birds are present, appropriate buffers determined by the BLM, in coordination with the NDOW/USFWS, would be applied until an approved biologist determines the young have fledged or the nest has failed.

New man-made structures associated with the Proposed Action (e.g. gen-tie line, perimeter fencing, substation, and control house) could impact migratory birds (particularly the priority avian species listed in Table 3-11) within and around the LSEP. Specifically, the 1.62 km (1 mile) long gen-tie line, perimeter fencing, substation, and control house could all function as artificial perching and/or nesting structures for raptors and ravens. The additional perches could result in increased predation efforts on ground and shrub nesting birds in the area. Approximately 10.4 km (6.46 miles) of transmission line, which is used by raptors and ravens for perching and nesting, currently exists within 1 mile of the solar facility. Injury or morality of migratory birds as a result of electrocution (gen-tie line) or collisions with the structures (gen-tie line, perimeter fencing photovoltaic panels, buildings, etc…) could also occur. Collision rates with structures are likely to increase in low light conditions, during inclement weather (e.g., fog, which is rare in the desert), during strong winds, during panic flushes when birds are startled by a disturbance and are fleeing from danger, or attempting to escape preying raptors. The following mitigation measures would reduce the likelihood of injury or mortality to migratory birds from electrocutions or collisions:

- Transmission lines and all electrical components should be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012) to reduce the likelihood of large bird electrocutions and collisions.

- Reflective markers should be installed on perimeter fencing, where appropriate, to reduce the likelihood of migratory birds colliding with the structure.

- Vegetation (invasive and native) around collision hazards, such as substations and the perimeter fence, would be removed as necessary to reduce foraging potential for raptors and decrease the likelihood of raptor fatalities from colliding with structures.

The use of artificial lighting during nighttime hours (potentially during construction, on the control house, on the access gates, and throughout the PV field) could confuse and negatively impact nesting and migrating birds. For example, artificial light sources can attract night migrating birds, which in turn increases the probability of bird mortality from colliding with structures. Additionally, attracted birds may unnaturally circle the light source (Gauthreaux Jr. and Belser 2006), unnecessarily expending critical energy reserves, resulting in increased chances of mortality from exhaustion or predation. The mitigation measure identified for lighting in the VRM section of this EA (Section 3.11 Environmental Consequences) as well as the following mitigation measure would reduce impacts of night lighting on migratory birds:

- Any nighttime construction would generally be avoided and specifically prohibited within the migratory bird breeding season (March 1 to July 31).

Implementing the Proposed Action could result in the spread of invasive plant species within and around disturbed areas. This includes short-term or partially disturbed areas, such as the temporary laydown yard within the PV field, pole locations along the gen-tie line, or small sale areas within either 40 acre mineral material site, which would require interim reclamation following construction. Based on the low average annual precipitation and high density of invasive plant species currently located within the LSEP, there is a high probability surface disturbing activities could increase invasive plant species and subsequently decrease native plant species in and around the partially disturbed areas within the LSEP. In areas where vegetation would be completely cleared (e.g. PV field), there is a high probability the native species would not re-establish, even with reclamation of the site. If, in the future, there is an increase in invasive plant species and a decrease in native plant species within and immediately adjacent to the LSEP, habitat quality for migratory birds (particularly the priority avian species listed in Table 3-11) would be further degraded.

Another potential impact of project related activities/facilities would be an increase in the number of some avian scavengers and predators (e.g., some raptors and ravens) attracted to the locale. Specifically, project related activities/facilities could result in mortality of a variety of wildlife species, and in turn certain raptors and/or ravens by the animal carcasses. The following mitigation measure would reduce the occurrence of scavengers and predators being attracted to the site:

- Wildlife mortalities (carcasses) found incidentally within and along the perimeter of the LSEP would be removed and disposed of to prevent the creation of attractant features for raptors and/or ravens.

- Vegetation around larger facilities, such as substations, would be removed as necessary to reduce foraging potential for raptors and/or ravens.

