BLM

Regional Mitigation Strategy for the Dry Lake Valley North Solar Energy Zone

Final Report

Produced by:
Bureau of Land Management
March 2016

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Regional Mitigation Strategy for the Dry Lake Valley North Solar Energy Zone

Final Report

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

March 2016

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NOTATION

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AIM	Assessment, Inventory, and Monitoring
BLM	Bureau of Land Management
CBR	Central Basin & Range
DLVN	Dry Lake Valley North
DOE	Department of Energy
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
LPI	Line Point Intercept
MQ	Management Question
NEPA	National Environmental Policy Act
OHV	Off Highway Vehicle
PEIS	Programmatic Environmental Impact Statement
PM	Particulate Matter
PV	Photovoltaic
RAC	Resource Advisory Council
REA	Rapid Ecoregional Assessment
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right of Way
SD	Standard Deviation
SEZ	Solar Energy Zone
SHPO	State Historic Preservation Office
SNWA	Southern Nevada Water Authority
SRMA	Special Recreation Management Area
SRMS	Solar Regional Mitigation Strategy
SSS	Special Status Species
USFWS	United States Fish & Wildlife Service
VRI	Visual Resource Inventory
VRM	Visual Resource Management

UNITS OF MEASURE

km^2	square kilometers(s)
m	meter(s)

UNIT CONVERSIONS

1 km^2	0.39 mi^2
1 m	3.28 ft

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ABSTRACT

The "Regional Mitigation Strategy for the Dry Lake Valley North Solar Energy Zone" presents a strategy for compensating for the residual or unavoidable impacts that are expected from the development of the Dry Lake Valley North Solar Energy Zone (SEZ) in southeastern Nevada. This strategy responds to a call for the development of solar regional compensatory mitigation strategies for each of the SEZs, as committed to in the Record of Decision for the Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States. The strategy consists of preliminary findings and recommendations for conducting each element of a process that identifies: (1) the residual impacts of utility-scale solar development in the Dry Lake Valley North SEZ that may warrant regional compensatory mitigation; (2) mitigation actions that can be implemented in the region to compensate for those impacts; (3) how a regional compensatory mitigation obligation or fee could be calculated; and (4) how the impacts and mitigation actions could be monitored. Although this strategy for the Dry Lake Valley North SEZ is not a Bureau of Land Management decision, it will inform future decisions, including project-specific decisions under the National Environmental Policy Act regarding configuration of lease parcels and issuance of leases for the Dry Lake Valley North SEZ; lease stipulations; impacts warranting compensatory mitigation in the region; where and how regional compensatory mitigation might occur; and how monitoring and adaptive management might occur.

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1 INTRODUCTION AND PURPOSE

1.1 Purpose of the Strategy

This report, *Regional Mitigation Strategy for the Dry Lake Valley North Solar Energy Zone: Final Report*, recommends compensation options for certain residual impacts expected from the development of the Dry Lake Valley North Solar Energy Zone (SEZ) in southeastern Nevada. As mandated by the Federal Land Policy and Management Act of 1976, the Bureau of Land Management (BLM) is required to manage the public lands for multiple uses while protecting the quality of ecological and other environmental and cultural values in a manner that does not result in the permanent impairment of the land's productivity. The BLM places a priority on avoiding and minimizing impacts; however, onsite, avoidance, and minimization actions[1] in particular may not be sufficient to avoid and minimize impacts. Utility-scale solar development often involves a long-term commitment of resources over a relatively large area. The BLM is considering requirements for compensatory mitigation for those residual impacts that warrant regional compensatory mitigation. Accordingly, this strategy provides:

1. The residual impacts expected as a result of development within the Dry Lake Valley North SEZ (Appendix A).

2. The regionally important trends in the Great Basin and Range ecoregion, where the Dry Lake Valley North SEZ is located (Section 2.1.3.2).

3. Conceptual models that depict the relationships among resources, ecosystem functions, ecosystem services, and change agents (including human development, climate change, wildfire, and invasive species) (Section 2.4.3.2.1; Appendix B).

4. The residual impacts that, in consideration of regional trends and the roles that the impacted resources play, may warrant regional compensatory mitigation (Section 2.4.3.2.2; Appendix C).

5. Regional goals and objectives for resources identified with residual impacts, including those recommended in the applicable land use plan(s) and mitigation desired outcomes (Section 2.5).

6. A recommended method for calculating a regional compensatory mitigation fee that could be assessed to developers choosing to contribute to a mitigation fund, and an explanation of how it was calculated for the Dry Lake Valley North SEZ. In addition, the strategy includes the estimated cost of regional compensatory mitigation action(s) that would compensate for residual impacts and help meet regional goals and objectives, including a breakout of acquisition, restoration, and/or ongoing management costs to ensure effectiveness, additionality, and durability (Section 2.6).

7. Preliminary information on management of mitigation obligation revenues derived from development of the Dry Lake Valley North SEZ (Section 2.7).

8. Recommended regional compensatory mitigation sites, action(s), and desired outcomes for the Dry Lake Valley North SEZ to contribute to achieving the regional goals and objectives (Section 2.8).

[1] Terms used throughout this document are defined in the Glossary (Section 4).

9. Discussion of how the mitigation outcomes should be monitored and what will happen if the actions are not achieving the desired results (Section 2.9).

The BLM authorized officer will make a determination of compensatory mitigation requirements prior to issuing the lease and notice to proceed and will also take the following into consideration:

- The National Environmental Policy Act (NEPA) analysis completed for the lease sale, project permitting, and mitigation alternatives, including comments submitted by the public and other stakeholders.

- Any changes to the applicable resource management plan (RMP) or other related plans that affect management of the SEZ or possible mitigation sites.

- The input received from Government-to-Government consultation with tribes.

- Any other information that would update, correct, or otherwise supplement the information contained in this strategy.

1.2 Background

In 2012, the BLM and the U.S. Department of Energy published the "Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States" (Final Solar PEIS; BLM and DOE 2012). The Final Solar PEIS assessed the impact of utility-scale solar energy development on public lands in the six southwestern states of Arizona, California, Colorado, Nevada, New Mexico, and Utah. The "Approved Resource Management Plan Amendments/Record of Decision (ROD) for Solar Energy Development in Six Southwestern States" (Solar PEIS ROD) implemented a comprehensive solar energy program for public lands in those states and incorporated land use allocations and programmatic and SEZ-specific design features into land use plans in the six-state study area (BLM 2012). The Solar PEIS ROD identified 17 priority areas for utility-scale solar energy development, including the Dry Lake Valley North SEZ. The Final Solar PEIS presents a detailed analysis of the expected impacts of solar development on each SEZ.

Comments on both the Draft Solar PEIS and the Supplement to the Draft Solar PEIS encouraged the BLM to incorporate a robust mitigation framework into the proposed solar energy program to address any residual impacts expected to result from solar development in the SEZs, despite avoidance of most impacts and the implementation of design features to minimize impacts. In the Supplement to the Draft Solar PEIS, the BLM presented, as part of its incentives for SEZs, the concept of regional mitigation planning.[2] A draft framework for regional mitigation planning was posted on the project web page between publication of the Supplement to the Draft Solar PEIS and the Final Solar PEIS to foster stakeholder engagement. A revised framework for regional mitigation planning was then included in the Final Solar PEIS and the Solar PEIS ROD. The BLM is continuing to refine a process for developing solar regional mitigation strategies for SEZs, and has released a draft procedural guidance document on the topic (BLM 2014a).

[2] In the Final Solar Energy PEIS (BLM and DOE 2012), Appendix A, Section A.2.5, the BLM refers to solar regional mitigation plans (SRMPs). To be consistent with guidance issued in BLM Instruction Memorandum 2013-142 (BLM 2013), the BLM adopts the terminology of solar regional mitigation strategies (SRMSs).

Federal regulations require consideration of a mitigation hierarchy consisting of avoidance, minimization, rectification, reduction or elimination of impacts over time, and/or compensation (i.e., the mitigation hierarchy[3]) (40 CFR [Code of Federal Regulations] 1508.20). Implementation of the mitigation hierarchy begins with the location and configuration of the SEZs, so as to avoid as many conflicts as possible. Avoidance is also used within the boundaries of SEZs by designating non-development areas. Minimization involves the implementation of design features (which in the case of the Solar PEIS are required mitigation measures) and management practices meant to reduce the impacts onsite. As a part of the analysis, the Final Solar PEIS included a robust suite of design features in the BLM's solar energy program that will be employed to minimize some of the expected impacts of development onsite. The Final Solar PEIS analyzed, and the Solar PEIS ROD adopted, both programmatic and SEZ-specific design features. These design features will be included as part of the Plans of Development required for projects within SEZs prior to BLM issuance of leases, or as stipulations in the leases. This solar regional mitigation strategy (SRMS) addresses only the last aspect of the mitigation hierarchy, compensatory mitigation. Compensatory mitigation is evaluated by the BLM based on the need to address residual impacts to resources (i.e., those impacts that cannot be avoided or minimized; also referred to as "unavoidable impacts").

Figure 1-1 illustrates how mitigation measures identified in the Solar PEIS ROD, including design features, are carried forward and are included, to the extent they apply, in project-specific NEPA measures conducted following submission of an application by a developer. It is important to note that avoidance of resource impacts was included in designating the SEZs. Table 1-1 illustrates the context of the per-acre mitigation fee recommended in this SRMS document in comparison to other fees and costs to be borne by the project developer through time. The fees and costs include rental and nameplate capacity fees, costs for implementing design features to accomplish onsite mitigation, compensatory mitigation fees, and bonding costs for reclamation of the project site following decommissioning.

This SRMS consists of recommendations to mitigate some of the residual impacts that will remain after avoidance and minimization measures are taken. A major focus of this regional compensatory mitigation strategy is to provide a recommended fee to be paid by the developer that will offset those residual impacts and to offer a suite of mitigation actions and locations, depending on project-specific details, to meet mitigation goals and objectives for effectiveness, feasibility, durability, and additionality. This strategy differs from project-level compensatory mitigation development that has been conducted historically by the BLM because this regional strategy is developed in advance of project-specific analyses, considers resources' conditions and trends in the context of the larger landscape, and identifies the desired outcomes for compensatory mitigation actions, including the outline for a comprehensive protocol for monitoring those actions. This SRMS is consistent with BLM's interim policy on regional mitigation, Draft Manual Section 1794, issued on June 13, 2013.

[3] Throughout this document, the terminology of avoidance and minimization may be used to refer as well to other parts of the mitigation hierarchy, specifically rectification and reduction or elimination of impacts over time.

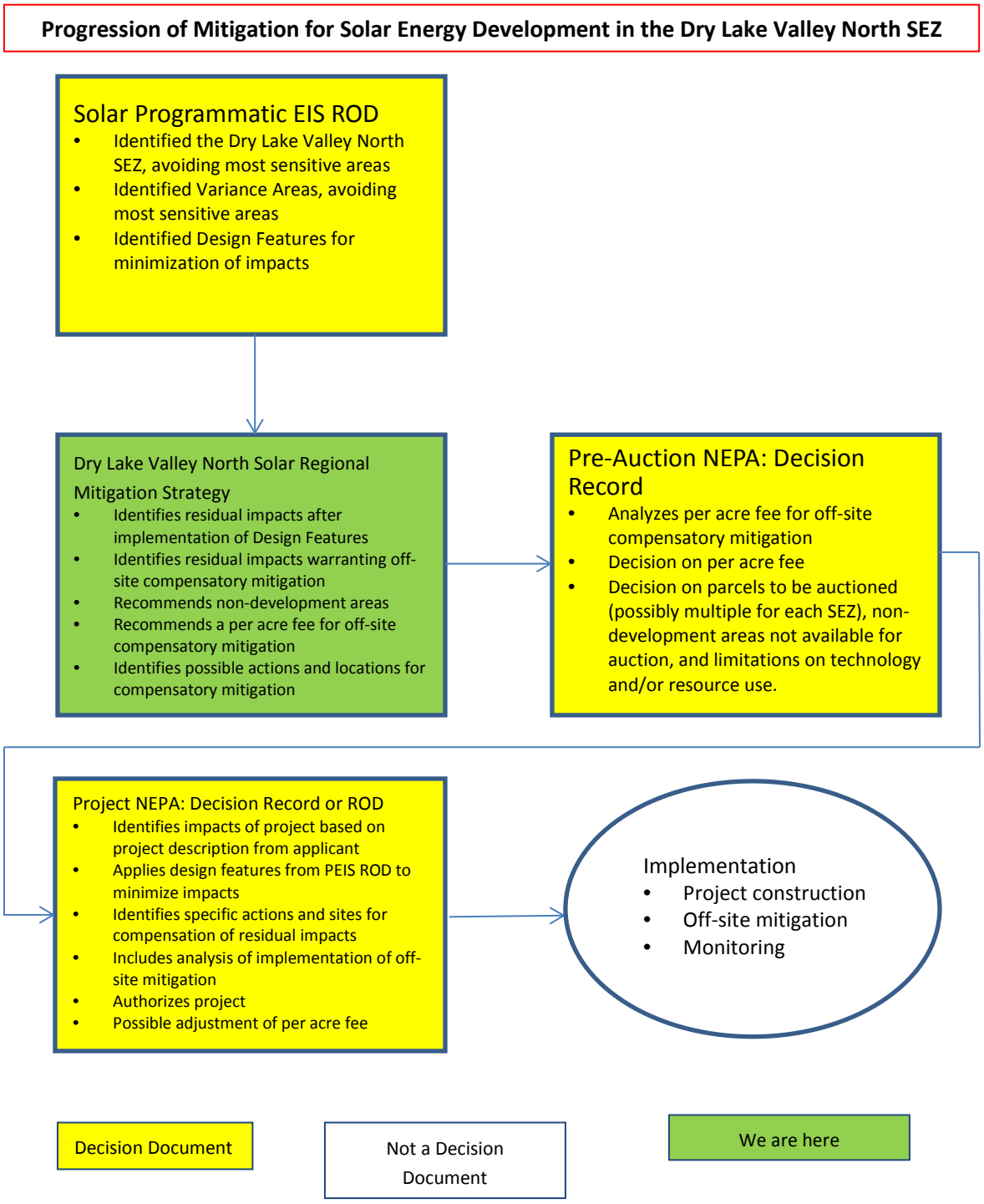

Figure 1-1. Mitigation Flow Diagram for Solar Energy Development

Table 1-1. Fees and Costs Associated with Renewable Energy Development (green highlighted element addressed in this Solar Regional Mitigation Strategy)

Fee/Cost Borne By Developer	When Paid	Disposition
Accepted Bid at Auction	At issuance of lease	U.S. Treasury (BLM recovers reasonable costs)
Rent (per acre)	At issuance of lease	U.S. Treasury
Nameplate Capacity Fee (per megawatt)		
Per-acre Mitigation Fee (recommended in this SRMS)	At issuance of notice to proceed	Held by BLM in a specific account or with a third party (e.g., National Fish and Wildlife Federation)
Cost of implementation of design features and other project-specific mitigation	During project construction and operation	Spent by developer on project implementation activities
Bond for post-closure reclamation of project site	At issuance of lease	Held by BLM, returned if not needed by BLM
Reclamation of project site after decommissioning	Cost borne by leaseholder, or BLM uses reclamation bond	Spent by developer (or BLM) on reclamation activities

1.3 Solar Regional Compensatory Mitigation Strategy Process

In August 2012, the BLM initiated a regional mitigation strategy for solar energy development with the Dry Lake SEZ, which constituted the first SRMS developed for an SEZ. The Dry Lake SEZ SRMS originated simultaneously with, and served as a pilot test case for, the establishment of BLM's interim policy on regional mitigation (Draft Manual Section 1794). The Dry Lake SEZ SRMS was completed in 2014 (BLM 2014a) and, together with the BLM's interim policy on regional mitigation, serves as a guide for preparing the Dry Lake Valley North SEZ SRMS.

The Dry Lake Valley North SEZ is located in Lincoln County in southeastern Nevada. The population centers closest to the SEZ are Pioche, located about 15 mi (24 km) to the east, and Caliente, approximately 15 mi (24 km) to the southeast. The process for developing the Dry Lake Valley North SEZ SRMS largely followed the outline for regional mitigation planning presented in the Final Solar PEIS and the BLM Solar Regional Mitigation Strategy for the Dry Lake Solar Energy Zone (BLM 2014a). In general, a team of specialists from the BLM Caliente Field Office, with the support of Argonne National Laboratory (Argonne), produced a preliminary product at each step in the process. The opportunity for written comments was extended to the public. The content and methods used in this process incorporate many of the ideas and comments received from the public.

The mitigation actions identified in this strategy are designed to compensate for the loss of some of the habitat, cultural resources, visual resources, and ecological services that are expected from the development of the Dry Lake Valley North SEZ. For the purpose of this analysis, it is assumed that all of the developable land within the Dry Lake Valley North SEZ will be affected. Recommendations on the degree of compensation consider the condition of the resource values present in the Dry Lake Valley North SEZ and also the relevant management objectives in the RMP and the relative costs and benefits of the use of public lands for solar energy development, including the amount of time and effort required to restore the disturbed area(s) upon expiration of the leases. The recommended compensatory mitigation actions are drawn from the *Ely District Record of Decision and Approved Resource Management Plan* (Ely RMP) (BLM 2008) and the *Dry Lake Valley Watershed Evaluation Report* (BLM 2014b). These documents discuss resource management goals and objectives and identify restoration and preservation needs within the watershed that encompasses the Dry Lake Valley North SEZ. See Sections 2.5.2 and 2.5.3 for more information on land management goals as identified in the Ely RMP and Dry Lake Valley Watershed Evaluation Report, respectively.

Under the terms of this strategy, the amount of the recommended mitigation fee for the Dry Lake Valley North SEZ is based on the impacts of solar development in the SEZ. The fee for the Dry Lake Valley North SEZ will allow potential reclamation, restoration, and enhancement projects, which are identified in the Dry Lake Watershed. The funding will allow significant progress toward achieving regional management outcomes. As part of the solar energy program, the solar long-term monitoring program will be used to evaluate the effectiveness of the regional compensatory mitigation strategies for the SEZ (consistent with the Assessment, Inventory, and Monitoring [AIM] Strategy [Toevs et al. 2011]). This regional compensatory mitigation strategy will be subject to continued review and adjustment to help ensure that the mitigation-related desired outcomes are being met.

The timeline of this SRMS process, relative to a solar development project implementation schedule, is provided in Figure 1-2. The compensatory mitigation obligation (fee) will be analyzed and established, along with the environmental impacts of leasing parcels within the SEZ for future solar energy development during a pre-auction NEPA analysis. The compensatory mitigation obligation, site(s), and action(s) strategically recommended in this document will be considered in the project-

specific NEPA evaluations required for planned solar energy developments within the Dry Lake Valley North SEZ (see Figure 1-2). At the conclusion of the project-specific NEPA evaluation, the BLM authorized officer will identify the appropriate compensatory mitigation obligation, site(s), and action(s) as part of the BLM's project decision. The compensatory mitigation obligation, site(s), and action(s) selected by the authorized officer may differ from the recommendations made in this SRMS document and may be based on several factors, including but not limited to (1) new information regarding the presence/absence of environmental resources that may change the potential for impact; (2) implementation of additional design features, avoidance areas, or other technologies not evaluated in the BLM Solar PEIS that would minimize impacts; (3) new information about additional mitigation sites or actions; and/or (4) updated assessments of mitigation costs and an adjustment of the base fee for inflation to current-year dollars.