The area within the LSEP does not contain suitable habitat for waterbirds. As stated previously, it is unknown if any of these bird species currently, or would in the future, fly over the LSEP on their way to access Walker Lake or other destinations during spring and fall migrations. Specific to the solar facility, a hypothesis posits 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. Kagan et al. (2014) analyzed avian mortality at a photovoltaic solar power plant in California and documented mortalities for an array of waterbird species, with the primary cause of death being blunt trauma (birds colliding with structures associated with the solar facility). These findings suggest there may be some potential for waterbirds, if they were to fly over the solar facility, to mistake the PV field for water and be injured or killed as a result of crashing into the solar panels. A mitigation measure to reduce the potential of injury or mortality to migratory birds from the Proposed Action, and ensure adequate monitoring is in place to determine if mortalities are occurring, is stated below:

- A Bird and Bat Conservation Strategy (BBCS) would be developed with the goal of reducing the potential risks of avian mortality resulting from construction and operation of the LSEP. The goals of this Strategy would be to:

    - Identify baseline conditions for raptor and bat species currently present at the LSEP;
    - Identify construction and operational activities which may increase the potential of adverse effects to these species on and adjacent to the LSEP, including bird mortality associated with potential attraction to photovoltaic panels;
    - Specify steps which should be taken to avoid, minimize, and mitigate any potential adverse effects on these species; and
    - Detail long-term monitoring and reporting goals, including collection and reporting of bird carcasses

No Action
Under the No Action alternative, the LSEP would not be authorized; therefore no impacts to migratory birds would occur.

Cumulative Effects
See General Wildlife Section (Section 3.13)

3.15 Special Status Species

Affected Environment

Some species of plants and wildlife are accorded special status by Federal and state agencies largely because they are either scarce on a regional level, facing clearly defined threats, or in a position within the regional landscape to potentially become scarce. Special status species include:

- Threatened, endangered, proposed, or candidates for Federal listing under the Endangered Species Act of 1973 or equivalent state laws;
- BLM-sensitive species designated by the BLM Nevada State Director;
- Protected under Title 47, Chapter 527 (Protection and Preservation of Timbered Lands, Trees and Flora) of the Nevada State Code;
- At-risk taxa tracked by the Nevada National Heritage Program within the Department of Conservation and Natural Resources; and/or;
- Designated as sensitive by the Nevada Native Plant Society.

The State of Nevada can fully protect wildlife species through the stipulations of Nevada Revised Statute (NRS) 501. Furthermore, the State of Nevada protects "critically endangered" plant species, as well as cacti, under NRS 527.

There are no species Federally listed as endangered or threatened, proposed for listing, or candidates for listing under the Endangered Species Act known to occur within the LSEP and its associated area of influence; therefore, the LSEP would have no effect on endangered, threatened, proposed, and candidate species.

Table 3-12: Special status species occurring, or could potentially occur, within and out to one mile of the LSEP.

Species	Notes
Avian	
Brewer's Sparrow	General habitat requirements are described in the Migratory Birds Section. No Brewer's sparrows were observed within and out to 150 m (492.13 ft) from the solar facility during baseline surveys conducted in 2014 (SWCA 2014).
Burrowing Owl	General habitat requirements are described in the Migratory Birds Section. Suitable burrowing owl habitat exists throughout the LSEP and surrounding Soda Spring Valley. No burrowing owls or their sign were observed within and out to 150 m (492.13 ft) from the solar facility during baseline surveys conducted in 2014 (SWCA 2014).
Ferruginous Hawk	General habitat requirements are described in the Migratory Birds Section. No ferruginous hawks were observed during baseline surveys conducted within and out to 1.61 km (1 mile) from the solar facility in 2014 (SWCA 2014).

Species	Notes
Golden Eagle	General habitat requirements are described in the Migratory Birds Section. Detailed information about golden eagle use within a 16.09 km (10 mile) buffer of the LSEP is located in the text below the table.
Loggerhead Shrike	General habitat requirements are described in the Migratory Birds Section. One loggerhead shrike was observed within a 150 m (492.13 ft) buffer of the solar facility during baseline surveys conducted in 2014 (SWCA 2014).
Sage Thrasher	General habitat requirements are described in the Migratory Birds Section. No sage thrashers were observed within and out to 150 m (492.13 ft) from the solar facility during baseline surveys conducted in 2014 (SWCA 2014).
Swainson's Hawk	General habitat requirements are described in the Migratory Birds Section. No Swainson's hawks were observed during baseline surveys conducted within and out to 1.61 km (1 mile) from the solar facility during 2014 (SWCA 2014).
Mammals	
Pale Kangaroo Mouse (*Microdipodops pallidus*)	Pale kangaroo mice are found in sandy soils in valley bottoms dominated by greasewood and saltbush. They are primarily granivorous, with insects complimenting their diet in the summer (WAPT 2012). Suitable habitat (though lower quality) exists throughout the LSEP; however, it is not known if the species actually occurs in the locale.
Pallid Bat (*Antrozous pallidus*)	Pallid bats are found throughout NV in low to mid elevations in habitats that include pinyon-juniper, blackbrush, creosote, sagebrush, and salt desert scrub. Foraging occurs both in vegetation and on the ground surface, and the bat's diet primarily consists of ground-dwelling arthropods (Bradley et al. 2006).
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Townsend's big-eared bats are found in a variety of habitats, such as pinyon-juniper, sagebrush, and salt desert scrub. The bat primarily forages on moths in open forest habitats of pinyon-juniper, mahogany (*Cercocarpus* spp.), aspen (*Populus tremuloides*), and cottonwood (*Populus* spp.). Townsend's big-eared bats will travel long distances to reach suitable foraging areas (Bradley et al. 2006).
Big Brown Bat (*Eptesicus fuscus*)	Big brown bats occur in a variety of habitats that include aspen stands, pinyon-juniper woodlands, lowland/upland riparian areas, sagebrush communities, grasslands, desert scrub communities, and agricultural fields. They roost in hollow trees, mine crevices, caves, tunnels, and buildings. Big brown bats forage over open land and water and consume a variety of insects, with beetles and caddis flies comprising the majority of their diet (Bradley et al. 2006).

Species	Notes
California Myotis (*Myotis californicus*)	The California myotis is found predominantly at lower to middle elevations in a variety of habitats, which include lowland riparian, desert scrub, sagebrush steppe, montane grassland, pinyon-juniper woodland, and mixed-conifer. Mines, caves, rock crevices, and hollow trees are used as roosting sites, and small moths, flies, and beetles comprise the majority of the bat's diet (Bradley et al. 2006).
Western Small-footed Myotis (*Myotis ciliolabrum*)	The western small-footed myotis is associated with desert scrub, grassland, sagebrush steppe, pinyon-juniper woodland, and agricultural areas. Caves, mines, and trees as roosting sites. The species forages in open areas on a variety of insects that includes small moths, flies, ants, and beetles (Bradley et al. 2006).
Western Pipistrelle (*Pipistrellus Hesperus*)	The western pipistrelle is associated with blackbrush, salt desert shrub, sagebrush, and pinyon-juniper habitats. Rock crevices, mines, and caves are generally used as roosting sites. Foraging occurs in open areas, and food items include small moths, leafhoppers, mosquitoes, and flying ants (Bradley et al. 2006).
Mexican Free-tailed Bat (*Tadrida brasilensis*)	The Mexican free-tailed bat occurs in a variety of habitats in Nevada, from low desert to high mountains. Cliff faces, mines, caves, and hollow trees are used as roosting sites. The bat's diet includes moths, flying ants, beetles, and a variety of other insects (WAPT 2012).
Plants	
Sand Cholla (*Grusonia pulchella*)	In NV, the sand cholla is reliant on sand dunes or deep sand (NNHP 2001). Three individual plants were found within the solar facility during baseline surveys (JBR 2008).
Plains Prickly Pear (*Opuntia polyacantha)*)	The plains prickly pear is not a BLM Nevada sensitive species; however, all cacti are protected in Nevada under NRS 527.060-120. Six individual plants were found within the solar facility during baseline surveys (JBR 2008).

The LSEP does not contain known natural structures (e.g. caves, rock outcrops, trees, etc…) the sensitive bat species described in Table 3-12 could use as roosting sites. No primary foraging or drinking locations, such as open water, springs, streams, and wet meadows, occur within the LSEP. Given the LSEP and its associated 1 mile buffer lacks roosting structures and primary foraging and drinking areas, current bat use of the location is most likely limited to casual foraging while dispersing through the area.

SWCA found a total of 34 confirmed golden eagle nests, with an additional 25 nests identified as possible golden eagle nests, during baseline surveys conducted within a 16.09 km (10 mile) distance in May of 2014 (SWCA 2014). These nests were all located on cliffs within the Gillis Range, Garfield Hills, Gabbs Valley Range, or Black Dyke Mountain. The closest observed golden eagle nest to the LSEP was approximately 3.38 km (2.1 miles) to the northeast in the

Gabbs Valley Range; this nest was unoccupied during 2014 surveys. Of the 34 confirmed golden eagle nests, three were active: one nest was approximately 10.91 km (6.5 miles) to the south of the LSEP, one was approximately 7.40 km (4.6 miles) to the north, and one was approximately 14.48 km (9 miles) to the northeast (SWCA 2014). Suitable golden eagle nesting sites within and out to 1 mile from the LSEP are limited to poles along the transmission line. The entire LSEP is considered suitable golden eagle foraging habitat, however the degraded habitat conditions will not support a high density of prey. No eagles were observed foraging within the LSEP during baseline surveys conducted in 2014 (SWCA 2014).