1.4 Stakeholder Involvement in the Solar Regional Compensatory Mitigation Strategy Process

Representatives from federal, state, and local government agencies; nongovernmental organizations concerned with issues such as environmental or recreational impacts; representatives from the solar development industry and utilities; tribal representatives; and individual members of the public who had been involved in the Solar PEIS process were invited to provide input on the project documents. A field visit to the Dry Lake Valley North SEZ, which stakeholders were invited to attend, was conducted in November 2013. A public workshop was also held in March 2014 to present the SRMS process to stakeholders and to obtain stakeholder input. Documents related to the SRMS are posted on the project documents web page on the Dry Lake Valley North SEZ SRMS Project website at: http://www.blm.gov/nv/st/en/fo/ely_field_office/blm_programs/energy/dry_lake_valley_north.html.

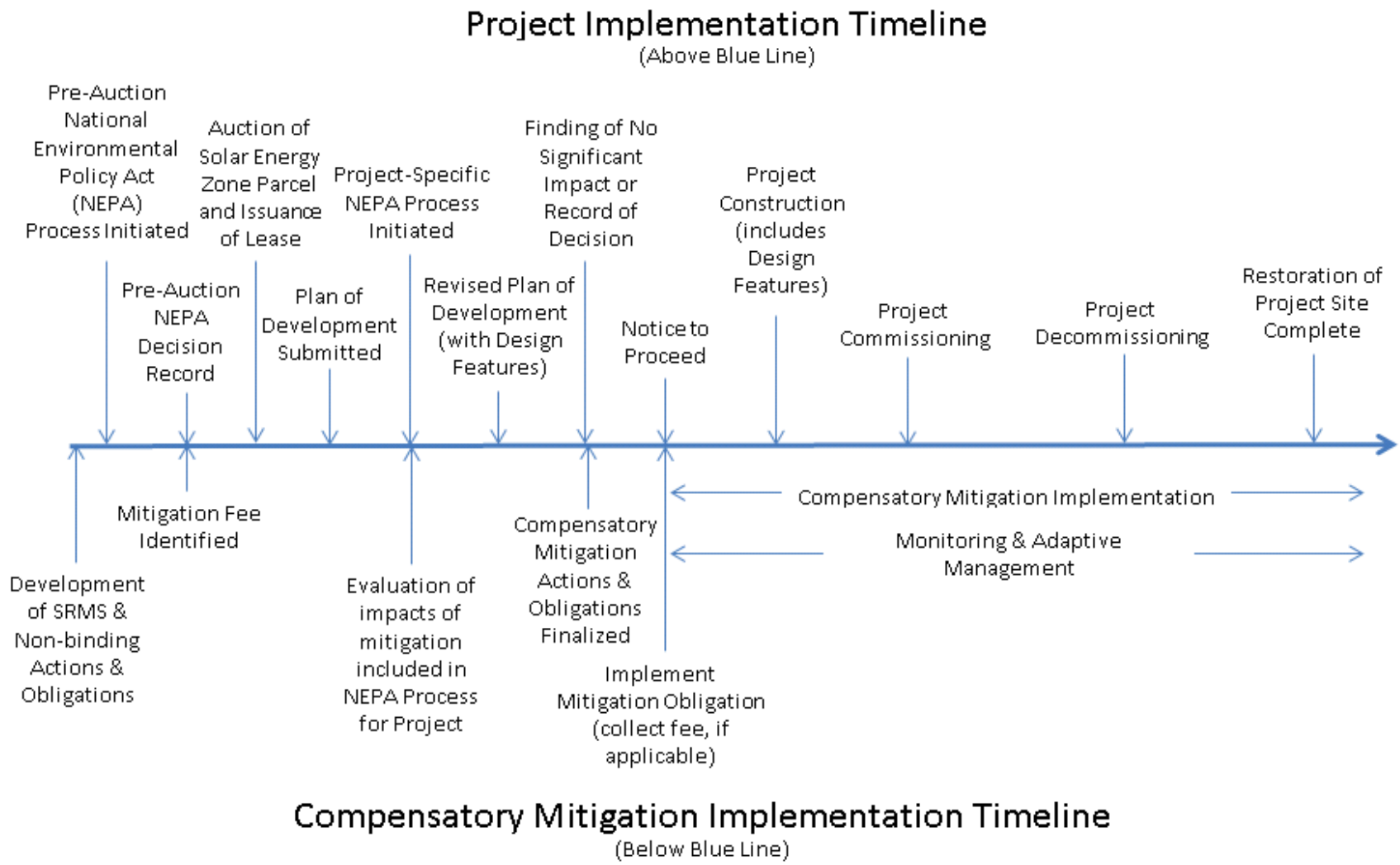

Figure 1-2. Timeline of Solar Regional Mitigation Processes Relative to the Solar Energy Development Schedule

2 COMPENSATORY MITIGATION STRATEGY – DRY LAKE VALLEY NORTH SOLAR ENERGY ZONE

2.1 Description of the Dry Lake Valley North Solar Energy Zone and Surrounding Region

2.1.1 General Description of the Solar Energy Zone

The Dry Lake Valley North SEZ is located in Lincoln County, Nevada. The total area of the Dry Lake Valley North SEZ, as shown in Figure 2-1, is 28,726 acres (116 km^2) (BLM and DOE 2012). In the Final Solar PEIS and the Solar PEIS ROD, 3,657 acres (14.8 km^2) of floodplain and wetland within the SEZ boundaries were identified as non-development areas. The developable area of the SEZ given in the Final Solar PEIS was 25,069 acres (101 km^2). There are no pending solar applications within or near to the SEZ.

The population centers closest to the Dry Lake Valley North SEZ are Pioche, located about 15 mi (24 km) to the east, and Caliente, located about 15 mi (24 km) to the southeast; both communities have populations of about 1,000. The smaller communities of Caselton and Prince are located about 13 mi (21 km) to the east of the SEZ. The major roads nearest to the SEZ are State Route 318, which is about 7 mi (11 km) to the west of the SEZ, and U.S. 93, about 8 mi (13 km) to the south. Access to the interior of the SEZ is by dirt roads. The nearest railroad access is approximately 25 mi (40 km) from the SEZ.

The SEZ contains two transmission corridors running north to south along its eastern boundary. Both of these corridors were designated in the Ely RMP in 2008 (BLM 2008). The locally designated western corridor is 2,640 ft (804 m) wide and was designated at the direction of Congress in the Lincoln County Conservation, Recreation, and Development Act (LCCRDA) of 2004 to accommodate a water pipeline, transmission line, and related facilities proposed by the Southern Nevada Water Authority (SNWA). The eastern corridor is part of the Southwest Intertie Project and was designated as a Section 368 Corridor in 2009. This corridor now contains the 500 kV OnLine electrical transmission line (see Figure 2-1 for the designated corridors). An unpaved and unnamed roadway follows these transmission corridors along the eastern side of the SEZ.

The SEZ also contains a portion of the Silver State Off-Highway Vehicle (OHV) Trail. Livestock grazing is also currently permitted on the SEZ in the Ely Springs Cattle allotment in the northeastern portion of the SEZ. About 65% of the allotment area is located within the SEZ, and loss of this area for grazing is projected to result in the loss of about 2,761 animal unit months of grazing (BLM and DOE 2012). The SEZ is also located within a U.S. Department of Defense operating area.

2.1.2 Landscape Condition of the Solar Energy Zone and the Region

In 2013, the BLM completed the "Central Basin and Range Rapid Ecoregional Assessment (REA)" for the Central Basin and Range ecoregion in which the Dry Lake Valley North SEZ is located (Comer et al. 2013). The Central Basin and Range REA examines broad-scale ecological values, conditions, and trends within the ecoregion by synthesizing existing spatial datasets in a meaningful timeframe. The REAs serve multiple purposes in an ecoregional context, including identifying and answering important management questions; understanding key resource values; understanding the influence of various change agents; understanding projected ecological trends; identifying and mapping key opportunities

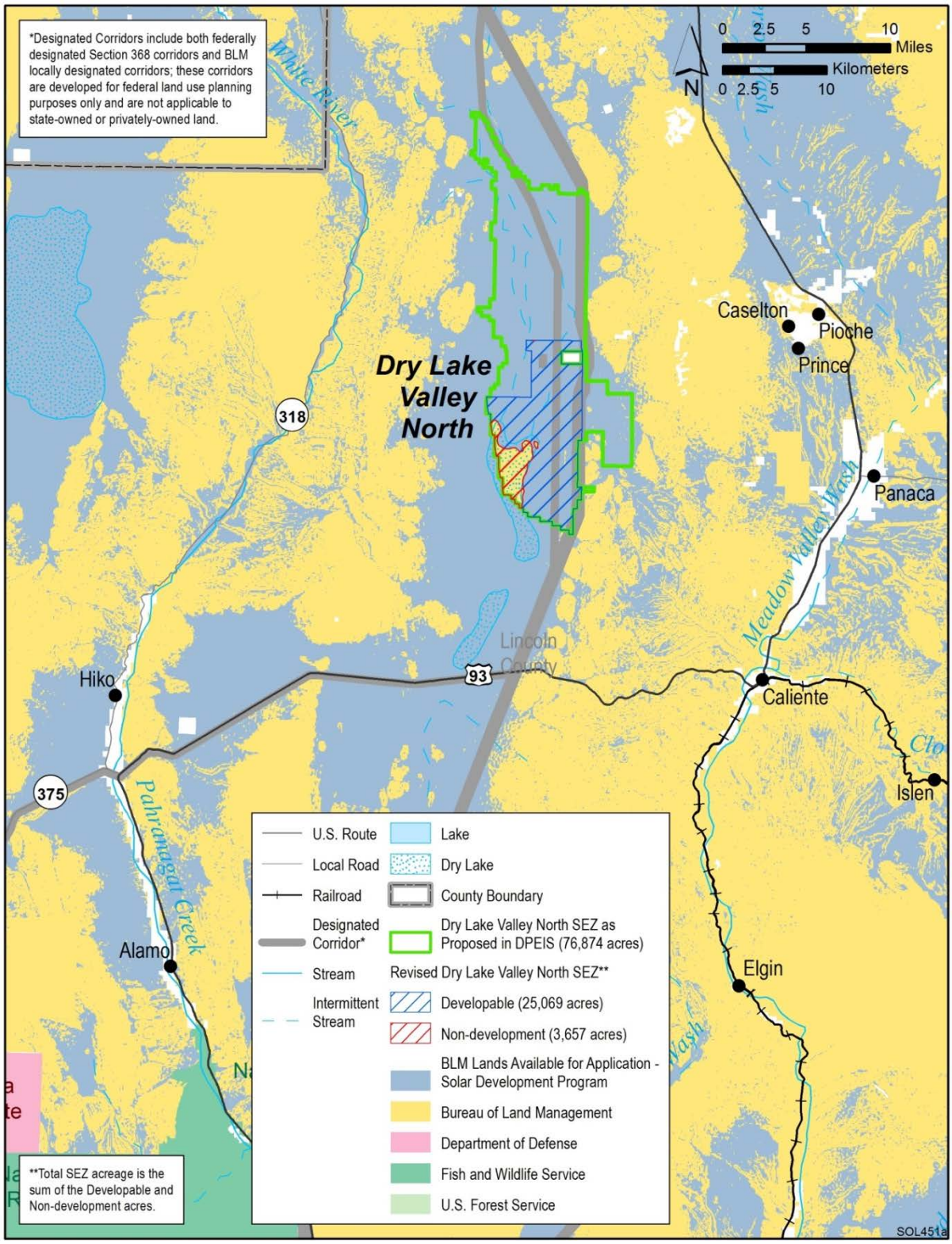

Figure 2-1. Dry Lake Valley North Solar Energy Zone and Surrounding Area as Identified in the Solar PEIS (Source: BLM and DOE 2012)

for resource conservation, restoration, and development; and providing a baseline to evaluate and guide future actions.

One useful product of the REAs is the development of landscape condition models.[4] These geospatial models have been created to represent the condition or level of intactness throughout the ecoregion at the time in which the assessments were initiated (approximately 2010). The landscape condition model is a combination of two primary factors—human land use and a distance-decay function from land uses. Different land use categories were assigned a relative value between 0 and 1, representing very high landscape alteration to very little landscape alteration. For example, high-density urban areas received values closer to 0, whereas undisturbed areas received values closer to 1. The distance decay function considered the proximity of each site to human land uses. Table 2-1 lists a number of examples of land use and distance decay scores for various stressor categories in the Central Basin and Range. A full description of the landscape condition model and how it was developed can be found in the Central Basin and Range Rapid Ecoregional Assessment Final Report (Comer et al. 2013).

The landscape condition model developed for the Central Basin and Range was developed as a raster dataset of 100 × 100-m cells. The model illustrates landscape condition values throughout the ecoregion (Figure 2-2). The resulting map provides a composite view of the relative impacts of land uses across the entire ecoregion. Darker green areas indicate apparently least-impacted areas (most intact), and orange-red areas are the most impacted (least intact). According to this landscape condition model, most of the impacts occur near urban areas and along roadways. However, most of the Central Basin and Range is still relatively intact. The landscape condition within the Dry Lake Valley North SEZ is shown in Figure 2-3.

2.1.3 Regional Setting

2.1.3.1 General Description

Land ownership in the vicinity of the Dry Lake Valley South SEZ is primarily federal ownership managed by the Bureau of Land Management. There are very few other public or private landowners or managers within 20 miles (32 km) of the SEZ. The Desert National Wildlife Refuge, operated by the U.S. Fish and Wildlife Service, is the closest other federally owned area and is located approximately 20 miles southwest of the SEZ. The Nevada Test Site, owned and operated by the U.S. Department of Energy, is located approximately 40 mi (64 km) southwest of the SEZ.

The Dry Lake Valley North SEZ is located in a relatively undeveloped rural area, bounded on the west by the North Pahroc Range and on the east by the Highland Range. The habitat of the land within the SEZ is arid basin dominated by Inter-Mountain Basins Mixed Salt Desert Scrub vegetation communities. Land cover types[5] in the vicinity of the SEZ are presented in Figure 2-4. In total, there are 24 land cover types predicted to occur in the vicinity (i.e., within 5 mi [8 km]) of the Dry Lake Valley North SEZ (Table 2-2). There are nine land cover types that occur in the developable portion of the SEZ

[4] Due to differences in modeling approaches, some REAs have referred to these models as landscape intactness models.

[5] Geospatial data for land cover types were obtained from the Southwest Regional Gap Analysis Project (http://earth.gis.usu.edu/swgap/).

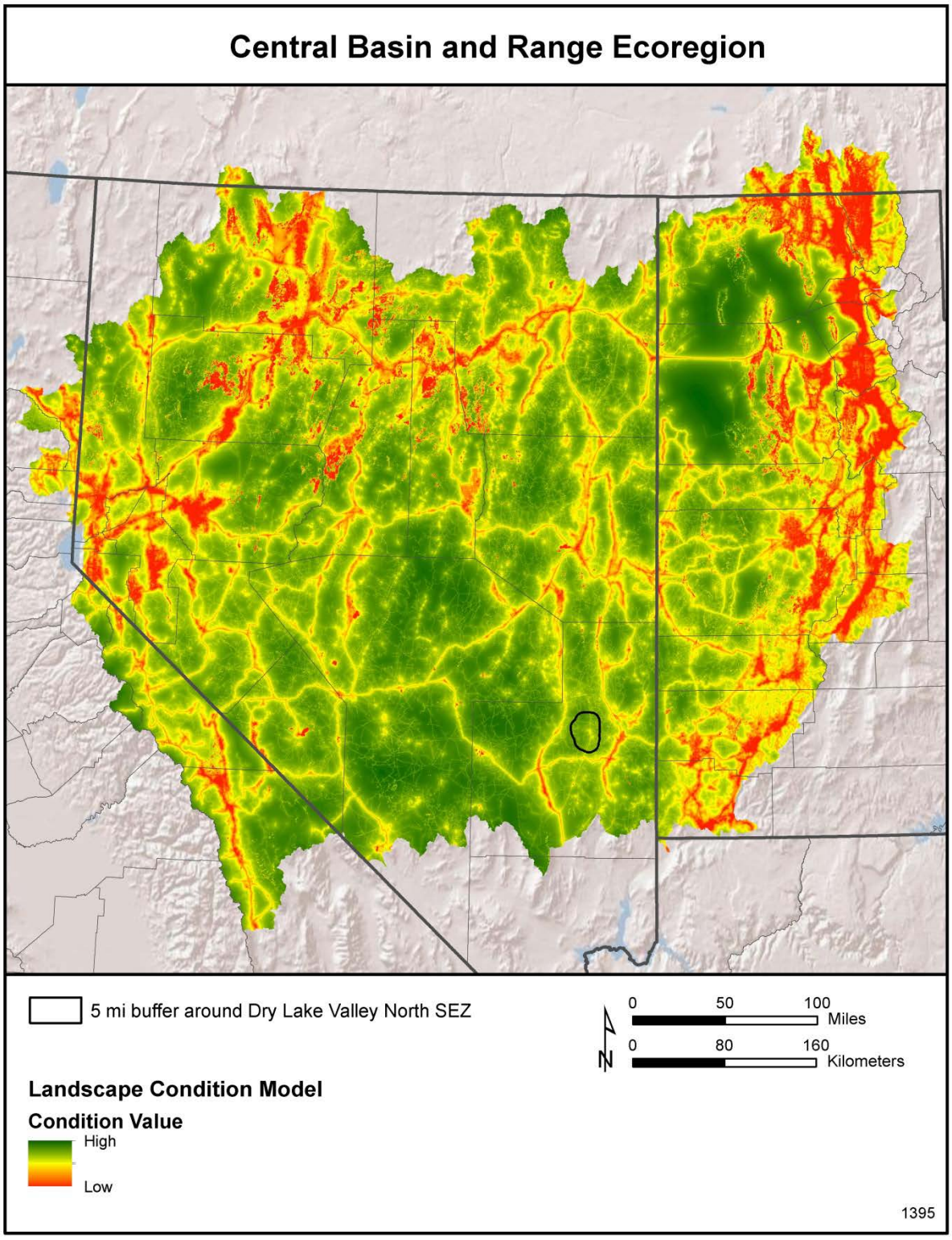

Figure 2-2. Landscape Condition Model of the Central Basin and Range Ecoregion. Darker green areas indicate least-impacted areas (most intact), whereas orange-red areas are the most impacted (least intact). Also shown is the 5-mile buffer around the Dry Lake Valley North Solar Energy Zone.