The vegetation within and immediately adjacent to the LSEP (Soda Springs Valley) is consistent with the Intermountain cold desert shrub key habitat type (SWCA 2014).

Environmental Consequences

Proposed Action
General impacts to the Intermountain cold desert shrub habitat and these wildlife species, as well as applicable mitigation measures to reduce the magnitude of these impacts, are described in Section 3.13 General Wildlife and Section 3.14 Migratory Birds. More specific impacts to individual special status species are described below.

Mammals
Pale Kangaroo Mouse
The use of artificial night lighting sources (potentially during construction, on the control house, on the access gates, and throughout the PV field) could impact pale kangaroo mice (if they were to occur in the area). During increased illumination at night, nocturnal rodents have been observed to decrease activity (Kramer and Birney 2001; Wolfe and Summerlin 1989; Clarke 1983) and alter foraging behavior (Vasquez 1994). Also, during increased nocturnal illumination, owl hunting effectiveness on nocturnal rodents can increase (Clarke 1983). Mitigation measures which should reduce the impacts of night lighting on wildlife, such as pale kangaroo mice, are stated in Section 3.14 Migratory Birds and in Section 3.11 Visual Resources.

Bats
Potential impacts from the Proposed Action to the sensitive bat species listed in Table 3-12 include the loss of low quality foraging habitat, injury or mortality from collisions with structures (e.g. gen-tie line and PV modules), displacement by noise from vehicles and equipment, and alteration of behavior from night lighting. Clearing and disturbing up to approximately 677 acres of Intermountain cold desert shrub habitat would likely have negligible impacts on sensitive bat species due to the lack of primary foraging and drinking areas within the LSEP. Human-caused noise has been found to impact bat foraging behavior (Schaub et al. 2008); noise created by vehicles and equipment during bat foraging times could deter bats from feeding within and immediately adjacent to the LSEP. Again, due to the area within and immediately adjacent to the LSEP lacking primary foraging and drinking areas, noise from vehicles and equipment would most likely have negligible impacts on local bat populations. Night lighting could attract insects, which may in turn attract foraging bats, thereby altering bat behavior. Suggested mitigation measures to reduce the impacts of night lighting on wildlife, such as bats, are listed in Section 3.14 Migratory Birds and in Section 3.11 Visual Resources.

A mitigation measure to reduce the potential of injury or mortality to bats from the Proposed Action, and ensure adequate monitoring is in place to determine if mortalities are occurring, would be the development of a BBCS.

Plants

Clearing and disturbing up to approximately 677 acres of Intermountain cold desert shrub habitat would result in the loss and fragmentation of habitat available to the sand cholla and plains prickly pear. Furthermore, surface disturbing activities associated with the Proposed Action have the potential to destroy individual sand cholla and plains prickly pear plants. The following mitigation measure would reduce the likelihood of mortality of cacti:

- Prior to any surface disturbing activities, a BLM approved botanist (approval would be based on sufficient experience in surveying for and transplanting cactus) would conduct pre-disturbance surveys and flag all cacti. Appropriate avoidance buffers to protect individual cactus plants would be established where practicable. In areas where avoidance is not practicable, all cacti within the permanent and temporary impact areas would be replanted immediately in undisturbed locations containing suitable habitat adjacent to the LSEP. Unless otherwise directed by the BLM botanist, all replanted cactus would be watered and otherwise maintained for a period of one year. The goal would be to achieve at least 80% survival of all transplanted cacti.

Dust created as a result of construction, operation, and maintenance of the solar facility, as well as the development and use of the mineral material sites, could have negative impacts on the cactus species. Impacts from dust would mostly occur during the construction phase. Cacti encrusted in dust can have reduced ability to carry out photosynthesis and decreased water-use efficiency. Furthermore, excessive dust on the flowers can have adverse effects on plant-pollinator interactions.

No Action

Under the No Action alternative, the LSEP would not be authorized; therefore no impacts to special status species would occur.

Cumulative Effects

See General Wildlife Section (Section 3.13)

3.16 Cumulative Effects of the No Action Alternative

The No Action Alternative would result in the project denial, and therefore, no new cumulative effects would be realized to any resource analyzed in this environmental analysis.

3.17 Summary of Recommended Mitigation Measures

Mitigation measures are listed in the order they appear in the above analysis. When a mitigation measure applies to another section, the section name is listed, where applicable.

Livestock Grazing

- Cattleguards would be installed on the highway and the two separate sections of the PV field would be connected by additional fencing to prevent livestock from funneling into the gap and potentially being struck by vehicles. Fencing not intended to exclude access to the PV fields would be designed to meet BLM and NDOT requirements for wildlife passage and highway safety.

Noxious, Invasive, and Non-native Species

- A weed abatement plan would be submitted prior to any surface disturbance associated with the LSEP, to insure weeds are identified and managed in the appropriate manner. The plan should include the following:
    - A pre-disturbance survey of the project area to identify existing invasive species;
        - Locations would be marked with a Global Positioning System (GPS) and mapped, followed by locations being flagged;
    - Appropriate treatment methods would be identified by the applicant;
    - Weed-free staging areas would be identified for project construction;
    - Best Management Practices (BMPs) to prevent erosion of the job site and the potential transport of weedy material on to, or off of, the job site during rainfall and storm-water events;
    - Procedures for insuring seed and other plant materials would be checked and certified weed-free (weed count in compliance with State and Federal seed laws);
    - Monitoring methods for treated areas and new infestations over the life of the LSEP, including final reclamation, would be identified;
    - A treatment/monitoring schedule.

- Invenergy Solar would develop a plan to address noxious and invasive weeds on approximately 560 acres (the same size area as where the PV panels would be installed) in the vicinity of the solar facility. The plan would be targeted to address areas where the most benefit would be realized, such as along public roads and other areas where existing weed infestation may be spread from. Specific treatment areas, treatment methods, targeted noxious and invasive weed species, and monitoring periods would be identified by Invenergy Solar and included in the plan in coordination with BLM specialists and local cooperating agencies who manage weeds in the area, prior to receiving a Notice to Proceed. Funding for the plan would be provided by Invenergy Solar when commercial operations begin.

The above mitigation measures also apply to Vegetation and General Wildlife.

Vegetation

- Where practicable, vegetation would not be cleared from the PV field prior to construction. Post construction, an appropriate seed mix of low posture perennial vegetation could be seeded in areas where minimal disturbance by operation and maintenance activities occurred.

Visual Resource Management

- Where practicable, all new structures should be painted using dark greens, browns or tans similar to Beetle, Juniper Green, or Shadow Gray, as found on the BLM Standard Environmental Color Chart CC-001, to reduce visibility from areas most likely to be viewed by the public. Structures which cannot be painted or obtained in colors that are compatible with BLM Standard Environmental Color Chart CC-001 should be reported to the Authorized Officer, prior to installation, with justification.

- Vegetation removed during construction would be stockpiled and used as vertical mulching on areas with surface disturbance not needed for general operations of the facilities upon completion of the construction phase of the LSEP.

- The applicant would provide a Lighting Management Plan for review and approval. Motion-activated lighting should be installed on the control house, on the access gates, and throughout the solar arrays for access during non-daylight hours. Lighting would be directed downwards towards the project facilities to limit area light pollution. Light shields should be utilized on lighting units to deflect light away from the town of Luning, Highway 95 and Highway 361. Safety and general security lighting should be limited to the minimum illumination needed to achieve safety and security objectives to avoid unnecessary light pollution into the night skies.

The above mitigation measure also applies to Migratory Birds, Special Status Species (burrowing owls, special status raptors, special status passerines, pale kangaroo mouse, bats), and General Wildlife.

- Reclamation would be completed on all areas of surface disturbance within material sites when materials are depleted or the need for the site/s no longer exists. During excavation of material sites, topsoils and overburden would be placed in a low berm at the edge of the pits to provide screening from Highway 361 or 95 and would be used for surface reclamation when the material site is closed.

- If gen-tie line is constructed using metal poles, the surface finish would consist of self-weathering steel alloy or, if finished with galvanized coating, treated with weathering chemical. Where feasible, visual screening, such as using brown slats in chain-link fences or weathering chemicals on galvanized surfaces to reduce reflectivity and glare, would be utilized to reduce impacts to the viewshed.

General Wildlife

- Trash and food would be stored in closed and secured containers, which would be removed as necessary, to reduce the attractiveness to scavengers and predators, particularly ravens.

- Road-killed wildlife associated with the LSEP would be promptly removed to control scavenger and predator numbers, particularly ravens.