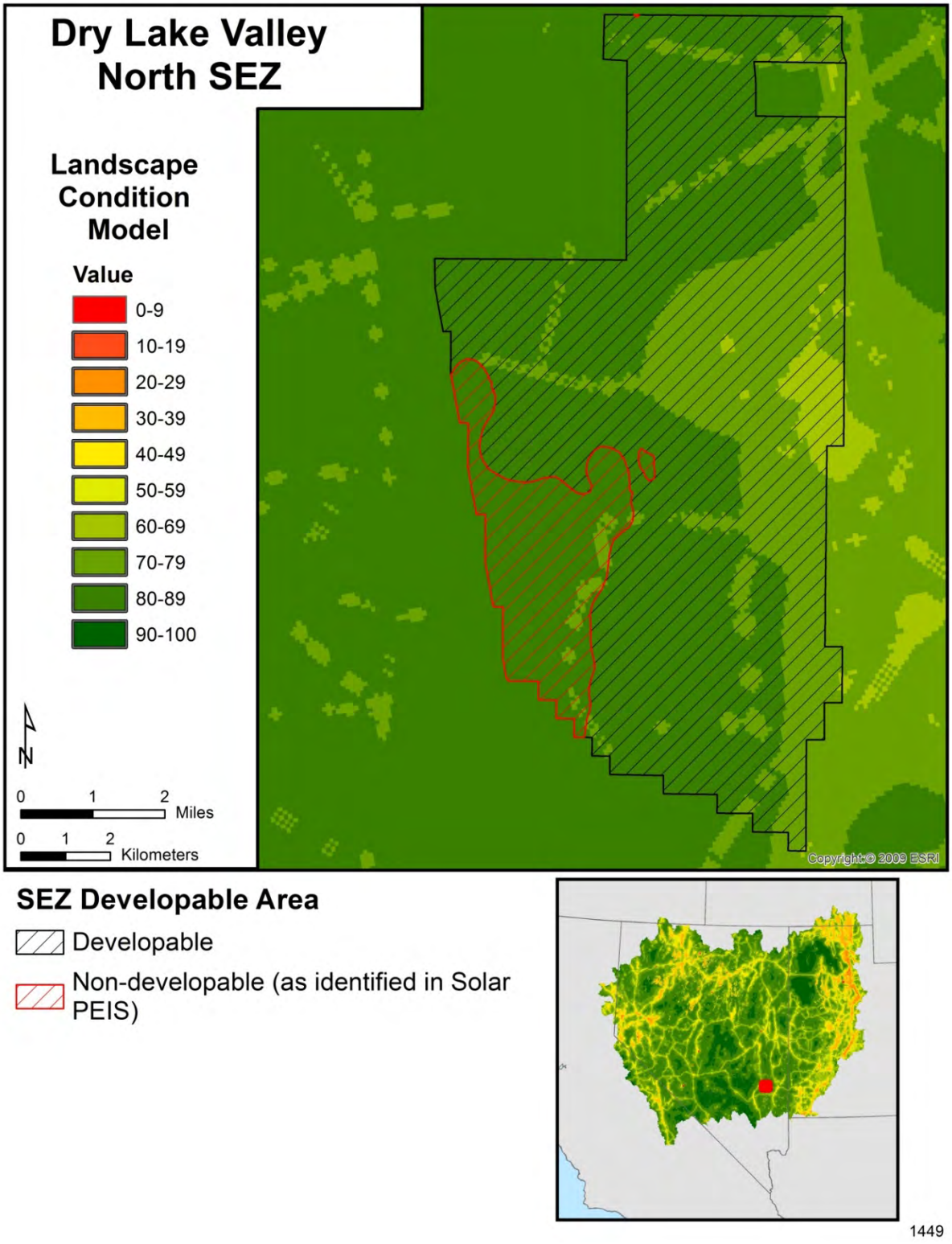

Figure 2-3. Landscape Condition Model of the Dry Lake Valley North Solar Energy Zone within the Central Basin and Range Ecoregion (inset)

Table 2-1. Ecological Stressor Source, Site-impact Scores, and Distance Decay Scores Implemented for the Landscape Condition Model for the Central Basin and Range

Ecological Stressor Source	Site Impact Score	Presumed Relative Stress	Distance Decay Score	Impact Approaches Negligible (m)
Transportation				
Direct roads, 4-wheel drive	0.7	Low	0.5	200
Local, neighborhood, and connecting roads	0.5	Medium	0.5	200
Secondary and connecting roads	0.2	High	0.2	500
Primary highways with limited access	0.05	Very High	0.1	1,000
Primary highways without limited access	0.05	Very High	0.05	2,000
Urban and Industrial Development				
Low-density development	0.6	Medium	0.5	200
Medium-density development	0.5	Medium	0.5	200
Powerline/transmission lines	0.5	Medium	0.9	100
Oil/gas wells	0.5	Medium	0.2	500
High-density development	0.05	Very High	0.05	2,000
Mines	0.05	Very High	0.2	500
Managed and Modified Land Cover Types				
Ruderal forest and Upland	0.9	Very Low	1	0
Native veg. with introduced species	0.9	Very Low	1	0
Pasture	0.9	Very Low	0.9	100
Recently logged	0.9	Very Low	0.5	200
Managed tree plantations	0.8	Low	0.5	200
Introduced tree and shrub	0.5	Medium	0.5	200
Introduced upland grass and forb	0.5	Medium	0.5	200
Introduced wetland	0.3	High	0.8	125
Cultivated agriculture	0.3	High	0.5	200

(Table 2-2). The three most dominant land cover types in the developable portion of the SEZ are: Inter-Mountain Basins Mixed Salt Desert Scrub (88.8% of the developable area), Inter-Mountain Basins Semi-Desert Shrub Steppe (5.8% of the developable area), and Inter-Mountain Basins Semi-Desert Grassland (1.8% of the developable area).

2.1.3.2 Regional Conditions and Trends

The BLM REAs present a framework for determining the condition and trend of various resource values and conservation elements in the ecoregion. The Central Basin and Range REA defines conservation elements as resources of conservation concern within an ecoregion. These elements could include habitat or populations for plant and animal taxa, such as threatened and endangered species, or ecological systems and plant communities of regional importance. A list of conservation elements could also include other resource values, such as highly erodible soils; populations of wild horses and burros;

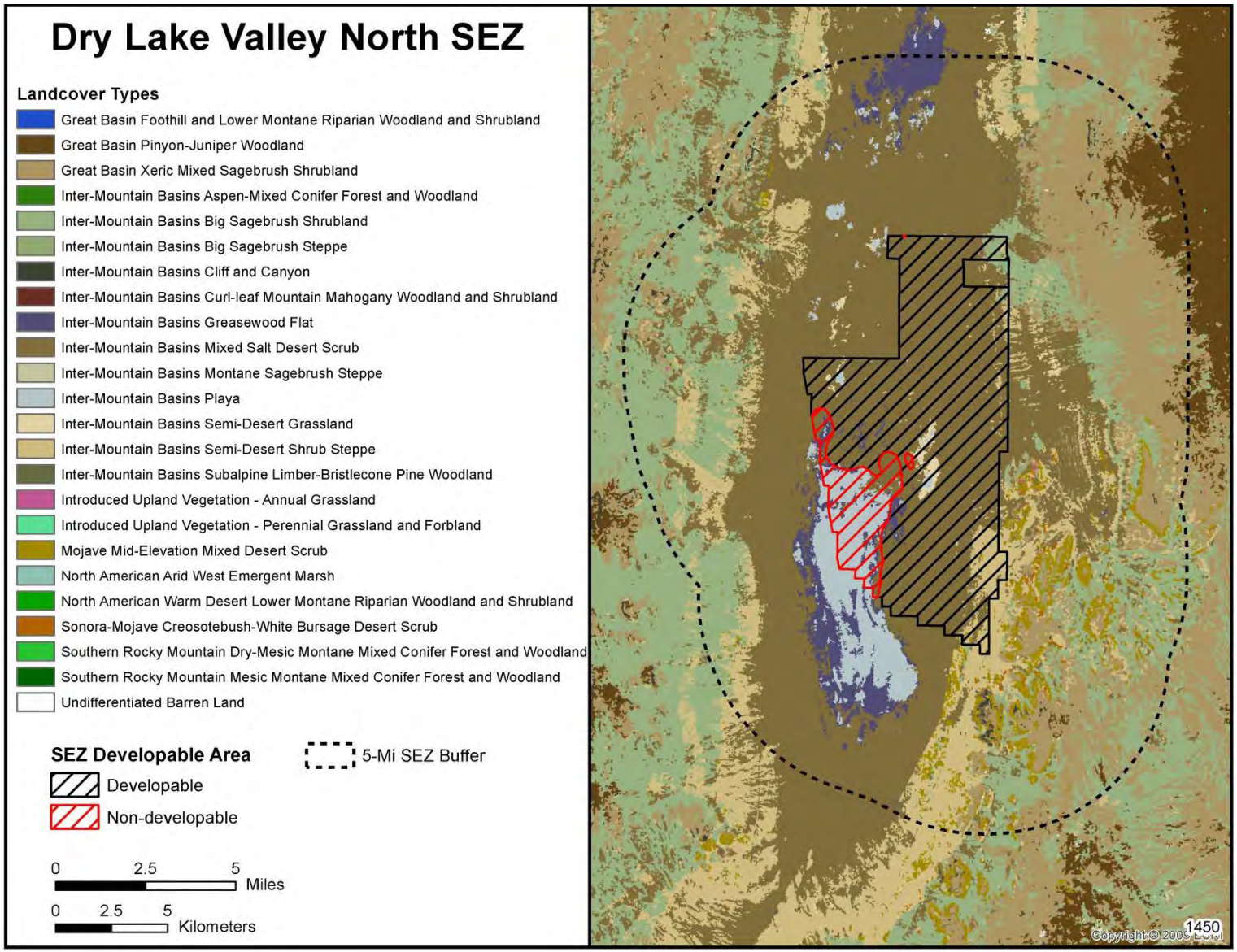

Figure 2-4. Land Cover Types in the Vicinity of the Dry Lake Valley North Solar Energy Zone

Table 2-2. Land Cover Types and Amounts in the Vicinity of the Dry Lake Valley North Solar Energy Zone

Land Cover Types	Acres in SEZ Developable Area	Percentage of SEZ Developable Area (%)	Acres in SEZ Affected Area (5-mi Buffer)[1]	Percent-age of SEZ Affected Area (%)
Land Cover Types in the SEZ Developable Area				
Inter-Mountain Basins Mixed Salt Desert Scrub	22,256.7	88.78	121,128.2	36.22
Inter-Mountain Basins Semi-Desert Shrub Steppe	1,452.1	5.79	25,625.5	7.66
Inter-Mountain Basins Semi-Desert Grassland	440.8	1.76	1,140.6	0.34
Inter-Mountain Basins Greasewood Flat	440.8	1.76	6,668.5	1.99
Inter-Mountain Basins Big Sagebrush Shrubland	277.8	1.11	88,101.4	26.34
Inter-Mountain Basins Playa	165.2	0.66	6,915.1	2.07
Mojave Mid-Elevation Mixed Desert Scrub	23.6	0.09	4,623.1	1.38
Invasive Annual Grassland	9.1	0.04	132.5	0.04
Great Basin Xeric Mixed Sagebrush Shrubland	2.9	0.01	59,535.1	17.80
Land Cover Types Outside the SEZ Developable Area				
Great Basin Pinyon-Juniper Woodland			19,136.5	5.72
Inter-Mountain Basins Cliff and Canyon			385.4	0.12
Sonora-Mojave Creosotebush-White Bursage Desert Scrub			282.6	0.08
Inter-Mountain Basins Big Sagebrush Steppe			232.6	0.07
Introduced Upland Vegetation - Perennial Grassland and Forbland			155.0	0.05
Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland and Shrubland			113.9	0.03
Inter-Mountain Basins Montane Sagebrush Steppe			108.1	0.03
Inter-Mountain Basins Subalpine Limber-Bristlecone Pine Woodland			78.7	0.02
Undifferentiated Barren Land			37.6	0.01
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland			13.3	0.004
Southern Rocky Mountain Mesic Montane Mixed Conifer Forest and Woodland			7.1	0.002
North American Arid West Emergent Marsh			3.6	0.001
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland			1.6	0.000
Southern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest and Woodland			1.6	0.000
North American Warm Desert Lower Montane Riparian Woodland and Shrubland			1.1	0.000
TOTAL (acres)	25,069		334,429	

[1] In the Solar PEIS (BLM and DOE 2012), the affected area included the SEZ and the 5-mile buffer surrounding the SEZ. This buffer was conservatively defined to represent the area in which indirect effects may occur.

scenic viewsheds; or designated sites of natural, historical, or cultural significance. There are two basic types of conservation elements in the Central Basin and Range:

- Coarse-filter conservation elements, which typically include all of the major ecosystem types within the assessment landscape and represent all of the predominant natural ecosystem functions and services in the ecoregion; and

- Fine filter conservation elements, which complement the first set of elements by including a limited subset of focal species assemblages and individual species.

A full list and explanation of the coarse-filter conservation elements within the Central Basin and Range can be found in Appendix B of the Central Basin and Range REA (Comer et al. 2013). In brief, the core conservation elements include 26 coarse-filter conservation elements that represent terrestrial and aquatic ecological system types and communities and nearly 400 fine-filter conservation elements that represent individual species, species assemblages, and ecologically important physical features (such as soils of conservation concern).

Problematic trends are understood by forecasting the interaction of conservation elements with the change agents in the ecoregion. The four change agents include fire, invasive species, climate change, and human development. Of these change agents, the conservation elements' vulnerability to human development and climate change is used in this assessment to evaluate resource conditions and trends.[6]

Understanding the problematic conservation element trends relevant to the Dry Lake Valley North SEZ was accomplished through (1) a geospatial analysis of available ecoregional data, and (2) expert opinion by the BLM interdisciplinary team. Figure 2-5 presents a conceptual illustration of the geospatial framework for determining the condition and trends of conservation elements in the ecoregion. The geospatial data used in this assessment are publicly available. These data include the BLM's landscape condition model for the Central Basin and Range, modeled land cover types, and species-specific habitat suitability models. Evaluating condition and trends of coarse- and fine-filter conservation elements (land cover and habitat models) in an ecoregional context provides a better understanding of the impacts of solar energy development within the Dry Lake Valley North SEZ relative to the rest of the ecoregion.

The geospatial process for quantitatively evaluating condition and trends for conservation elements begins with a characterization of the distribution of the conservation element within identified analysis areas: (1) the entire Central Basin and Range ecoregion, (2) vicinity of the Dry Lake Valley North SEZ, and (3) within the Dry Lake Valley North SEZ developable area. These areas are then clipped to current (e.g., 2015) and anticipated future (e.g., 2025) human development footprints[7] and forecast trends. Trends are understood by using the current and future human development footprints to evaluate the expected future distribution of the conservation element relative to its current distribution. In addition, REA models regarding the potential future suitable bioclimate for broad-scale ecological systems were used to understand Conservation Element trends pertaining to climate change.

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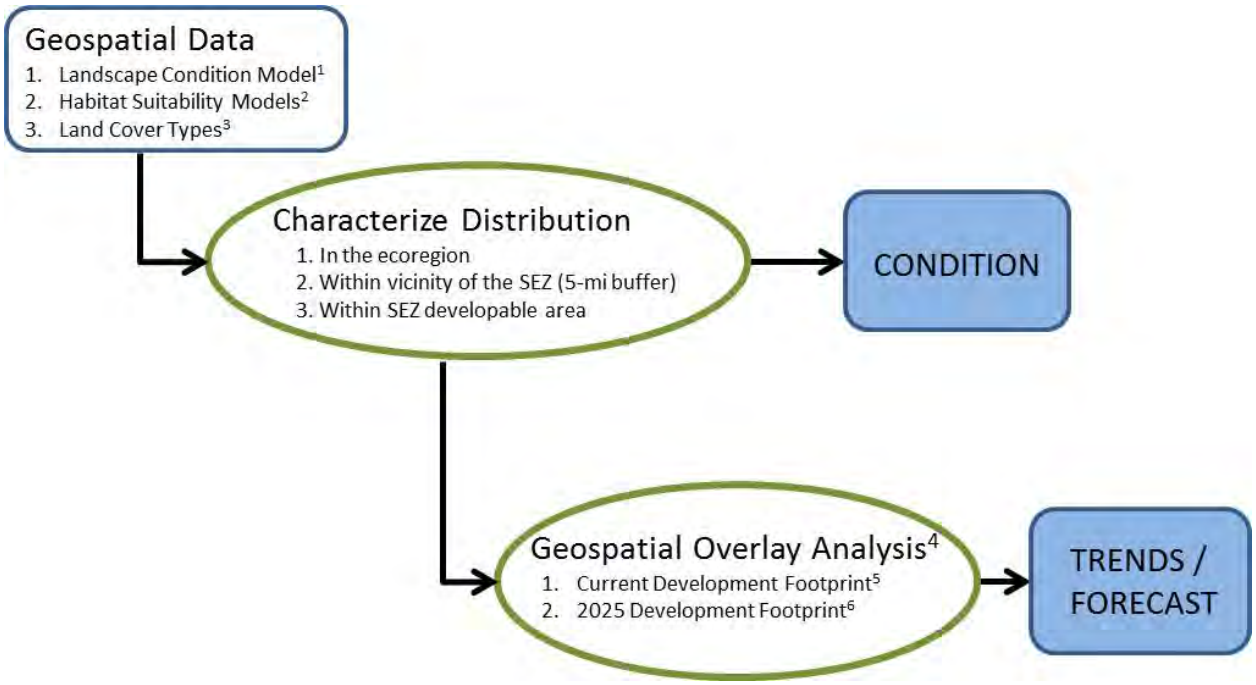
[6] Conditions and trends of Conservation Elements evaluated in this SRMS considered the human development (including agriculture and grazing) and climate change REA change agents. These two change agents are fundamental drivers of landscape change as they influence, at least in part, other change agents (e.g., invasive species, wildfire).

[7] Geospatial data for current and future human development footprints are described in more detail in the CBR REA (Comer et al. 2013).



1 The landscape condition model is available from and described in the BLM Central Basin and Range Rapid Ecoregional Assessment.

2 Habitat suitability models are available from the Southwest Regional Gap Analysis Project.

3 Land cover types are available from the Southwest Regional Gap Analysis Project.

4 The overlay change agent/conservation element analysis was conducted to determine geospatial trends. Geospatial data for the change agent were overlayed with the distribution of conservation elements to determine current and future distributions of the conservation elements.

5 Geospatial data for the current human development footprint model are available from and described in the BLM Central Basin and Range Rapid Ecoregional Assessment.

6 Geospatial data for the future (approximately 2025) human development footprint model are available from and described in the BLM Central Basin and Range Rapid Ecoregional Assessment.

Figure 2-5. Conceptual Diagram for Estimating Condition and Trends of Conservation Elements in the Central Basin and Range Ecoregion for the Dry Lake Valley North Solar Energy Zone Solar Regional Compensatory Mitigation Strategy

An example table showing the condition and trends of various coarse- and fine-filter conservation elements in the Central Basin and Range is shown in Table 2-3A. Because of the large number of fine-scale conservation elements (e.g., species) that could potentially be evaluated, the BLM determined that an evaluation of coarse-filter conservation elements (e.g., ecological systems) would be a suitable habitat-based proxy for geospatial trends of fine-scale conservation elements. In Table 2-3A, the coarse-filter conservation elements that were evaluated include the Central Basin and Range landscape condition model, as developed in the Central Basin and Range Rapid Ecoregional Assessment (Comer et al. 2013), and the Southwest Regional Gap Analysis Project's modeled land cover types.