- To minimize the transport of vehicle-borne seeds, roots, or rhizomes, all vehicles and heavy equipment used for the completion, maintenance, inspection, or monitoring of ground disturbing activities would be free of soil and debris capable of transporting seeds. All such vehicles and equipment would be cleaned, either offsite in an approved facility or in designated areas approved by the BLM, prior to entering the LSEP. Special emphasis would be applied to the axles, frames, cross members, motor mounts, on and underneath the steps, running boards, and front bumper/brush guard assemblies.

The above mitigation measure also applies to Noxious, Invasive, and Non-native Species.

To prevent entrapment of wildlife, all steep-walled trenches, auger holes, or other excavations would be covered at the end of each day or when long breaks in construction activity are expected. Fencing would be maintained around the covered excavations at night. For open trenches, earthen escape ramps would be maintained at intervals of no greater than ¼ mile. Any wildlife found would be safely removed and relocated by a trained wildlife biologist approved by the BLM.

Migratory Birds

- All surface disturbing activities should occur outside of the migratory bird nesting period (March 1 to July 31 for raptors and April 1 to July 31 for all other avian species). If surface disturbing activities are to occur during this period, pre-construction avian surveys would be conducted in appropriate habitats by qualified biologists (approved by the BLM) prior to surface disturbing activities commencing. The exact area to be surveyed would be based on the scope of the surface disturbing activities (as determined by the BLM). If ground disturbing activities do not take place within 14 days, the areas would need to be resurveyed. If nesting migratory birds are present, appropriate buffers determined by the BLM, in coordination with the NDOW/USFWS, would be applied until an approved biologist determines the young have fledged or the nest has failed.

The above mitigation measure also applies to Special Status Species (burrowing owls, special status raptors, special status passerines).

- Transmission lines and all electrical components should be designed, installed, and maintained in accordance with the APLICs Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012) to reduce the likelihood of large bird electrocutions and collisions.

- Reflective markers should be installed on perimeter fencing, where appropriate, to reduce the likelihood of migratory birds colliding with the structure.

- Vegetation (invasive and native) around collision hazards, such as substations and the perimeter fence, would be removed as necessary to reduce foraging potential for raptors and decrease the likelihood of raptor fatalities from colliding with structures.

The above mitigation measures also apply to Special Status Species (burrowing owls, special status raptors, special status passerines) and General Wildlife (avian species and bats).

- Any nighttime construction would generally be avoided and specifically prohibited within the migratory bird breeding season (March 1 to July 31).

The above mitigation measure also applies to Special Status Species (burrowing owls, special status raptors, special status passerines).

- Wildlife mortalities (carcasses) found incidentally within and along the perimeter of the LSEP would be removed and disposed of to prevent the creation of attractant features for raptors and/or ravens.

The above mitigation measure also applies to General Wildlife.

- Vegetation around larger facilities, such as substations, would be removed as necessary to reduce foraging potential for raptors and/or ravens.

- A BBCS would be developed with the goal of reducing the potential risks of avian mortality resulting from construction and operation of the LSEP. The objectives of this Strategy would be to:
    - Identify baseline conditions for raptor and bat species currently present at the LSEP;
    - Identify construction and operational activities which may increase the potential of adverse effects to these species on and adjacent to the LSEP, including bird mortality associated with potential attraction to photovoltaic panels;
    - Specify steps which should be taken to avoid, minimize, and mitigate any potential adverse effects on these species; and
    - Detail long-term monitoring and reporting goals, including collection and reporting of bird carcasses.

The above mitigation measure also applies to Special Status Species (burrowing owls, special status raptors, special status passerines) and General Wildlife (avian species and bats).

<u>Special Status Species - Plants</u>

- Prior to any surface disturbing activities, a BLM approved botanist (approval would be based on sufficient experience in surveying for and transplanting cactus) would conduct pre-disturbance surveys and flag all cacti. Appropriate avoidance buffers to protect

individual cactus plants would be established where practicable. In areas where avoidance is not practicable, all cacti within the permanent and temporary impact areas would be replanted immediately in undisturbed locations containing suitable habitat adjacent to the LSEP. Unless otherwise directed by the BLM botanist, all replanted cactus would be watered and otherwise maintained for a period of one year. The goal would be to achieve at least 80% survival of all transplanted cacti.

4.0 PERSONS, GROUPS OR AGENCIES CONSULTED

Information received from persons, groups, and/or agencies consulted during the Variance Area review process was used during the preparation of this EA; names and affiliations are contained in the Variance Area review documentation in Appendix A and in Section 1.5.3. Additional persons, groups, and/or agencies consulted during preparation of this EA are listed in Table 4-1.