There are no federally listed threatened or endangered species that occur on the Dry Lake Valley North SEZ. However, there are some species listed as sensitive by the BLM that could occur on the SEZ (see Appendix A for a summary of impacts to special status species). Based on the results presented in

Table 2-3A, it was concluded that most conservation elements are expected to experience a declining trend in the Central Basin and Range Ecoregion, as all conservation elements are expected to experience some level of range contraction owing to human development or climate change in the future. Of the bioclimate models available for the Ecological Systems in the Central Basin and Range REA (Comer et al. 2013) that are associated with the Dry Lake Valley North SEZ, future bioclimate is expected to expand for only the Inter-Mountain Basins Semi-Desert Shrub Steppe system. The landscape condition within the Central Basin and Range is also expected to decline in the future (Table 2-3B). Because the Inter-Mountain Basins Mixed Salt Desert Scrub system comprised the largest portion of the Dry Lake Valley North SEZ (88.7%), the cumulative expected future loss or degradation of this ecological system resulting from human development and climate change was considered to be a regionally important trend for that vegetation system and other conservation elements relative to the Dry Lake Valley North SEZ. The ecoregional condition and trends of dominant vegetation systems in the Dry Lake Valley North SEZ, based on results presented in the Central Basin and Range REA (Comer et al. 2013) are illustrated in Figures 2-6 through 2-11. Landscape condition was categorically presented as follows: excellent condition (modeled condition values >0.80), good condition (modeled condition values 0.65–0.80), fair condition (modeled condition values 0.40–0.65), and poor condition (modeled condition values <0.40) (see Section 2.1.2 for a summary of landscape condition model development). Other vegetation systems that comprise a small portion of the SEZ (e.g., Inter-Mountain Basins Semi-Desert Grassland) may be avoided.

Based on models prepared in the REA (Comer et al. 2013), human development throughout the ecoregion is expected to increase by 7.7% by 2025. This ecoregional trend includes assumed solar energy development of the Dry Lake Valley North SEZ.

2.2 General Description of Solar Development in the Dry Lake Valley North Solar Energy Zone

2.2.1 Description of Existing Rights-of-Way and Impact on Developable Area

As described in Section 2.1.1, the SEZ contains two transmission corridors running north to south along its eastern boundary (Figure 2-1). As stated in the Solar PEIS, these existing corridors will be used primarily for the siting of transmission lines and other infrastructure such as pipelines. These existing corridors will be the preferred locations for any transmission development that is required to support solar development and future transmission grid improvements related to the build-out of the Dry Lake Valley North SEZ. Any use of the corridor lands within the Dry Lake Valley North SEZ for solar energy facilities, such as solar panels or heliostats, must be compatible with the function of the corridors.

Subsequent to the signing of the Solar PEIS ROD, BLM Ely District Office staff revised the recommended developable area and non-development areas of the SEZ to take into account current existing land uses on the SEZ. Known locations of rights-of-way and existing power lines have been recommended as non-development areas within the SEZ (Figure 2-12). In addition, a very small portion (106 acres) of the Silver King Herd Management Area (HMA) that intersects the northwest boundary of the SEZ has been recommended as a non-development area. Although the total SEZ size is the same as that reported in the Final Solar PEIS (28,726 acres [116 km^2]), the developable area of the SEZ would be reduced from 25,069 acres (101 km^2) to 17,827 acres (72 km^2) if these recommendations are implemented (Figure 2-12).

Table 2-3A. Condition and Trends Assessment for Coarse-Filter Conservation Elements in the Central Basin and Range Relevant to the Dry Lake Valley North Solar Energy Zone

SEZ Distribution (Acres)		Percent of SEZ	Ecoregional Distribution (Acres)	Percent of Ecoregion	Ecoregional Condition Assessment		Ecoregional Trends Assessment			
					Condition[1]		Impact of Future Human Development[2]		Impact of Future Climate Change[3]	
					Current Condition in Vicinity of SEZ	Average Current Condition Across Ecoregion	Future Conversion to Human Development (acres)	Percent Future Conversion (relative to current distribution)	Net Change in Suitable Future Bioclimate (2050)	% Net Change (relative to current distribution)
Ecological Systems										
Inter-Mountain Basins Mixed Salt Desert Scrub	22,257	88.7%	15,104,919	18.4%	Good	Good	830,900	5.50%	Contraction	−3.40%
Inter-Mountain Basins Semi-Desert Shrub Steppe	1,452	5.8%	2,921,940	3.5%	Good	Good	26,735	1.00%	Expansion	19.90%
Inter-Mountain Basins Semi-Desert Grassland	441	1.8%	863,504	1.1%	Good	Good	149,000	17.26%	N/A[4]	N/A
Inter-Mountain Basins Greasewood Flat	441	1.8%	3,899,087	4.7%	Good	Good	295,000	7.56%	N/A	N/A
Inter-Mountain Basins Big Sagebrush Shrubland	278	1.1%	16,138,915	19.6%						
Inter-Mountain Basins Playa	165	0.7%	4,312,477	5.3%						
Mojave Mid-Elevation Mixed Desert Scrub	24	<0.1%	1,301,124	1.6%						

Table 2-3A. (Cont.)

SEZ Distribution (Acres)			Percent of SEZ	Ecoregional Distribution (Acres)	Percent of Ecoregion	Ecoregional Condition Assessment		Ecoregional Trends Assessment			
						Condition[1]		Impact of Future Human Development[2]		Impact of Future Climate Change[3]	
						Current Condition in Vicinity of SEZ	Average Current Condition Across Ecoregion	Future Conversion to Human Development (acres)	Percent Future Conversion (relative to current distribution)	Net Change in Suitable Future Bioclimate (2050)	% Net Change (relative to current distribution)
Great Basin Xeric Mixed Sagebrush Shrubland		3	<0.1%	7,859,165	9.6%						
	TOTAL	25,061	100%	54,214,478	63.7%						

[1] Condition was qualitatively determined from REA data that characterized species condition values across the ecoregion. See Figures 2-6 through 2-9.

[2] On the basis of REA data, human development is expected to increase by 7.7% in the ecoregion by 2025. Conversion to human development was determined by overlaying species distribution models with modeled future human development.

[3] Current and future suitable bioclimate models were prepared for select species in the Central Basin and Range REA. Future bioclimate models were generated for the year 2050. See Figures 2-10 and 2-11.

[4] N/A – REA data are not available.

Table 2-3B. Landscape Condition Model Results for the Central Basin and Range Ecoregion

	Solar Energy Zone (SEZ) Site-Specific Condition	Landscape-Ecoregional Condition	Ecoregional Trends
Ecological Landscape Condition Model			
	Average Current Condition Value within the SEZ (SD[1])	Average Current Condition Value within the Central Basin and Range Ecoregion (SD)	Average Future Condition Value within the Central Basin and Range Ecoregion (SD)
Landscape Condition Value	80.8 (4.5)	73.0 (15.5)	69.2 (21.2)

[1] SD = standard deviation.

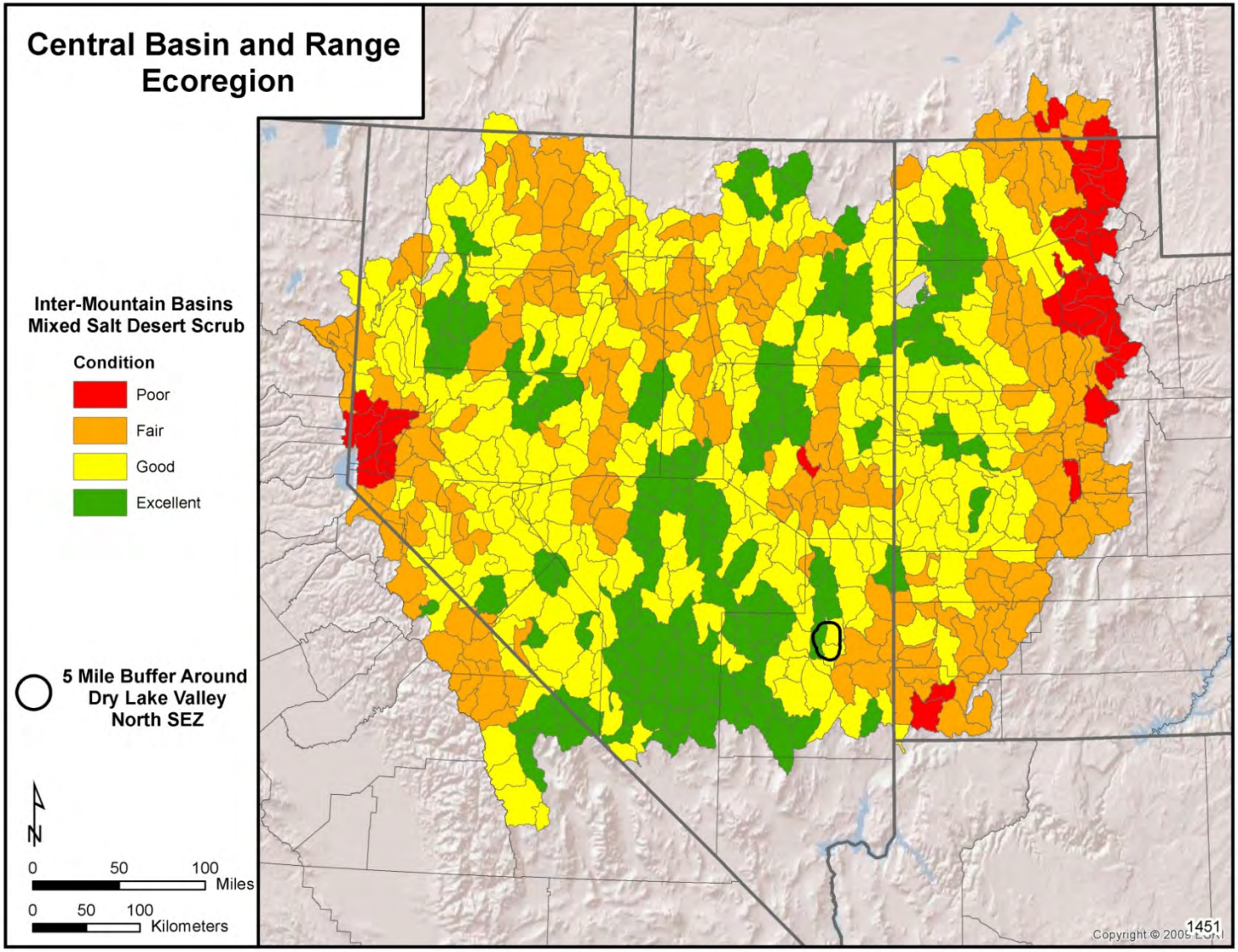


Figure 2-6. Condition of the Inter-Mountain Basins Mixed Salt Desert Scrub Ecological System, Summarized to 5th-Level Watersheds, in the Central Basin and Range Ecoregion and within the Vicinity of the Dry Lake Valley North SEZ

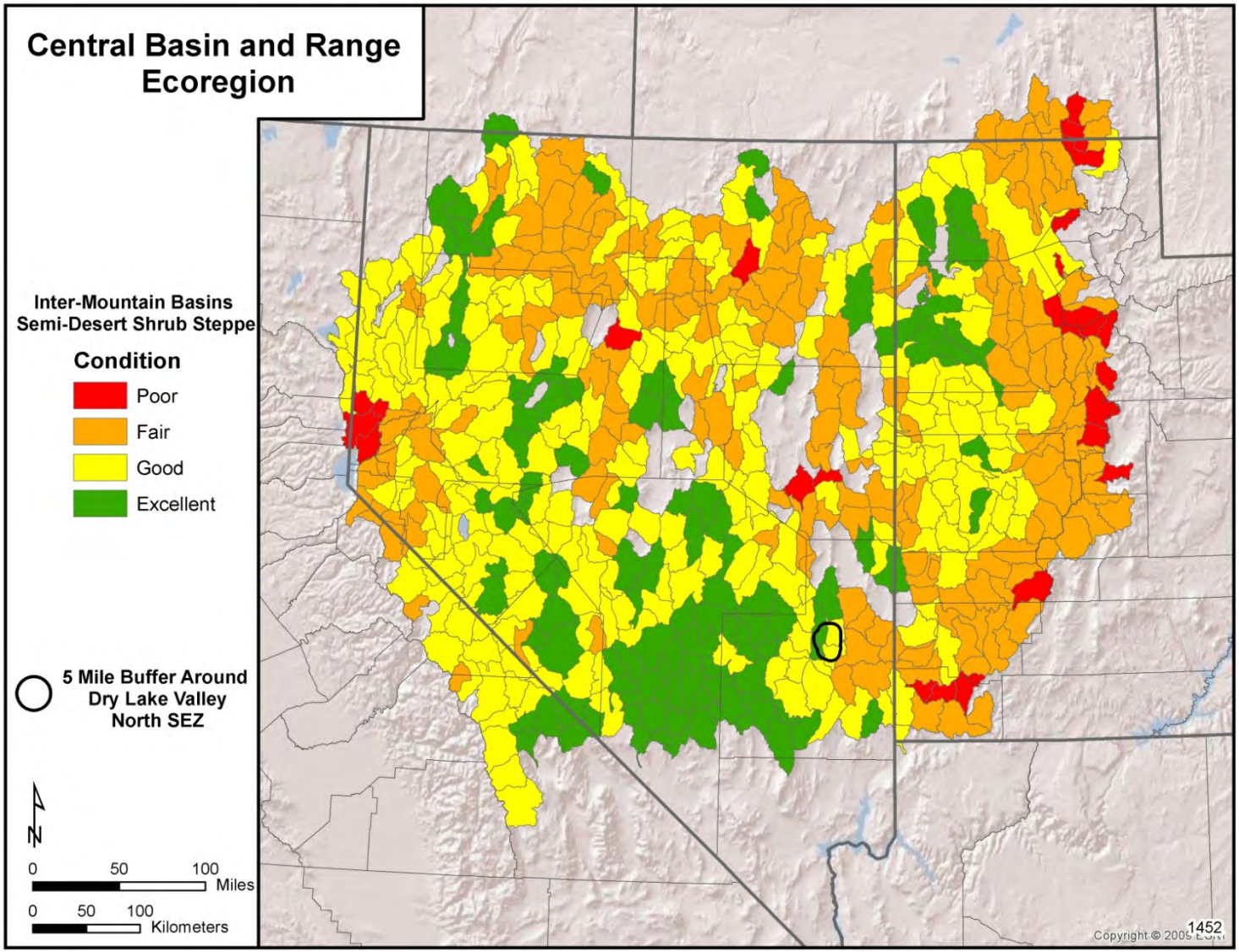


Figure 2-7. Condition of the Inter-Mountain Basins Semi-Desert Shrub Steppe Ecological System, Summarized to 5th-Level Watersheds, in the Central Basin and Range Ecoregion and within the Vicinity of the Dry Lake Valley North SEZ

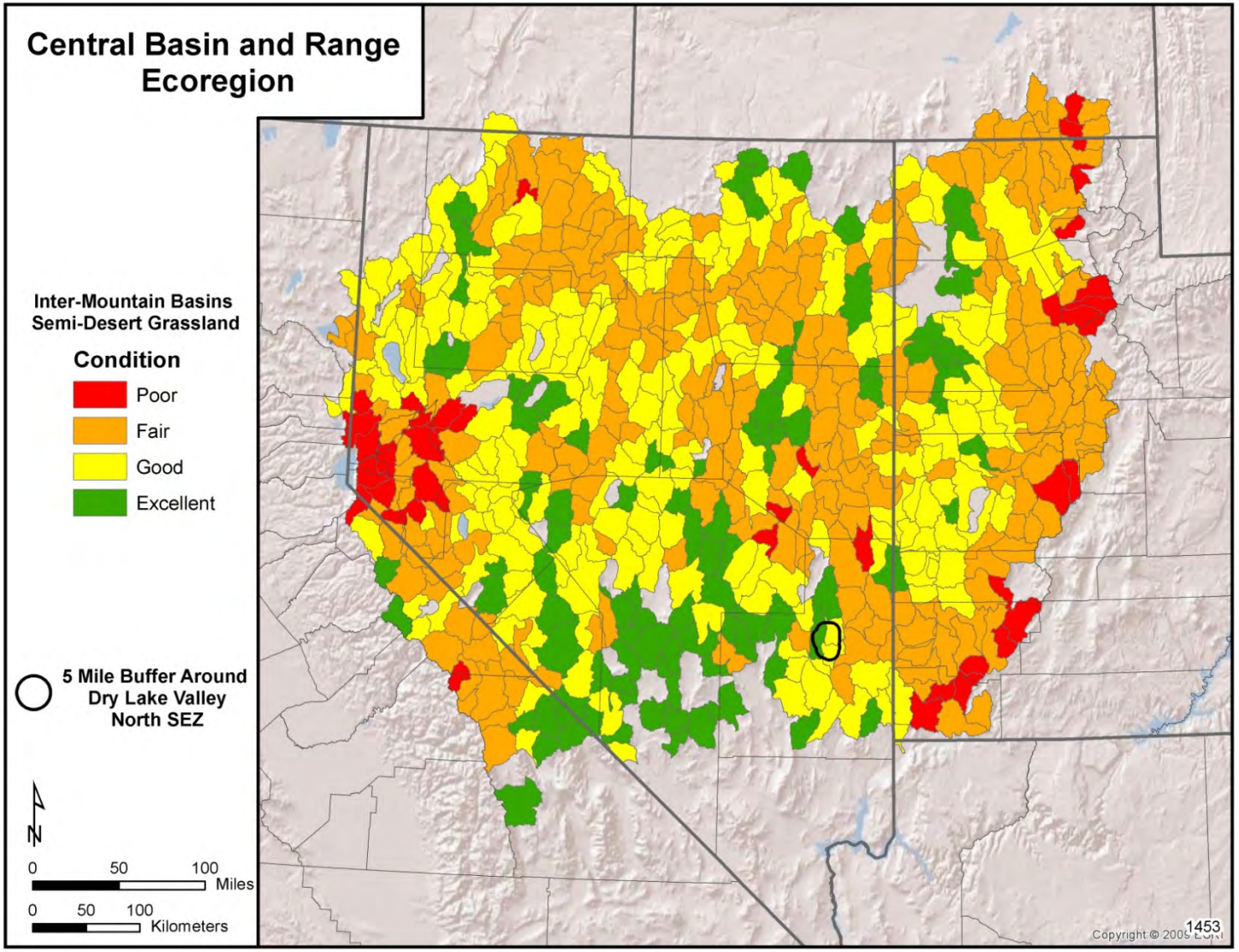


Figure 2-8. Condition of the Inter-Mountain Basins Semi-Desert Grassland Ecological System, Summarized to 5th-Level Watersheds, in the Central Basin and Range Ecoregion and within the Vicinity of the Dry Lake Valley North SEZ