Table 4-1: Persons, Groups, or Agencies Consulted

AGENCY/GROUP	PERSON/S CONTACTED
Nevada Department of Wildlife	Jenni Jeffers Mark Freese
U.S. Department of Fish and Wildlife	Chris Nicolai
Nevada State Historic Preservation Office	
Fallon Paiute-Shoshone Tribe	Tribal Members
Walker River Paiute Tribe	Tribal Members
Yomba Shoshone Tribe	Tribal Members
Invenergy Solar Development LLC	Laura Miner Matthew Ruhter
Sierra Pacific Power Company (NV Energy)	R. David Snelgrove
Mineral County Public Works Department	Eric Hamrey
BLM – Southern Nevada District Office RECO	Gregory Helseth
BLM – Nevada State Office	Kimberly Dow
BLM – Washington D.C. Office	Ray Brady

4.1 List of Preparers

Table 4-2: Stillwater Field Office Resource Specialists

NAME	TITLE	PROJECT EXPERTISE
Terri Knutson	Stillwater Field Manager	Authorized Officer
Matt Simons	Realty Specialist	Project Lead; Land Use Authorization; Visual Resources; Global Climate Change / Greenhouse Gas Emissions
Jason Wright	Archaeologist	Cultural Resources; Native American Religious Concerns
Kenneth Depaoli	Geologist	Geology; Mineral Materials
Dave Schroeder	Environmental Compliance Specialist	Wastes, Hazardous or Solid
Michelle Stropky	Hydrologist	Air Quality; Water Quality, Surface/Ground; Soils
Jill Devaurs	Land Law Examiner / Weed Coordinator	Noxious and Invasive, Non-native Species
Dan Westermeyer	Outdoor Recreation Planner	Recreation; Visual Resources; Travel Management; Wilderness; Lands with Wilderness Characteristics

NAME	TITLE	PROJECT EXPERTISE
Angelica Rose	Planning and Environmental Coordinator / Military Liaison	Environmental Justice; Socioeconomics
Chelsy Simerson	Rangeland Management Specialist	Wild Horse and Burro
Ken Vicencio	Range Technician	Livestock Grazing; Vegetation
Chris Kula	Wildlife Biologist	Migratory Birds; Threatened or Endangered Species; Special Status Species (BLM Sensitive Species); General Wildlife

5.0 LIST OF REFERENCES

43 Code of Federal Regulations (CFR) 2800.

43 Code of Federal Regulations (CFR) 3600.

Bureau of Land Management (BLM) 2007a. Appendix C. Final Programmatic Environmental Impact Statement, Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. U.S. Department of the Interior, Bureau of Land Management, Washington Office, Washington D.C.

____. H-1790-1 National Environmental Policy Act Handbook. Washington D.C.; US Department of the Interior Bureau of Land Management, 2008.

____. Carson City Field Office Consolidation Resource Management Plan. Carson City: Department of the Interior Bureau of Land Management, 2001.

____. Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. 1994.

____. 2007b. Record of Decision for the Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic EIS. U.S. Department of the Interior, Bureau of Land Management, Washington Office, Washington D.C.

City Data.com. 2003-2013. Nye County Data. Internet Website: http://www.city-data.com/county/Nye_County-NV.html. Accessed January 21, 2015.

City Data.com. 2003-2014. Mineral County Data. Internet Website: http://www.city-data.com/county/Mineral_County-NV.html. Accessed January 21, 2015.

Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. 1994.

Headwaters Economics. 2014. Economic Profile System (EPS) Socioeconomic Profiles produced for Mineral and Nye Counties, Nevada. Internet Web site: http://www.headwaterseconomics.org/eps/. Data for Economic Profile System accessed on January 21, 2015.

US Census Bureau. 2010. 2010 Census Summary Data. Internet Website: http://2010.census.gov/2010census/data/. Accessed January 15, 2015.

___. 2013 Mineral County QuickFacts from the US Census Bureau. Internet Website: http://quickfacts.census.gov/qfd/states/32/32021.html. Accessed January 15, 2015.

___. 2013. Nye County QuickFacts from the US Census Bureau. Internet Website: http://quickfacts.census.gov/qfd/states/32/32023.html. Accessed January 15, 2015.

U.S. Department of Commerce. 2014. Regional Economic Information System, Bureau of Economic Analysis. Internet Website: http://bea.gov/bea/regional/data.htm. Accessed January 15, 2015. Last Revised Thursday, 04-Dec-2014 15:02:51 EST.