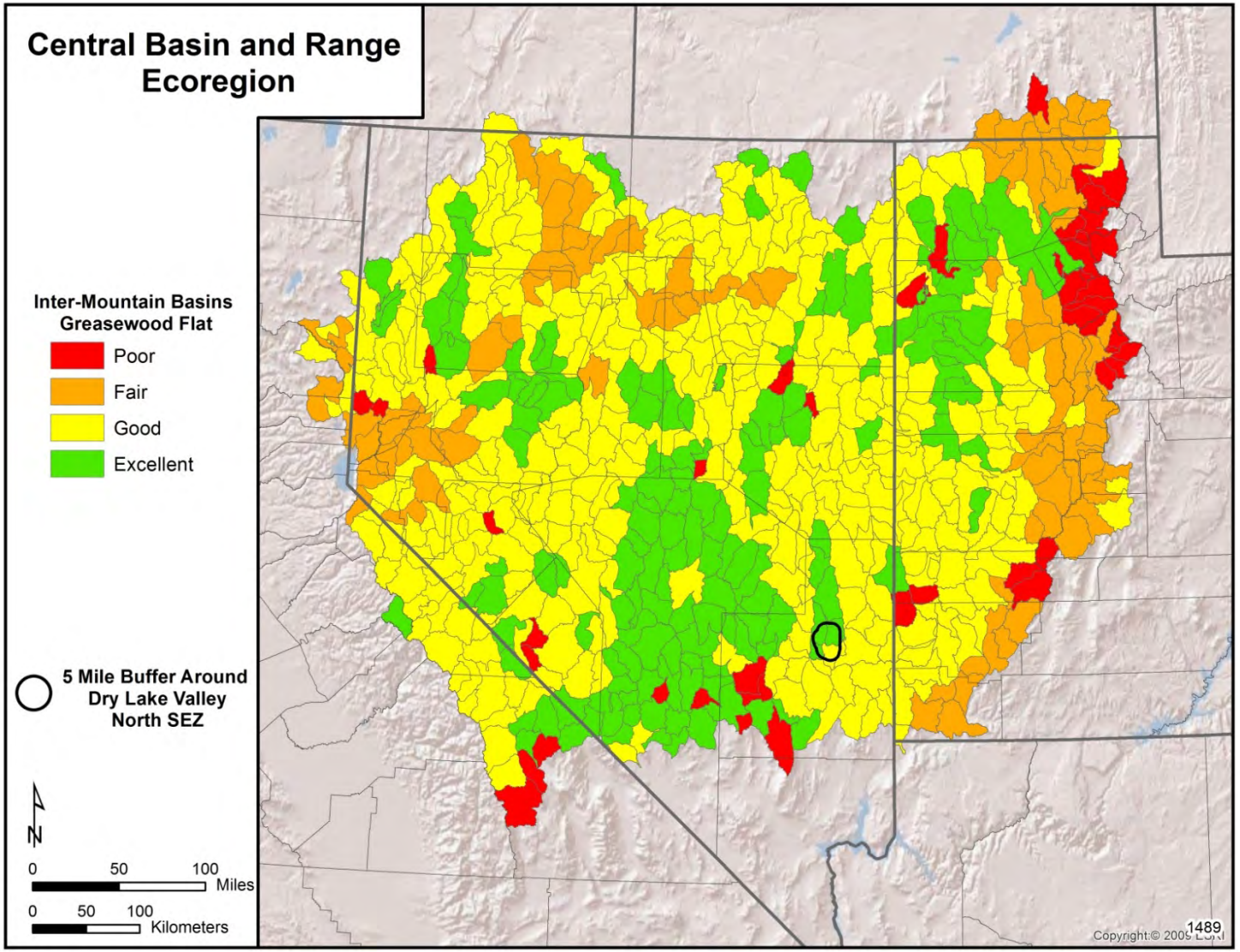


Figure 2-9. Condition of the Inter-Mountain Basins Greasewood Flat Ecological System, Summarized to 5th-Level Watersheds, in the Central Basin and Range Ecoregion and within the Vicinity of the Dry Lake Valley North SEZ

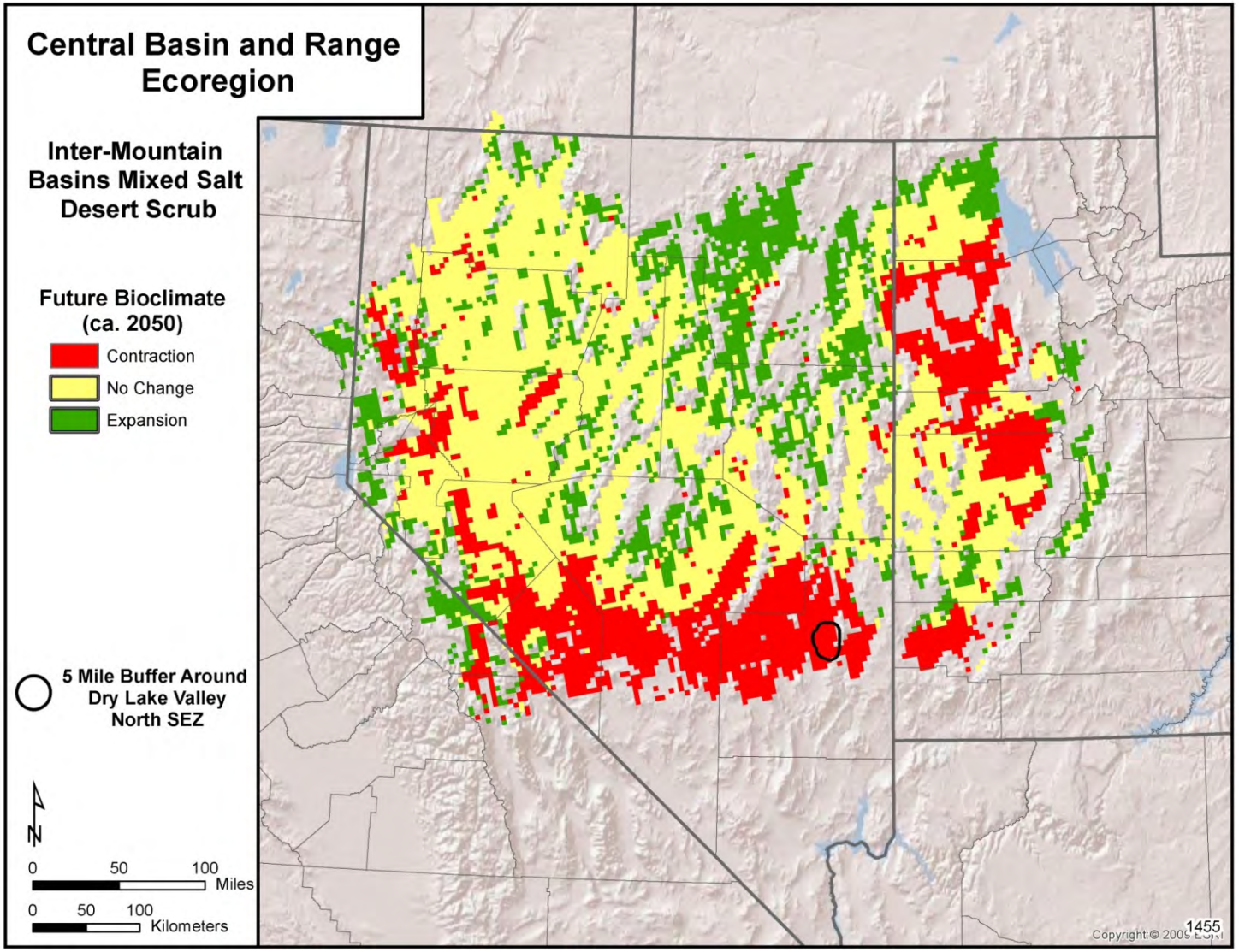


Figure 2-10. Expected Change in Future Suitable Bioclimate for the Inter-mountain Basins Mixed Salt Desert Scrub System in the Central Basin and Range Ecoregion and within the Vicinity of the Dry Lake Valley North SEZ

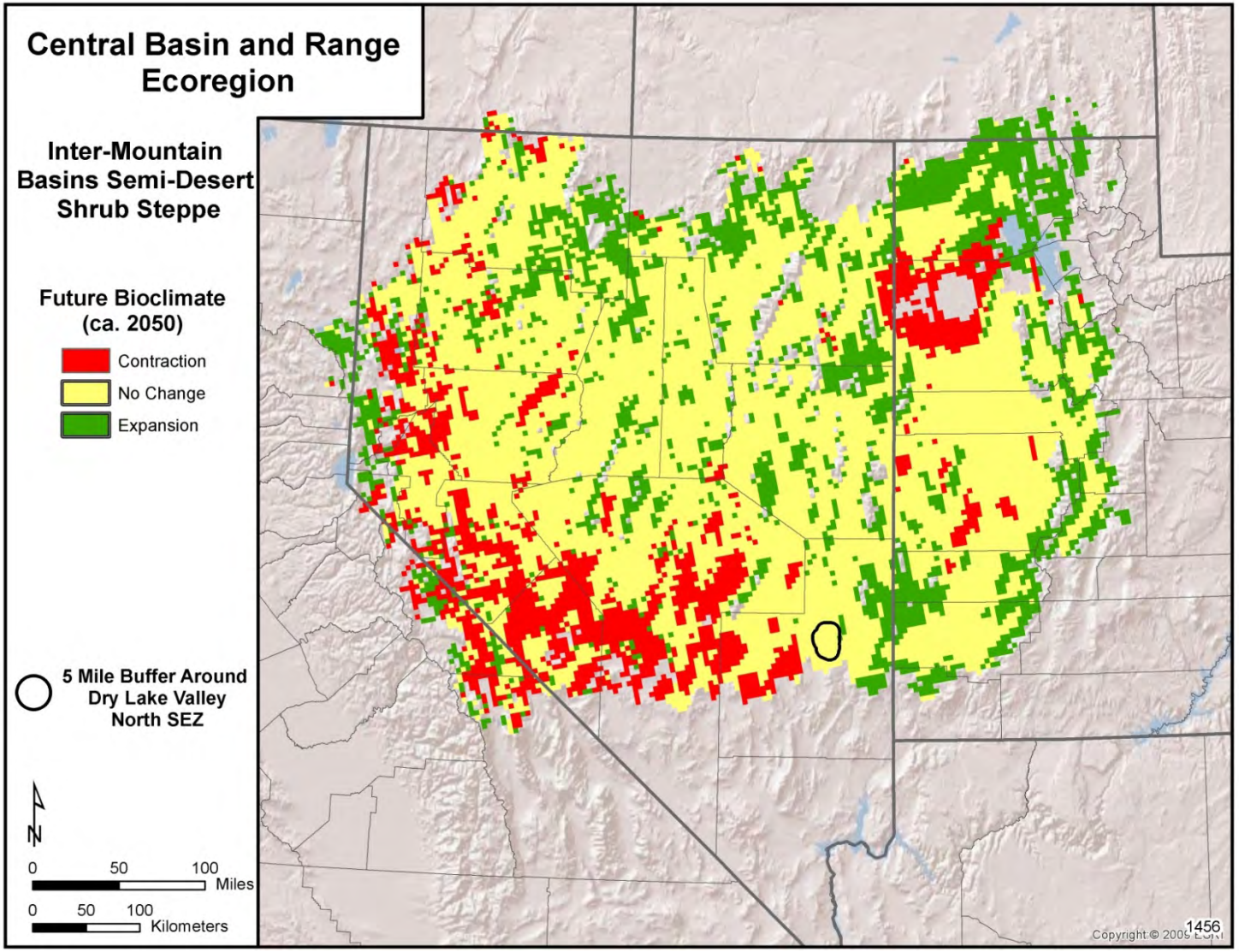


Figure 2-11. Expected Change in Future Suitable Bioclimate for the Inter-mountain Basins Semi-Desert Shrub Steppe System in the Central Basin and Range Ecoregion and within the Vicinity of the Dry Lake Valley North SEZ

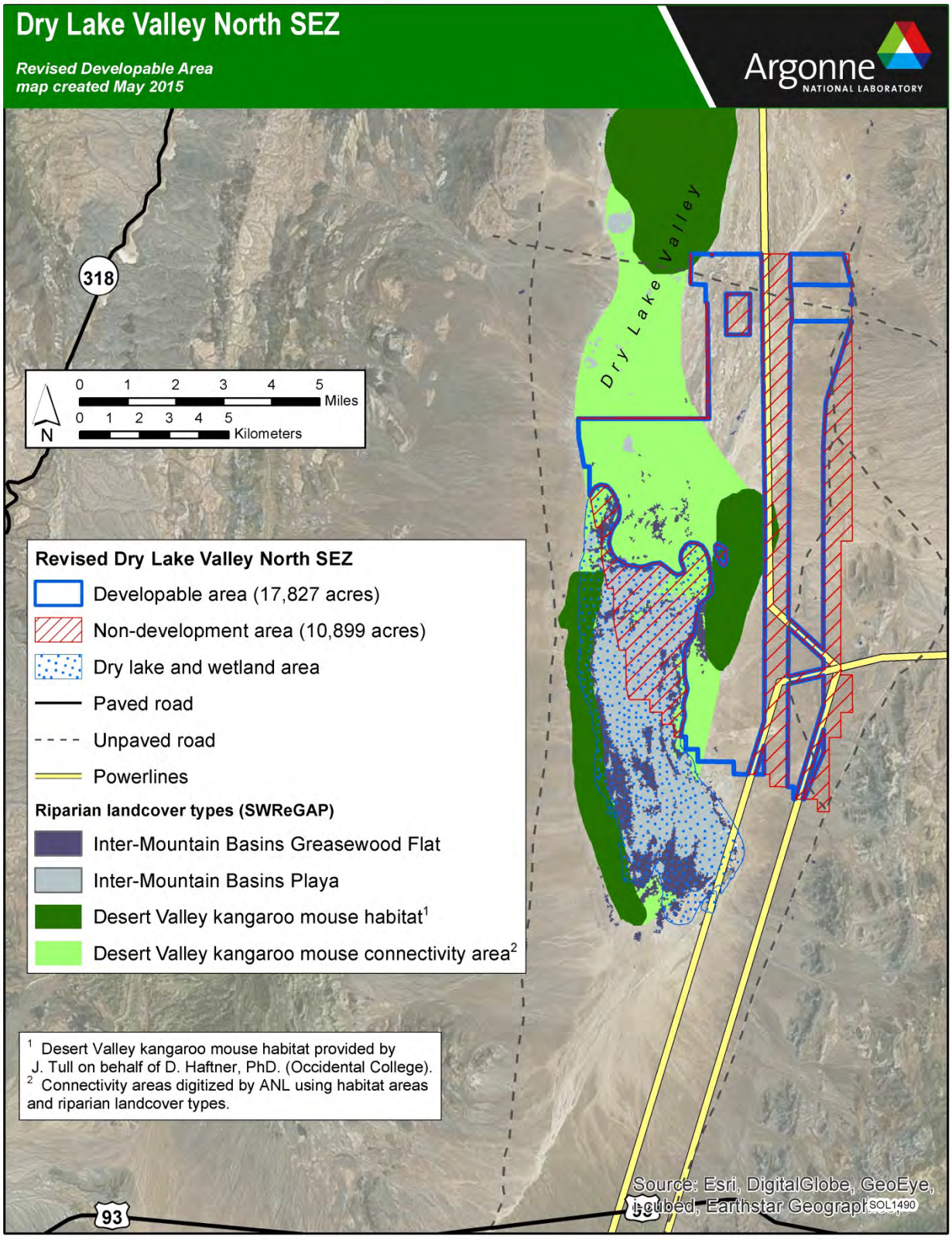


Figure 2-12. Dry Lake Valley North Solar Energy Zone Revised Developable Area. Also shown within the developable area are locations of potentially sensitive ecological resources.

2.2.2 Description of Potential Development

Utility-scale solar facilities of all technology types have a key element in common—they all have a large solar field with reflectors or photovoltaic surfaces designed to capture the sun's energy. The solar fields generally require a relatively flat land surface; only locations with less than 5% slope were included as SEZs in the Final Solar PEIS. In typical utility-scale solar facility construction to date, vegetation is generally cleared and solar fields are fenced to prevent damage to or from wildlife and trespassers.

In the Final Solar PEIS, maximum solar development of the Dry Lake Valley North SEZ was assumed to be 80% of the developable SEZ area over a period of 20 years. Although the developable area has been refined to 17,827 acres (72 km^2) (see Section 2.2.1), for the purposes of this assessment, it is assumed that more non-development areas may be identified in the future, and that only about 14,300 (57.9 km) (80% of the available acreage) will be developed. For example, areas in the western portion of the SEZ may contain suitable habitat and connectivity areas for sensitive species such as the Desert Valley kangaroo mouse (Figure 2-12). However, knowledge about the habitat for this species in the SEZ is limited; the habitat areas for this species shown in Figure 2-12 are based on preliminary assessments of Desert Valley kangaroo mouse habitat and connectivity. More detailed evaluation of Desert Valley kangaroo mouse habitat within these areas of the SEZ may be needed before designating any future avoidance areas for this species. In the Final Solar PEIS, data from various existing solar facilities were used to estimate that solar trough facilities will require about 5 acres/megawatt (0.02 km^2/megawatt), and other types of solar facilities (e.g., power tower, dish engine, and photovoltaic technologies) will require about 9 acres/megawatt (0.04 km^2/megawatt). Using these land requirement assumptions, full development of the Dry Lake Valley North SEZ, assuming the revised developable area, would allow development of solar facilities with an estimated total of between 1,594 megawatts (for power tower, dish engine, or photovoltaic technologies) and 2,869 megawatts (for solar trough technologies) of electrical power capacity.

Availability of transmission from SEZs to load centers is an important consideration for future development in SEZs. For the proposed Dry Lake Valley North SEZ, two transmission lines intersect the eastern boundary of the SEZ: a 69-kV transmission line and the 500-kV OnLine electrical transmission line (Figure 2-12). It is possible that an existing line could be used to provide access from the SEZ to the transmission grid; however, because existing lines may already be at full capacity, it is likely that at full build-out capacity, new transmission and/or upgrades of existing transmission lines would be required to bring electricity from the Dry Lake Valley North SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Dry Lake Valley North SEZ and a general assessment of the impacts of constructing and operating new transmission facilities on those load centers were provided in Section 11.4.23 of the Final Solar PEIS (this analysis identified Los Angeles as the most favorable load center for power from the SEZ). Project-specific analyses would also be required to identify the specific impacts of new transmission construction and line upgrades for any projects proposed within the SEZ.

An existing gravel access road that connects the SEZ to Route 93, about 8 mi (13 km) to the south, would need upgrades to support construction and operation of solar facilities. The Solar PEIS assumed that this access road would use an existing unpaved road and would not pass over areas with steep terrain.

2.3 Summary of Solar Development Impacts on the Dry Lake Valley North Solar Energy Zone

Comprehensive assessment of the potential impacts of solar development at the Dry Lake Valley North SEZ was provided in the Final Solar PEIS (BLM and DOE 2012). Potential adverse impacts included effects on nearby wilderness areas, livestock grazing, recreational use of the SEZ lands, military use of the SEZ lands, soils, water resources, vegetation, wildlife, special status species (both vegetation and wildlife), visual resources, and transportation. Some potential positive impacts of development were identified for local socioeconomics, as well as positive impacts in terms of the potential to reduce greenhouse gas emissions if solar energy produced at the SEZ would displace use of fossil fuels.

2.4 Application of the Mitigation Hierarchy for the Dry Lake Valley North Solar Energy Zone

2.4.1 Avoidance

2.4.1.1 Avoidance Areas Identified in the Solar PEIS

The BLM has made considerable effort to avoid impacts to environmental resources by reducing the size of the Dry Lake Valley North SEZ from its original size of 76,874 acres (311 km^2) as proposed in the Draft Solar PEIS (BLM and DOE 2010). In the Supplement to the Draft (BLM and DOE 2011), the size of the SEZ was reduced to eliminate 48,148 acres (195 km^2) to avoid or minimize some potential impacts on sage-grouse and other wildlife, impacts on grazing, and impacts on military operations. In addition, about 3,657 acres (15 km^2) of wetland and dry lake within the remaining SEZ boundaries were identified as non-development areas (BLM and DOE 2012). Avoidance of these areas will eliminate or largely reduce adverse impacts on them.

2.4.1.2 Existing Rights-of-Way

As discussed in Section 2.2.1, the BLM has revised the developable and non-developable portions of the SEZ to take into account existing land uses on the SEZ. Known locations of rights-of-way and existing power lines, as well as 106 acres (0.43 km^2) of HMA, have been recommended as non-development areas within the SEZ. The remaining developable area has been reduced to 17,827 acres (72 km^2) (Figure 2-12). This reduction in developable area of the SEZ also will reduce potential impacts identified in the Final Solar PEIS (e.g., fewer acres of habitat loss will occur for vegetation and wildlife species, including special status species).

2.4.1.3 Dry Lake Valley North Cultural Resources

Management of cultural resources is directed primarily by two laws: the National Historic Preservation Act (NHPA) of 1966, as amended, and the Archaeological Resources Protection Act of 1979. The NHPA requires management and enhancement of significant historic properties, and the Archaeological Resources Protection Act requires protection of archaeological resources (sites and objects of 100 years or more in age). The Federal Land Policy and Management Act directs the BLM to manage public lands on the basis of multiple use and to "protect the quality of historical resources and archaeological values." This act provides for the periodic inventory of public lands and resources.

Following the process for evaluating cultural resources outlined in Appendix E of the BLM's "Draft Procedural Guidance for Developing Solar Regional Mitigation Strategies" (Draft Procedural Guidance, BLM 2014c), the BLM interdisciplinary team determined that cultural resources at the Dry Lake Valley North SEZ (see textbox) most likely could be avoided or mitigated onsite (i.e., within the SEZ) in consultation with the state historic preservation officer (SHPO) and tribes, and may not require compensatory mitigation. Results of an archaeological inventory required prior to project approval may indicate compensatory mitigation is warranted where reasonably foreseeable impacts on eligible historic properties cannot be avoided, or where avoidance or scientific data recovery may not be sufficient to fully mitigate loss of cultural resource values. This conclusion would be determined in consultation regarding mitigation with the SHPO and tribes and would follow the requirements as established in the National Solar Programmatic Agreement among the BLM; the SHPOs from Arizona, California, Colorado, New Mexico, Nevada, and Utah; and the Advisory Council on Historic Preservation as signed in September 2012 and the State Protocol Agreement between the Nevada BLM and the Nevada SHPO for Implementing the National Historic Preservation Act, as revised in December 2014.

Cultural Resources in Dry Lake Valley North

When the Final Solar PEIS was released in July 2012, approximately 3.5% of the SEZ had been surveyed. Twenty-one prehistoric sites were recorded, four of which have the potential to meet eligibility criteria for listing in the *National Register of Historic Places*. Since that time, Class II archaeological fieldwork of a sampling of 1,282 acres (approximately 5% of the Dry Lake Valley North SEZ) resulted in the recording of 10 new archaeological sites (7 prehistoric sites and 3 historic sites) and some isolated artifacts. None of the new sites recorded were recommended as meeting the criteria of eligibility for listing in the *National Register of Historic Places*. However, just north of the SEZ, current archaeological investigations are revealing information relevant to understanding use of the valley during early prehistoric times (Paleoindian and Archaic), a use which likely extends into the SEZ.

Results of an ethnographic study with Southern Paiute tribal representatives for the Delamar Valley, just south of the SEZ, will also inform the Dry Lake Valley North area, given that the landscape and plant and animal communities are very similar.

Archaeological inventory and evaluation are required prior to project approval. Inventory and evaluation results may indicate compensatory mitigation is warranted where reasonably foreseeable impacts on eligible historic properties cannot be avoided, or where avoidance or scientific data recovery may not be sufficient to fully mitigate loss of cultural resource values. Mitigation options would be determined in consultation with the SHPO and tribes and would follow the requirements as established in the National Solar Programmatic Agreement among the BLM; the SHPOs from Arizona, California, Colorado, New Mexico, Nevada, and Utah; and the Advisory Council on Historic Preservation as signed in September 2012 and the State Protocol Agreement between the Nevada BLM and the Nevada SHPO for Implementing the National Historic Preservation Act, as revised in December 2014. Possible compensatory mitigation options include preservation and/or data recovery at another location, interpretation, examination of collections, education and outreach, oral histories, etc.

2.4.2 Minimization

2.4.2.1 Summary of Programmatic Design Features to be Applied

The Final Solar PEIS identified a comprehensive suite of required programmatic design features that would avoid and/or minimize adverse impacts to resources, either onsite or through consultation/coordination with potentially affected entities. The programmatic design features are extensive and are listed in their entirety in Appendix A of the Solar PEIS ROD (BLM 2012). These programmatic design features include required actions to avoid or minimize impacts on all of the potentially affected resources listed in Section 2.3.

2.4.2.2 Other Required Impact Minimization Measures and/or Stipulations

The Final Solar PEIS also includes SEZ-specific design features for all of the SEZs. The SEZ-specific design features identified for the Dry Lake Valley North SEZ were the following:

- *Lands and Realty:* Priority consideration should be given to utilizing existing County roads to provide construction and operations access to the SEZ. Any potential impacts on existing County roads would be discussed with the County.

- *Rangeland Resources (Livestock Grazing):* Within the Ely Springs cattle allotment, solar development should be sited to minimize the number of pastures affected, and existing range improvements should be relocated in coordination with the grazing permittee.

- *Rangeland Resources (Horses and Burros):* Installation of fencing and access control, provision for movement corridors, delineation of open range, traffic management (e.g., vehicle speeds), compensatory habitat restoration, and access to or development of water sources should be coordinated with the BLM.

- *Recreation:* Because of the 11-mi (18-km) length of the SEZ and the potential for solar development to sever current east–west travel routes, legal vehicular access through the area should be maintained.

- *Water Resources:* Groundwater analyses suggest that full build-out of dry-cooled and wet-cooled technologies is not feasible; for mixed-technology development scenarios, any proposed dry- or wet-cooled projects should utilize water conservation practices.

- *Wildlife (Mammals):* The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.

- *Cultural Resources:* The existing access road that connects the proposed SEZ to U.S. 93 should be upgraded instead of constructing a new access road to reduce ground disturbances and the potential for impacts on cultural resources.

Some additional minimization measures would likely be identified during preparation of a NEPA analysis to support a competitive lease offering within the SEZ. These measures would also be incorporated into the lease offering as stipulations. For example, if any archaeological sites are found

during the cultural resource inventory and are determined to be eligible for listing in the *National Register of Historic Places*, avoidance and minimization will be considered during consultation with the Nevada SHPO and affected tribes to avoid and/or minimize impacts on significant cultural resources.

2.4.3 Regional Compensatory Mitigation

Identifying the impacts of utility-scale solar development that may warrant regional compensatory mitigation involves three steps: (1) identifying all the potential impacts; (2) identifying which of the potential impacts are likely to remain as residual impacts (i.e., that cannot be mitigated onsite by avoidance and/or through the implementation of design features meant to minimize the impact); and (3) identifying which of the residual impacts may warrant regional compensatory mitigation by taking into consideration the condition and trend of the impacted resources in the region and how that condition and trend could be affected by the residual impacts. A public workshop was held in March 2014 to present the SRMS process to stakeholders and obtain stakeholder input on expected impacts and recommendations on regional compensatory mitigation actions and locations.

As part of the Dry Lake Valley North SRMS process, a team of specialists from the BLM Caliente Field Office (called the interdisciplinary team) reevaluated the potential impacts of solar development that were described in the Final Solar PEIS (see Section 2.3) in light of available data specific to the SEZ area. This team, along with other subject matter experts from both BLM and Argonne, followed the methodology presented in Sections 2.4.3.1 and 2.4.3.2 for first identifying residual impacts from solar development in the SEZ, and then for identifying the residual impacts that may warrant regional compensatory mitigation.

2.4.3.1 Identification of Residual Impacts

The following methodology was used to identify residual (i.e., unavoidable) impacts:

- The interdisciplinary team verified/augmented the affected environment and impacts presented in the Final Solar PEIS (for completeness, staff reviewed analyses in both the Draft and Final Solar PEIS).
  - Reviewed the affected environment and the direct, indirect, and cumulative impacts for each resource value presented in the Final Solar PEIS.
  - Evaluated whether the description of the affected environment and impacts was comprehensive and accurate and whether more detailed information was available that could influence the description of impacts as provided in the PEIS. Where applicable, new information was documented (see Appendix A, Impact Assessment Summary Table).

- The team verified/augmented the programmatic and SEZ-specific design features presented in Appendix A of the Final Solar PEIS.
  - Reviewed the programmatic and SEZ-specific design features (i.e., avoidance and minimization measures) presented in the Solar PEIS ROD, determined which design features are applicable to the Dry Lake Valley North SEZ, and determined whether there were additional measures that could be implemented to avoid and/or minimize impacts. Where applicable, this was documented as requiring evaluation in project-specific NEPA analyses (see Appendix A, Impact Assessment Summary Table).

- The team identified the impacts that could be mitigated through avoidance and/or minimization, assuming the required design features described previously would be implemented.
  - For each resource, the design features and additional avoidance and minimization measures were evaluated as to the degree that they could avoid and minimize the impacts.

- The residual impacts (i.e., those that would remain after implementation of required design features) were identified.

The summary table presented in Appendix A documents the basis for the identification of residual (unavoidable) impacts for the Dry Lake Valley North SEZ.

2.4.3.2 Residual Impacts that May Warrant Regional Compensatory Mitigation

2.4.3.2.1 Conceptual Models

A conceptual model or models depicting interrelationships between key ecosystem components, processes, and stressors at the Dry Lake Valley North SEZ is recommended in the BLM interim policy on regional mitigation to evaluate the effectiveness of mitigation recommended through an SRMS. The Dry Lake Valley North SEZ specialist team constructed conceptual models to explain the role that resources, individually and in concert with one another, play in the function of the relevant ecological, social, and cultural systems present in the region. The purpose of these models is to articulate key assumptions about regional landscape pattern and process. This regional model provided the context to identify important resources at the SEZ scale. Information sources used for the development of the conceptual model included the following:

- Central Basin and Range REA (Comer et al. 2013).

- Ely RMP (BLM 2008).

- Resource specialist expert opinion.

- Habitat conservation plans.

Additional resources (e.g., other baseline resource surveys, inventories, occurrence records, studies/research, assessments, and plans providing insight into regional conditions and trends; ethnographic studies; BLM, county, or regional land use plans; and federal, state, or local social and economic studies) could be used to refine the models in the future.

Three conceptual models were developed for the Dry Lake Valley North SRMS. These models were developed with a goal of describing in detail the processes essential to sustain the ecosystem and the stressors that influence those processes. The first tier of the conceptual model displays the Central Basin and Range ecosystem interactions at an ecoregional scale. Tier 2 displays solar energy development in relation to BLM-managed activities and resources, values, and functions. The most detailed model, Tier 3, displays solar energy development at the Dry Lake Valley North SEZ identifying

those resources that are anticipated to experience residual impacts and that will warrant regional compensatory mitigation. Tiers 1 – 3 of the conceptual models are presented in Appendix B.

2.4.3.2.2 Residual Impacts that May Warrant Regional Compensatory Mitigation

Based on the best available information, conceptual models, assessments, and expert opinion, the BLM identified those residual impacts that may warrant compensatory mitigation in the context of existing policy and laws and current resource management plans' goals and objectives regarding those resources. BLM estimated where and how the residual impacts of solar development, at full build-out of the SEZ, could affect the condition and trend of the at-risk resource values at both local and landscape scales. The following criteria were also considered in determining whether compensatory mitigation may be warranted:

a. The relative importance placed on the resource in the land use plan.

b. The rarity, legal status, or state or national policy status of the resource.

c. The resilience of the resource in the face of change and impact.

Next, the BLM applied the criteria to the assumed full build-out of the SEZ to identify which residual impacts, in the context of the regional setting, may warrant regional compensatory mitigation for the Dry Lake Valley North SEZ. This evaluation has been reviewed by stakeholders, and their comments have been considered. Based upon the criteria, BLM identified the Inter-Mountain Basins Mixed Salt Desert Scrub community and associated conservation elements (e.g., wildlife species) as being at risk from the extent of SEZ full buildout and on the basis of the regional trend analysis outlined in Section 2.1.3.2. As presented in Table 2-3A, approximately 88.7% of the Dry Lake Valley North SEZ is composed of the Inter-Mountain Basins Mixed Salt Desert Scrub community. Although this community was characterized as being in good condition in the Central Basin and Range REA, approximately 5.5% of the community throughout the Central Basin and Range Ecoregion is expected to be altered by human developments in the near-term future (e.g., by 2025). In addition, this community is expected to experience a 3.40% decrease in available suitable bioclimate across the ecoregion as a result of future climate change (e.g., by 2050).

Based upon the criteria, BLM also identified the following residual impacts that may warrant regional compensatory mitigation for the Dry Lake Valley North SEZ:

- The loss of habitat and individuals of the following BLM-sensitive plant and animal species: Blaine fishhook cactus, Great Basin fishhook cactus, Eastwood milkweed, golden eagle, western burrowing owl, and Desert Valley kangaroo mouse.

- The loss of ecological value and function and ecosystem services (and the human uses that depend on them), as a result of development and until the lease expires and the site is restored. The primary components of an ecological system are: soils, vegetation, water, air, and wildlife. The dominant vegetation system likely to be impacted on the SEZ is Inter-Mountain Basins Mixed Salt Desert Scrub.

- The visual impacts that will occur from development in the SEZ itself (designated as visual resource management [VRM] Class III in the Ely RMP [BLM 2008]), and along U.S. 93 Scenic Highway. The magnitude of these impacts would be project specific.

In addition, the following residual impacts were identified as having the potential to occur, depending on the following: the way the area is developed, the success of onsite avoidance and minimization, results of investigations to fill data gaps, and/or the discovery of unanticipated resources:

- Introduction and spread of invasive/noxious weeds.

- Impacts on use of the Silver State OHV trail for transportation and recreation (several OHV and motorcycle events are held on the trail each year).

- Diminished quality of visual resources as observable from nearby specially designated areas, especially the Silver State OHV trail, in the Chief Mountain Special Recreation Management Area, and in the Big Rocks and Weepah Springs Wilderness Areas.

- Impacts on cultural resources, which are possible pending results of additional investigations and tribal consultation.

- Impacts on certain Native American concerns (e.g., loss of habitat and spiritual value), which are possible pending results of additional investigations and tribal consultation

Although no regional compensatory mitigation outcomes are proposed for these potential residual impacts, they will be the focus of an elevated level of monitoring so as to facilitate the timely detection of unanticipated impacts and conditional stipulations to be included in the grant to afford prompt and effective remediation.

2.5 Regional Goals and Mitigation Desired Outcomes

The regional compensatory mitigation described in this strategy is focused on recommending appropriate compensation for the residual impacts of developing the Dry Lake Valley North SEZ that warrant compensatory mitigation (i.e., those impacts that cannot be either avoided or minimized onsite and are likely to exacerbate problematic regional trends). For impacts recommended for regional compensatory mitigation (see Section 2.4.3.2.2), the mitigation desired outcome, at the narrowest level, is to offset the residual adverse impacts that are expected to occur onsite with actions that improve or protect the impacted resource elsewhere in the region.

The Ely RMP (BLM 2008) is one guide for identifying project-specific BLM actions that also address goals for the region in which the Dry Lake Valley North SEZ is located. The RMP document establishes management goals, objectives, and recommendations related to the residual impacts identified in Section 2.4.3.2.2. The RMP guidance regarding regional goals and objectives is identified in the second and third columns of Table 2-4. The relationships between regional goals and objectives identified in the Ely RMP and recommended compensatory mitigation sites and actions to address resource impacts in the Dry Lake Valley North SEZ are also shown in Table 2-4.

The Caliente Field Office recently completed an evaluation report for the Dry Lake Valley Watershed (BLM 2014b), which is the watershed that encompasses the Dry Lake Valley North SEZ. The

watershed evaluation assesses the status of watershed resource conditions against the Mohave-Southern Great Basin Area Resource Advisory Council (RAC) Standards for Rangeland Health. The evaluation was conducted in accordance with BLM regulations regarding Rangeland Health Standards (43 CFR subpart 4180, BLM Handbook H-4180-1, and Standards and Guidelines for Nevada's Mohave-Southern Great Basin Area).

The Dry Lake Valley Watershed evaluation (BLM 2014b) identified the following standards for ecological resources in the watershed that encompasses the Dry Lake Valley North SEZ. The watershed evaluation recommendations for meeting these standards are provided in Table 2-5, along with the relationship between the standards and the recommended mitigation actions and sites evaluated in this SRMS.

Soils

- Standard: Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.

Ecosystem Components

- Standard 1: Watersheds should possess the necessary ecological components to achieve state water quality criteria, maintain ecological value and function, and sustain appropriate uses.

- Standard 2: Riparian and wetlands vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover; capture sediment; and capture, retain, and safely release water (watershed function).

Biota and Habitat

- Standard: Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Wild Horse Populations

- Standard: Wild horses exhibit characteristics of a healthy, productive, and diverse population. Age structure and sex ratios are appropriate to maintain the long-term viability of the population as a distinct group. Herd management areas are able to provide suitable feed, water, cover, and living space for wild horses and maintain historic patterns of habitat use.

Compensatory mitigation desired outcomes for the Dry Lake Valley North SEZ are presented in Table 2-6. These are high-level desired outcomes to be considered in project-specific NEPA analyses for selecting compensatory mitigation sites and actions within the region. Potential compensatory mitigation sites and actions for the Dry Lake Valley North SEZ are evaluated in Section 2.8. The relationship between regional goals and mitigation desired outcomes from recommended regional compensatory mitigation actions is also provided in Table 2-6.

Table 2-4. Relationship Between Ely RMP Goals and Objectives and Recommended Regional Compensatory Mitigation Actions for the Dry Lake Valley North SEZ

Ely RMP Goals and Objectives			Dry Lake Valley North SEZ Recommended Regional Compensatory Mitigation Actions[1]		
			Restore public lands outside the SEZ in the same watershed		
	Goal(s)	Objective(s)	Implement treatments that enhance and benefit vegetative communities	Decrease the spread of annual grasses and invasive species through direct treatment	In coordination with existing water rights holders and grazing permittees, fence springs and pipe water to a trough
Water	Water quality is suitable for the appropriate beneficial uses and meets approved federal, state, tribal, and local requirements, guidelines, and objectives. Watersheds achieve and maintain resource functions and conditions required for healthy lands and sustainable uses.	To protect the chemical, physical, and biological integrity of waters as needed to maintain healthy ecological systems and provide values that support multiple uses. Acquire and perfect sufficient water rights to meet public land management needs.	X	X	
		To manage watersheds that display physical and biological conditions or functions required for necessary ecological components to achieve state water quality criteria, maintain ecological value and function, and sustain appropriate uses.			X
Soils	Maintain or improve long-term soil quality. Ensure that upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform.	Ensure that soils exhibit infiltration and permeability appropriate to the soil type, with erosion and compaction having minimal effect on soil quality.	X		X

Table 2-4. (Cont.)