Natural Resources Conservation Service (NRCS). 2015. Web Soil Survey. Online at: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

Natural Resources Conservation Service (NRCS). 1991. Soil Survey of Mineral County Area, Nevada (Volume 1). Online at: http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=NV

NDWR. 2014. State of Nevada, Division of Water Resources, Hydrographic Regions and Basins. Online at http://water.nv.gov/programs/planning/counties/?county=12. Accessed on January 28, 2015.

United States Geological Survey (USGS). 2014. Preliminary Surficial Geology Map, Luning and Mina 7.5' Quadrangles. Online at: http://store.usgs.gov/b2c_usgs/usgs/maplocator/(ctype=areaDetails&xcm=r3standardpitrex_prd&carea=%24ROOT&layout=6_1_61_48&uiarea=2)/.do.

USGS. 2003. Principal Aquifers of the 48 Conterminous United States, Hawaii, Puerto Rico, and the U.S. Virgin Islands: U.S. Geological Survey, Madison, Wisconsin, USA. Shapefile. Online at http://pubs.usgs.gov/ha/ha730/gwa.html. Accessed on January 28, 2015.

Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

Boeker, E.L. and T.D. Ray. 1971. Golden eagle population studies in the Southwest. Condor 73:463-467.

Bradley, P.V., M.J. O'Farrell, J.A. Williams, and J.E. Newmark. Editors. 2006. The Revised Nevada Bat Conservation Plan. Nevada Bat Working Group. Reno, Nevada. 216 pp.

Clarke, J. A. 1983. Moonlight's influence on predator/ prey interactions between short-eared owls (Asio flammeus) and deermice (Peromyscus maniculatus). Behavioral Ecology and Sociobiology 13:205–209.

Farmer, A.M. 1993. The effects of dust on vegetation—a review. Environmental Pollution 79:63 75.

Gauthreaux Jr., S. A., and C. G. Belser. 2006. Effects of artificial night lighting on migrating birds. Pages 67–93 in C. Rich and T. Longcore, editors. Ecological consequences of artificial night lighting. Island Press, Washington, D.C., USA.

Great Basin Bird Observatory (GBBO). 2010. Nevada Comprehensive Bird Conservation Plan, ver. 1.0. Great Basin Bird Observatory, Reno, NV. Available online at www.gbbo.org/bird_conservation_plan.html.

JBR Environmental Consultants, Inc. (JBR). 2008. Mud Lake Solar, LLC Luning Solar Project Vegetation Survey. JBR Project No 07.00482.01. Reno, Nevada: JBR Environmental Consultants, Inc.

Kagan, R.A., T.C. Viner, P.W. Trail, and E.O. Espinoza. 2014. Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis. National Fish and Wildlife Forensics Library. 28 pp.

Kramer, K.M. and E.C. Birney. 2001. Effect of Light Intensity on Activity Patterns of Patagonian Leaf-eared Mice, Phyllotis xantopygus. Journal of Mammalogy 82(2):535-544.

Neel, L.A. 1999. Nevada Partners in Flight Bird Conservation Plan http://www.partnersinflight.org/bcps/plan/pl-nv-10.pdf.

Nevada Department of Wildlife. 2014. Walker Lake Waterbird Census.

Nevada Department of Wildlife. 2014. 2013-2014 Big Game Status.

Richardson, C.T. and C.K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildlife Society Bulletin 25(3):634-638.

Schaub, A., J. Ostwald, and B.M. Siemers. 2008. Foraging bats avoid noise. The Journal of Experimental Biology 211: 3174-3180.

Sharifi, M.R., A.C. Gibson, and P.W. Rundel. 1997. Dust Impacts on Gas Exchange in Mojave Desert Shrubs. Journal of Applied Ecology 34(4)837-846.

Sutter, G.W. II and J.L. Joness. 1981. Criteria for golden eagle, ferruginous hawk, and prairie falcon nest site protection. Raptor Res. 15:12-18.

SWCA Environmental Consultants. 2014. Luning Solar Energy Project Biological Report. September 2014.

Vasquez, R.A. 1994. Assessment of Predation Risk via Illumination Level: Facultative Central Place Foraging in the Cricetid Rodent Phyllotis darwini. Behavioral Ecology and Sociobiology 34(5):375-381.

White, C.M. and T.L. Thurow. 1985. Reproduction of ferruginous hawks exposed to controlled disturbance. Condor 87:14-22.

Wildlife Action Plan Team (WAPT). 2012. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno.

Wolfe, J.L. and C.T. Summerlin. 1989. The influence of lunar light on nocturnal activity of the old-field mouse. Animal Behavior 37(3):410-414.