Ely RMP Goals and Objectives			Dry Lake Valley North SEZ Recommended Regional Compensatory Mitigation Actions[1]		
			Restore public lands outside the SEZ in the same watershed		
	Goal(s)	Objective(s)	Implement treatments that enhance and benefit vegetative communities	Decrease the spread of annual grasses and invasive species through direct treatment	In coordination with existing water rights holders and grazing permittees, fence springs and pipe water to a trough
Vegetation	Achieve or maintain resistant and resilient ecological conditions while providing for sustainable multiple uses and options for the future across the landscape.	Manage for resistant and resilient ecological conditions including healthy, productive, and diverse populations of native or desirable nonnative plant species appropriate to the site characteristics.	X	X	
Special Status Species	Conserve, maintain, and restore special status species populations and their habitats; support the recovery of federally listed threatened and endangered species; and preclude the need to list additional species.	Manage habitat for special status species in a manner that will benefit these species directly or indirectly and minimize loss of individuals or habitat from permitted activities.	X	X	X

Table 2-4. (Cont.)

Ely RMP Goals and Objectives			Dry Lake Valley North SEZ Recommended Regional Compensatory Mitigation Actions[1]		
			Restore public lands outside the SEZ in the same watershed		
	Goal(s)	Objective(s)	Implement treatments that enhance and benefit vegetative communities	Decrease the spread of annual grasses and invasive species through direct treatment	In coordination with existing water rights holders and grazing permittees, fence springs and pipe water to a trough
Fish and Wildlife	Provide habitat for wildlife (i.e., forage, water, cover, and space) and fisheries that is of sufficient quality and quantity to support productive and diverse wildlife and fish populations, in a manner consistent with the principles of multi-use management, and to sustain the ecological, economic, and social values necessary for all species.	Manage habitat for aquatic species, priority wildlife species, and migratory birds in a manner that will benefit wildlife species and minimize conflicts among species and wildlife or habitat losses from permitted activities.[2]	X	X	X
		Use wildlife water developments, both natural and artificial, to improve the condition of wildlife habitat and mitigate impacts on wildlife species from loss of natural water sources or loss of habitat.			X
Visual Resources	Manage public land actions and activities in a manner consistent with Ely District Office's visual resource management objectives by class.	Implement multiple use activities within the planning area with mitigation measures consistent with the visual resource management classes.	X		

[1] Restoration of public lands outside the SEZ in the same watershed as the SEZ is listed here as the highest-ranking compensatory mitigation action and location. See Appendix D for the screening summary of candidate mitigation sites and actions.

[2] Priority species for terrestrial wildlife habitat management are elk, mule deer, pronghorn antelope, Rocky Mountain bighorn sheep, desert bighorn sheep, and migratory birds, given that these species cover the entire Ely RMP planning area. Priority habitats include calving/fawning/kidding/lambing grounds, crucial summer range, crucial winter range, and occupied desert bighorn sheep habitat.

Table 2-5. Relationship Between Recommendations Identified in the Dry Lake Valley Watershed Evaluation Report and Recommended Regional Compensatory Mitigation Actions for the Dry Lake Valley North SEZ

Soils	Ecosystem Components	Biota and Habitat	Wild Horse Populations	Dry Lake Valley Watershed Evaluation Report Recommendations	Dry Lake Valley North SEZ Recommended Regional compensatory mitigation Actions[1]		
					Restore public lands outside the SEZ in the same watershed		
					Implement treatments that enhance and benefit vegetative communities	Decrease the spread of annual grasses and invasive species through direct treatment	In coordination with existing water rights holders and grazing permittees, fence springs and pipe water to a trough
X	X	X		Implement restoration treatments to restore vegetative communities.	X		
X	X	X		Decrease the spread of annual grasses and invasive species through direct treatment and management policies.		X	
X	X	X		Manage livestock grazing to adhere to standards and continue the evaluation of standards and guidelines.			
X	X	X		Fence spring source while providing access to water on the outside of the fence.			X
X	X	X	X	Manage wild horse herds at appropriate management levels.			
X	X	X		Continue wildland fire Emergency Stabilization and Rehabilitation.	X		
		X		Implement habitat improvement projects (i.e., vegetative community restoration, construction of wildlife water developments, etc.).	X	X	X
		X		Reduce impact of recreational use through the development of management plans and infrastructure implementation.			
			X	Install water developments as feasible to improve wild horse distribution.			X

[1] Restoration of public lands outside the SEZ (but in the same watershed as the SEZ) is listed here as the highest-ranking compensatory mitigation action and location. See Appendix D for the screening summary of candidate mitigation sites and actions.

Table 2-6. "Crosswalk" Between Regional Goals and Mitigation Desired Outcomes, Actions, and Sites

Resource Impacted that May Warrant Compensatory Mitigation	Regional Goal/ Regional Objective/ RMP Guidance	Mitigation Action and Sites[8]	Mitigation Desired Outcome[9]
Ecosystem: Inter-Mountain Basins Mixed Salt Desert Scrub Vegetation Community Special Status Species: Blaine fishhook cactus, Great Basin fishhook cactus, Eastwood milkweed, golden eagle, western burrowing owl, and Desert Valley kangaroo mouse Visual Resources Cultural Resources[2]	Special Status Species: **Regional Goal:** Manage habitats for nonlisted special status plant and animal species to support viable populations so future listing is not necessary. Species include: Blaine fishhook cactus, Great Basin fishhook cactus, Eastwood milkweed, golden eagle, western burrowing owl, and Desert Valley kangaroo mouse.	Restore and enhance habitat Eradicate invasive species Fence springs and pipe water to troughs	**Mitigation Outcome 1:** Mitigate the loss of habitat by restoring, enhancing, and/or protecting habitat altered by development (taking into account the existing landscape condition in the SEZ), and preferably in the same region in which the SEZ is located. At minimum, maintain equal amount (e.g., 1:1 ratio) of habitat for wildlife and special status species. **Outcome 2:** Protect genetic diversity of special status plant species by seed collection before disturbance. **Outcome 3:** Secure basic scientific information pertaining to special status species (e.g., distribution and habitat use on and in the vicinity of the SEZ, phenology, diet) that would aid in the identification of potential avoidance areas or restoration sites.
	Ecosystem Services: **Regional Goal:** Restore, enhance, and/or preserve the Inter-Mountain Basins Mixed Salt Desert Scrub vegetation community.		**Mitigation Outcome 4:** Restore, enhance, and/or preserve the Inter-Mountain Basins Mixed Salt Desert Scrub vegetation community and ecosystem altered by development (taking into account the existing condition of the SEZ) to 80% of existing vegetative cover (acres) and composition of primary plant species within 5 years of initiation of land-disturbing development on the SEZ as an interim goal, with a minimum of 100% (1:1 ratio) as the end goal over 20 years.

[8] Restoration of public lands outside the SEZ (but in the same watershed as the SEZ) is listed here as the highest-ranking compensatory mitigation action and location. See Appendix D for the screening summary of candidate mitigation sites and actions.

[9] The mitigation-related desired outcome is a measurable objective on the scale of an SEZ that is tied explicitly to the recommended mitigation action and can be applied to achieve the regional goals and objectives of the resource.

Table 2-6. (Cont.)

Resource Impacted that May Warrant Compensatory Mitigation	Regional Goal/ Regional Objective/ RMP Guidance	Mitigation Action and Sites[10]	Mitigation Desired Outcome[11]
	Visual Resources: **Regional Goal:** Restore and/or enhance visual resource values.		**Mitigation Outcome 5:** Restore and/or enhance visual resource values proportionate to expected impacts in concert with ecosystem restoration.
	Cultural Resources[12]: **Regional Goal 1:** Identify and preserve significant cultural resources and ensure that they are available for appropriate uses by present and future generations (Federal Land Policy and Management Act, Section 103(c), 201(a), and (c); NHPA, Section 110(a); Archaeological Resources Protection Act, Section 14 [a]). **Goal 2:** Seek to reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration, or potential conflict with other resource uses (Federal Land Policy and Management Act, Section 103(c), NHPA, Section 106, 110[a][2]) by ensuring that all authorizations for land use and resource use will comply with the NHPA, Section 106.		**Mitigation Outcome 6:** Ensure the preservation and protection of significant cultural resources on BLM-administered land in accordance with the NHPA and established regulations and agreements. Appropriate management actions will be determined on a project-by-project basis through completion of the NHPA Section 106 Process outlined in the *Programmatic Agreement among the United States Department of Interior, Bureau of Land Management, the Arizona State Historic Preservation Officer, the California State Historic Preservation Officer, the Colorado State Historic Preservation Officer, the New Mexico State Historic Preservation Officer, the Nevada State Historic Preservation Officer, the Utah State Historic Preservation Officer, and the Advisory Council On Historic Preservation regarding solar energy development on lands administered by the Bureau of Land Management,* which was signed in September 2012, and the *State Protocol Agreement between the Bureau of Land Management, Nevada and the Nevada State Historic Preservation Officer for Implementing the National Historic Preservation Act*, as revised in December 2014.

[10] Restoration of public lands outside the SEZ (but in the same watershed as the SEZ) is listed here as the highest-ranking compensatory mitigation action and location. See Appendix D for the screening summary of candidate mitigation sites and actions.

[11] The mitigation-related desired outcome is a measurable objective on the scale of an SEZ that is tied explicitly to the recommended mitigation action and can be applied to achieve the regional goals and objectives of the resource.

[12] Although during evaluation of residual impacts, cultural resources received a finding of "maybe" for having residual impacts warranting regional compensatory mitigation, it is included in this table to aid in future discussions regarding development.

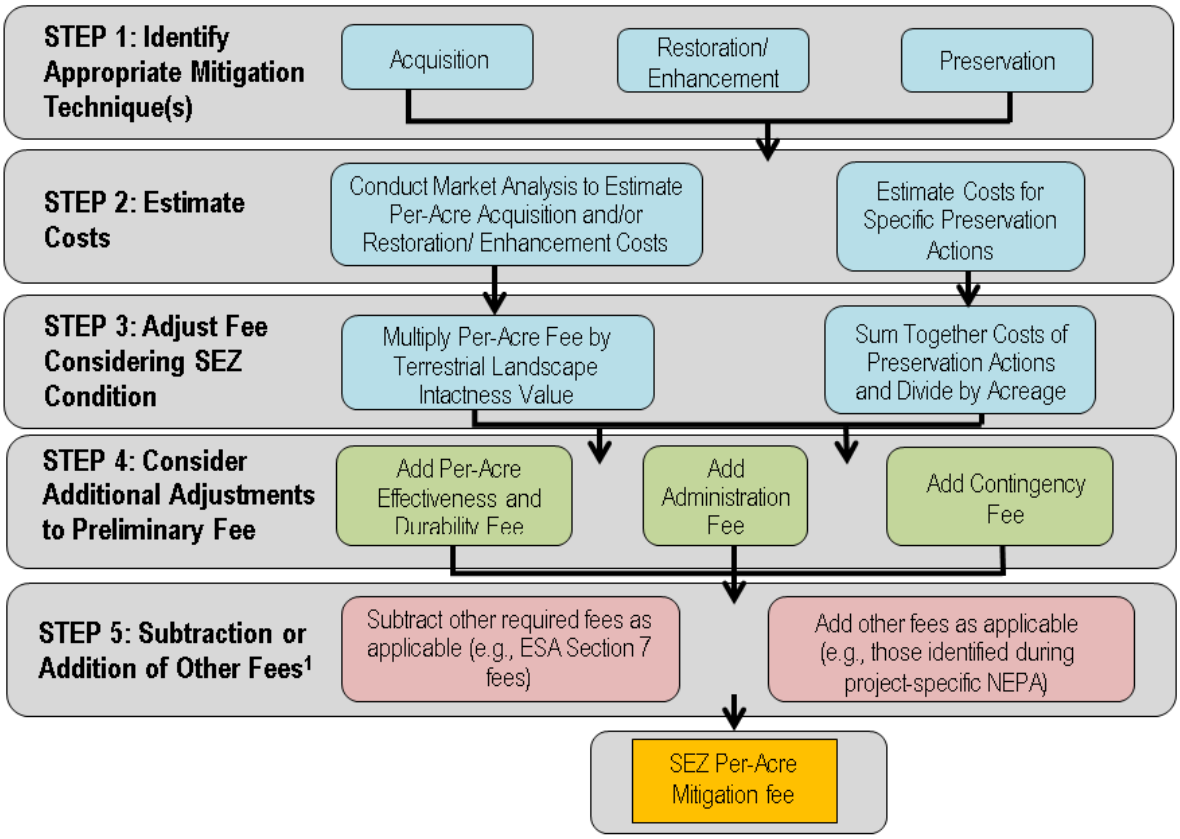
2.6 Calculating the Recommended Mitigation Obligation for the Dry Lake Valley North Solar Energy Zone

In this section, BLM recommends a regional mitigation obligation based on residual impacts likely warranting mitigation for the Dry Lake Valley North SEZ, as summarized in Section 2.4.3.2.2. The BLM recognizes that several options are available to satisfy compensatory mitigation obligations for residual impacts of solar development in the SEZ. These options include (a) proponent-responsible compensatory mitigation, (b) the purchasing of credits from BLM-approved mitigation banks or conservation/mitigation exchanges (if available), and (c) contributions to a mitigation fund.

This section provides BLM's recommended method and process based on contributions to a mitigation fund (Option c) and a step-wise, estimated cost of impact basis and calculation. The BLM presents mitigation action reference costs (base fees) and a recommended project mitigation fee for the Dry Lake Valley North SEZ used to inform BLM's subsequent identification of an appropriate compensatory mitigation fee. Under this option, BLM recommends that the long-term responsibility for compensatory mitigation be transferred away from the authorized land user (solar developer) with payment of a predetermined fee based on the type and magnitude of the identified residual impacts warranting compensatory mitigation. The entire fee would be paid before development commences but would be managed to provide for the selected mitigation actions over the life of the project impacts. If contribution to a mitigation fund is selected as the mitigation method in coordination with the developer, the likely fee will be identified before parcels are made available for auction. The fee will be updated to reflect current costs of acquisition and/or restoration and may also include costs for compensatory mitigation for impacts warranting mitigation not previously included in the fee (e.g., cultural impacts and Native American concerns). In addition, just prior to issuing a notice to proceed with construction, BLM may adjust that fee in order to include costs based on impacts that require consideration of project-specific data (e.g., impacts to visual resources). The final compensatory mitigation fee will be paid by the developer at the issuance of the Notice to Proceed (see Table 1-1).

As discussed in the Draft Procedural Guidance for Developing Solar Regional Mitigation Strategies (BLM 2014c) and modified through stakeholder input, the mitigation method options for establishing the preliminary base compensation fee are these: the approximate costs of restoring/enhancing, acquiring, and/or preserving (or some combination therein) an area of land with similar resource value in the same ecoregion as the SEZ. However, because most lands in the vicinity of the Dry Lake Valley North SEZ are already under federal management, acquisition is not a likely mitigation option for this SEZ. Restoration and/or preservation of similar areas on BLM-administered lands are the most likely mitigation options.

Figure 2-13 presents a flow diagram describing the various steps for calculating a per-acre regional compensatory mitigation fee. The steps outlined in the narrative that follows discuss the specific assumptions and calculations used to determine the recommended fee for the Dry Lake Valley North SEZ.



[1] No fees pertaining to Endangered Species Act (ESA) Section 7 are currently applicable for the SEZ. Any additional fees identified during project-specific NEPA analyses will be added to the final mitigation fee as part of the NEPA decision.

Figure 2-13. BLM-recommended Steps for Calculating Per-acre Regional Compensatory Mitigation Fee for the Dry Lake Valley North SEZ, Based on Impacts

Step 1: ***Identify the mitigation method or combination of methods:*** Because restoration and/or enhancement are the most likely mitigation actions that could be implemented in the Dry Lake Watershed, the BLM interdisciplinary team recommends that restoration of habitat similar to that found in the SEZ should be the basis for the mitigation fee.

Step 2: ***Estimate Costs for the Base Fee:*** The range of restoration costs presented in Table 2-7 include costs for actions to restore similar vegetation and habitat to that which would be lost in the SEZ, specifically costs for seeding, planting, and weed control. The BLM recommends that these costs be the basis for the restoration base fee. The cost for aerial seeding is estimated as approximately $14 per acre. The costs for more comprehensive seeding activities (including purchasing, collecting, and application) are estimated at $1,400 per acre. The range assumed for seeding for the base fee is $14 to $1,400 per acre with a mean of $707 per acre. The cost range for planting (including collecting seeds, growing plants in a green house, and replanting on the reclamation site) is $9/plant; for this SRMS, BLM assumed 100 plants per acre. The costs for weed control range from about $112 to $600 per acre, with an average estimated cost of $316 per acre.

Table 2-7. Sources of Restoration Action Costs Used as Restoration Cost Assumptions

Mitigation Measure	Cost	Agency-Proponent	Source	Project
Aerial seeding of sagebrush in Idaho	Approximately $14/acre	BLM	BLM Idaho	Various projects (2011)
Seeding (including purchasing, collecting, and application)	$1,400/acre	BLM	BLM Nevada, market analysis	None currently
Planting	$9/plant	BLM	BLM Nevada, market analysis	None currently
Weed Control in San Luis Valley, Colorado	$112–600/acre	BLM, U.S. Forest Service (FS)	BLM, FS Invasive Species programs	Various weed control projects (2014)

Past precedents for the mitigation ratio ranges that have been required to date for compensatory mitigation on permitted solar facilities on public lands have ranged from 1:1 to 5:1 (Table 2-8). The recommended mitigation ratio for the Dry Lake Valley North SEZ is based on management actions identified in the Ely RMP (BLM 2008), which provides for a 2:1 ratio when mitigating impacts to special status species habitat. The potential for impacts to special status species such as birds and the Desert Valley kangaroo mouse is widespread throughout the SEZ. As such, the 2:1 mitigation ratio was recommended for the Dry Lake Valley North SEZ. There is no habitat for Endangered Species Act (ESA)-listed species within the SEZ.

Table 2-8. Precedents for Mitigation Ratio Ranges

Project	Impact Requiring Compensatory Mitigation	Mitigation Ratio	Source
Genesis Solar Power Project	Loss of Desert Tortoise habitat	1:1 for 1,750 acres and 5:1 for 24 acres	USFWS 2010
Ivanpah Solar Electric Generating System	Loss of Desert Tortoise habitat	1:1 for 3,582 acres	USFWS 2011
Ely District Resource Management Plan	Loss of BLM special status species habitat	2:1 mitigation ratio	BLM 2008

Step 3: *Calculate the Adjusted Base Fee:* Because the base per-acre mitigation fee calculated in Step 2 represents the costs of restoring a site to a completely pristine landscape, the BLM recommends adjusting the base fee to reflect the actual landscape condition within the SEZ (Figure 2-13). To do this, the current condition of the Inter-Mountain Basins Mixed Salt Desert Scrub community – the dominant vegetation community in the SEZ – was used as an estimate of the condition of the SEZ relative to a completely intact system. The adjustment based on SEZ condition was made by multiplying the average landscape condition index value for the SEZ (0.81; developed based on data from the Central Basin and Range REA [Comer et al. 2013]) by the base fee, as follows:

Adjusted Base Per-Acre Mitigation Fee for the SEZ = Base Fee × 0.81 (condition index)

In developing this SRMS, the BLM considered the inclusion of an additional adjustment factor to account for the environmental benefit of locating several solar facilities in an SEZ, in close proximity to one another, as opposed to locating the facilities throughout the region. These benefits could include a reduced need for separate infrastructure such as roads, transmission lines and substations, and pipelines, as well as maintaining an overall greater condition of the landscape. However, because specific methods for calculating such an adjustment factor have not yet been determined, no corresponding adjustment was made to the recommended Dry Lake Valley North SEZ mitigation fee. If sufficient information to support such an adjustment becomes available in the future, the BLM may utilize that information to adjust mitigation fees for this or other SEZs.

Step 4: Additional adjustments to the fee

Step 4A: *Add Per-Acre Effectiveness and Durability Adjustment:* To help ensure that the restoration is effective and durable, the BLM recommends that a standard effectiveness and durability fee be applied to regional compensatory mitigation fees. In addition, the BLM recommends that the effectiveness and durability adjustment be applicable over the duration of project impacts. For this estimate of appropriate mitigation fees for the Dry Lake Valley North SEZ, a duration of impacts of 50 years is assumed.

The effectiveness and durability adjustment applicable for the Dry Lake Valley North SEZ includes long-term effectiveness monitoring. The cost for long-term monitoring of the success of restoration is currently estimated to be $5 per acre per year, as used in the Dry Lake SEZ SRMS (BLM 2014a). This assessment assumed the annual monitoring cost of $5/acre over a duration of 50 years (that is, a total of $250 per acre).

Because law enforcement is a standard activity for BLM, fees for these actions were not included in the effectiveness and durability adjustments.

Step 4B: *Add Administration and Contingency Fees:* The BLM recommends an administration fee of 5% for management of regional compensatory mitigation funds. In addition, a fee to account for any unforeseen future circumstances (contingency fee) should be included. For example, a fire is one of many possible contingencies that could reduce the effectiveness of reseeding. A 10% contingency fee is assumed for this assessment, based on the Lower Colorado River Habitat Restoration Plan (LCRMSCP 2004) and professional judgment.

Step 5: *Subtract or add other fees:* The Dry Lake Valley North SEZ is not located in an area subject to any Section 7 permitting fees for federally listed species under the Endangered Species Act. Because there are no ESA-listed species or critical habitat identified within the SEZ, no adjustment for ESA-listed species impacts is included in the fee calculation.

At this time, the recommended fee does not include a component for mitigation of cultural resources, because of an absence of archaeological inventory data and because consultation for cultural resources is still under way. If compensatory mitigation is identified as warranted for addressing cultural resources during future project-specific evaluations, the required mitigation fee to compensate for those impacts would be determined separately from the process described in this section.

Similarly, the recommended mitigation fee described in this section does not include a component for mitigation of visual resources. The determination of visual resource impacts must be performed at the project-specific level, because the locations of solar projects within the SEZ and type of

solar technology have a major effect on the impacts. Although compensatory mitigation has been identified as warranted for addressing visual impacts on the SEZ and surrounding areas (see Section 2.4.3.2.2), the specific, visually sensitive affected areas will not be known until project-specific NEPA evaluations are available. Therefore, appropriate compensatory mitigation fees for visual impacts must be determined at the project-specific level.

Recommended Compensatory Mitigation Fee for the Dry Lake Valley North SEZ: Table 2-9 provides the recommended per-acre fee for the Dry Lake Valley North SEZ, which includes components for restoration success, condition of the SEZ, effectiveness and durability, administration fees, and a contingency fee. The likely compensatory mitigation fee for the SEZ will be identified as part of the pre-auction NEPA decision record, and may include adjustments for land value and inflation and costs for impacts not previously included (e.g., for cultural resource or visual resource impacts). Prior to collecting the fee and after the project-specific NEPA evaluation, it may again be adjusted for inflation and/or for costs not previously included (e.g., for cultural resource or visual resource impacts). The BLM recommends a value of $3,870 per acre (2015 dollars) as the per-acre compensatory mitigation fee for the Dry Lake Valley North SEZ.

2.7 Management of Solar Regional Compensatory Mitigation Obligations

The BLM will select management options for SEZ mitigation obligations that are consistent with the BLM's interim regional mitigation policy, draft Manual Section 1794, issued June 13, 2013, and the U.S. Department of the Interior's Departmental Manual Section 600 DM 6 Landscape-Scale Mitigation Policy, issued October 23, 2015, which includes guidance for management of funds collected as part of the restoration or preservation portion of the total mitigation fee by an independent third party (BLM 2013). The Ely District Office will incorporate the most recent departmental mitigation policy to implement a transparent and effective accounting system to track funds contributed and funds spent, and to establish a funding mechanism to cover administration, durability, monitoring, and reporting for the investments for the duration of the impacts from development in the SEZ.

Table 2-9. Components of the Recommended Per-Acre Compensatory Mitigation Fee for the Dry Lake Valley North Solar Energy Zone

Activity or Adjustment	Dry Lake Valley North SEZ Recommended Fee[a]
STEPS 1 and 2: Identify Actions and Cost Components for Base Fee	
Restoration – Average of range for aerial seeding of $14/ acre, or for more comprehensive seeding, $1,400/acre	$707
Restoration – Planting ($9/plant; assume 100 plants/acre)	$900
Restoration: Weed control average of range for weed control (range of $112 to $600 per acre)	$316
Restoration success – (assumes 2::1 mitigation ratio)	$1,923
SEZ Base Fee (sum of acquisition and restoration cost, and assumed 2:1 mitigation ratio)	$3,846
STEP 3: Adjusted Base Fee	
Base Fee × Landscape Condition[b] (0.81)	$3,115
STEP 4: Additional Adjustments	
Effectiveness and durability for long-term monitoring – $5/acre/year for 50 years	$250
Adjusted Fee Subtotal (sum of adjusted base fee and long-term monitoring	$3,365
Administration Fee (5% of Adjusted Fee Subtotal)	$168
Contingency Fee (10% of Adjusted Fee Subtotal)	$337
Adjusted Fee (sum of adjusted fee subtotal, administration fee, and contingency fee)	$3,870
STEP 5: Other Fees	
ESA fees, other impacts – none currently identified	–
Recommended Per-Acre Fee (Adjusted Fee + Other Fees)	$3,870

[a] The recommended developable area for the Dry Lake Valley North SEZ is 17,827 acres.

[b] Based on the Landscape Condition Model developed for the Central Basin and Range REA. Other REAs have produced similar models, referred to as "landscape intactness models," which have been applied in other SRMSs.

2.8 Evaluation of Compensatory Mitigation Sites, Actions, and Desired Outcomes

The proposed regional compensatory mitigation sites and actions will mitigate for the temporary loss of some of the resources that will occur as a result of solar development in the Dry Lake Valley North SEZ. The set of potential mitigation actions presented here were generated by soliciting proposals from the public and from BLM staff in the district; however, no proposed mitigation actions or sites were received from the public. The BLM Caliente Field Office considered several regional compensatory mitigation actions, which were evaluated in Appendix D based on several criteria pertaining to regional goals described in Section 2.5. The candidate mitigation sites and actions screening matrix in Appendix D evaluates the following four proposed mitigation options:

CM01: Restore public lands outside the SEZ in the same watershed (Dry Lake Valley). This effort may include actions such as (but not limited to):

a. Restore and enhance desired vegetative communities in areas where the natural vegetative regime has been altered.
b. Eradicate invasive species by controlling and actively managing noxious and invasive weed species already present.
c. Fence springs and, where determined to be appropriate, pipe the water to a trough for wildlife, wild horses, and/or domestic animals.
d. Fund the seed collection and long-term storage of any special status species of plant populations found on the project site.

CM02: Acquire and restore non-federal lands in Coyote Springs Valley that contain habitat for sensitive species and other resources affected by solar development on the SEZ (options may include but are not limited to: conservation agreements, conservation easements, etc.).

CM03: Restore degraded habitats in the Highland Range and Schlesser pincushion ACECs (Areas of Critical Environmental Concern, which contain similar resource values to those unavoidably impacted by development).

CM04: Restore areas degraded by vehicle traffic through the implementation of a travel management plan for the Dry Lake Watershed that includes identification of "redundant" roads to be closed and restored.

The following criteria, in addition to others described in Appendix D, were used to screen and rank these sites and actions:

- The sites contain the same vegetation communities as the SEZ (e.g., Inter-Mountain Basins Mixed Salt Desert Scrub).
- The sites provide habitat for a similar suite of general wildlife, special status species, and rare plants.
- The sites are in a higher VRM class than the Dry Lake Valley North SEZ. Improvements provided by regional compensatory mitigation for the Dry Lake Valley North SEZ would result in improvements to a higher VRM class.

- The degree to which the mitigation site and actions are consistent with the goals, objectives, and recommendations of the Ely District RMP and the Dry Lake Valley Watershed Evaluation Report.

- The degree to which the mitigation sites and actions facilitate applicable management prescriptions in the Ely District RMP, with respect to durable mitigation investments. Management prescriptions that facilitate durability include, but are not limited to: special conservation-oriented designations, such as national conservation areas, ACECs, designated wilderness areas, and wilderness study areas; and areas where land-disturbing activities are prohibited.

Proposed Mitigation Actions and Sites. Based on the screening approach outlined in Appendix D, CM01 (restoration of public lands outside the SEZ) addressed the most criteria and was the highest-ranked compensatory mitigation action. However, the size of the Dry Lake Valley North SEZ's developable area (17,827 acres) will likely allow for the development of multiple utility-scale solar energy projects at different times in the future. The technology, scale, and schedule of these developments would influence the prioritization of compensatory mitigation options. For this reason, the BLM is currently considering all potential mitigation actions and sites listed above and in Appendix D. The determination of required compensatory mitigation actions and sites will be conducted at the project level through a project-specific NEPA assessment, such as a project-specific Environmental Assessment (EA), which would tie to the Solar PEIS (BLM and DOE 2012) and consider recommendations from this SRMS document.

2.9 Mitigation Effectiveness Monitoring and Adaptive Management Plan

In the Final Solar PEIS, the BLM committed to developing and incorporating a monitoring and adaptive management plan into its solar energy program. The BLM "Assessment, Inventory, and Monitoring Strategy for Integrated Renewable Resources Management" (AIM Strategy) (Toevs et al. 2011) will guide the development of a Dry Lake Valley North monitoring plan that will inform management questions at multiple scales of inquiry (e.g., the region/landscape, mitigation area, and project area). Detailed information about how the AIM Strategy will be implemented to support long-term monitoring of solar development is provided in Appendix A, Section A.2.4 of the Final Solar PEIS. This monitoring plan will also be consistent with and complement the BLM regional and national monitoring activities.

In the context of solar energy development, long-term monitoring should be conducted to (1) evaluate the effectiveness of mitigation measures, including avoidance measures, onsite mitigation, and regional compensatory mitigation; (2) detect unanticipated direct and cumulative impacts at the project and regional level; and (3) evaluate the effectiveness of elements of the BLM's solar energy program (e.g., policies, design features). To ensure that investments in regional compensatory mitigation actions are effective and that regional compensatory mitigation desired outcomes are being met, it is critical that the long-term monitoring plan include monitoring outcomes specific to the regional compensatory mitigation sites and actions. The findings of the long-term monitoring activities will be examined by the BLM to support adaptive management of solar development (i.e., to identify the need to adjust operational parameters, modify mitigation measures, and/or implement new mitigation to prevent or minimize further impacts). The following steps will be conducted to develop the mitigation effectiveness monitoring plan for the Dry Lake Valley North SEZ:

Step 1. Develop Management Questions and Monitoring Goals

The BLM interdisciplinary team has developed management questions to articulate the issues of concern related to monitoring mitigation effectiveness. The management questions provide the basis for developing monitoring goals. The management questions and monitoring goals for the Dry Lake Valley North SEZ are provided in the two text boxes that follow.

Management Questions Established for the Dry Lake Valley North Solar Regional Mitigation Strategy

1. Were the design features of the solar development effective to contain the impact of solar installation to the project site (e.g., trend of attributes, special species habitat indicators, invasive species, habitat metrics)?
2. Are the avoidance areas maintaining ecological composition and process similar to those adjacent to the project area?
3. Are the avoidance areas for cultural resources sufficient to protect their values from unintended or unanticipated adverse effects?
4. Did the regional compensatory mitigation actions achieve their outcomes?
5. Were the Dry Lake Valley North Solar Energy Zone (SEZ) mitigation actions, collectively, effective in improving the trend of landscape metrics in the regional compensatory mitigation site(s)?
6. What is the status and trend of landscape metrics for critical ecological processes necessary to sustain the Central Basin and Range ecosystem at two scales: the Dry Lake Valley North SEZ 2-mile buffer area, and the compensatory mitigation area(s)? (Note: Some impacts may need to be assessed at different distances, e.g., watershed, airshed).

Monitoring Goals Established for the Dry Lake Valley North Solar Regional Mitigation Strategy

1. Establish baseline measurements of landscape metrics and patterns. (Contributes to answers to Management Questions [MQs] 1, 2, 4, and 5.)
2. Establish baseline measurements for cultural resource values and determine the status and trend of these values once the permitted activity and related mitigation actions have been implemented. (Contributes to answers to MQs 1, 3, and 4.)
3. Determine the status, condition, and trend of priority resources and landscape pattern metrics once the permitted activity and related mitigation actions have been implemented. (Contributes to answer to MQ 5.)
4. Leverage the quantitative data from goals 1, 2, and 3 to map the location, amount, and spatial pattern of priority resources and disturbances. (Contributes to answer to all MQs.)
5. Generate quantitative and spatial data to address goals 1 and 3 to contribute to existing land health assessment and evaluation processes at multiple scales of inquiry. (Contributes to answer to MQ 6.)
6. Generate quantitative and spatial data to determine whether management actions (e.g., stipulations, land treatments) are moving resources toward desired states, conditions, or specific resource objectives identified in planning or related documents or legal mandates. (Contributes to answer to all MQs.)

Step 2. Identify Measureable Monitoring Outcomes and Indicators

Measureable monitoring outcomes will be established for each monitoring goal identified in Step 1. Outcome setting will be based on current regulatory requirements, RMP goals, or the desired future condition consistent with the land potential (as described in the ecological site description, if available – see Step 4). Examples of measureable monitoring outcomes are provided in the text box titled Measureable Monitoring Outcome Examples.

Measurable Monitoring Outcome Examples

An example of a measureable outcome for land status/trend of vegetation is:

(1) Detect a difference of 10 percentage points in the average amount of bare ground in the <MITIGATION SITE> over a 5-year period with 80% confidence.

(2) Determine whether at least 25% perennial grass cover in the <MITIGATION SITE> has been maintained with 80% confidence.

An example of an outcome for special status species is:

(1) Ensure that populations of <SPECIAL STATUS SPECIES NAME> in the <ECOREGION NAME> have not decreased by more than 20% within 5 years of the solar installation with 80% confidence.

An example of an outcome for cultural resource values is:

(1) Detect any unanticipated impacts attributable to development-related changes in natural processes (e.g., erosion, vegetation growth or removal) or to human effects (e.g., trampling, casual collection, vandalism) associated with increased project-related access.

Outcome setting includes specifying the attribute and measurable indicators of those attributes to be monitored. Monitoring outcomes will indicate the allowable amount of change (specific) and confidence level for the measured change (measurable), relationship to the management question (relevant), and timeframe during which the measurement occurs to effectively inform management (time sensitive).

Indicator selection will start with the standard AIM core and contingent quantitative indicators (MacKinnon et al. 2011) and supplement with additional indicators derived from ecosystem conceptual models and/or linked to specific management questions. The AIM core indicators and methods provide high-quality, quantitative information on all land cover types the BLM manages (MacKinnon et al. 2011). Table 2-10 (reproduced from MacKinnon et al. [2011]) lists each method and the corresponding indicators it measures, and the table describes recommendations to achieve consistent implementation across the BLM. When an ecological site at a monitoring site is identified, the BLM core measurements can be assessed in concert with information contained in the ecological site descriptions and the accompanying state and transition model to ascertain departure from an expected reference condition. The methodology for this assessment is contained in "Interpreting Indicators of Rangeland Health," BLM Technical Reference 1734-6 (Pellant et al. 2005). Table 2-11 is a summary table from this technical reference.[13]

In addition to the BLM core indicators, the design features for the Solar PEIS indicate that the BLM will consider requiring dust and noise monitoring as a leasing stipulation for the Dry Lake Valley North SEZ (BLM 2012). The developer's proposal will be reviewed by the BLM monitoring team to evaluate the efficacy of the proposal in complying with permit stipulations and informing BLM regulatory and land management needs.

Special Status Plant Species Monitoring. The BLM will consider requiring the developer to conduct long-term monitoring on special status plant populations found on the project site and located in the same geographic region for the length of the duration of the impact. A special status plant species monitoring plan will be designed to determine the status, trend, and recruitment success of the populations and will follow methods described in BLM Technical Reference 1730-1, "Measuring and Monitoring Plant Populations" (Elzinga, Salzer, and Willoughby 1998).

[13] Tables 2-10 and 2-11 summarize guidance for BLM monitoring that may change over time; the most current versions of these guidance documents should be utilized at the time the monitoring program for the Dry Lake Valley North SEZ is established.

Table 2-10. Recommended Methods and Measurements for Core and Contingent Indicators (reproduced from MacKinnon et al. [2011])

Method	Indicator(s)	Description
For core indicators		
Line-point intercept with plot-level species inventory	• Bare ground • Vegetation composition • Nonnative invasive species • Plant species of management concern	Line-point intercept (LPI) is a rapid and accurate method for quantifying cover of vegetation and bare ground. Because LPI can underestimate cover of uncommon species, this method is supplemented with searches of a 150-ft (45.7-m) diameter standard plot for at least 15 minutes and until new species detections are more than 2 minutes apart. When performing LPI within tree cover, a modified pin method (e.g., a pivot-table laser or extendable pin) will be used to capture overstory cover.
Vegetation height measurement	• Vegetation height	Measure height of tallest leaf or stem of woody and herbaceous vegetation (living or dead) within a 6-in (15-cm) radius recorded for points along a transect. If vegetation is taller than 10 ft, a standard tape and clinometer method should be used to estimate vegetation height.
Canopy gap intercept	• Proportion of soil surface in large intercanopy gaps	Canopy gap intercept measures the proportion of a line covered by large gaps between plant canopies and is an important indicator of the potential for erosion. Use 1-ft (30-cm) minimum gaps.
For contingent indicators		
Soil stability test	• Soil aggregate stability	This test measures the soil's stability when exposed to rapid wetting and provides information on integrity of soil aggregates, degree of structural development, resistance to erosion, and soil biotic integrity.
Soil sample collection and analysis	• Significant accumulation of soil toxins	The presence and concentrations of toxins are assessed by collecting three samples from the soil surface and one sample at depths of 0 to 4 in (0 to 10 cm) and 4 to 8 in (10 to 20 cm) using a soil corer and following Forest Inventory and Analysis protocol.

Table 2-11. Quantitative Indicators and Measurements Relevant to Each of the Three Rangeland Health Attributes (reproduced from Pellant et al. [2005])

Attribute	Qualitative Assessment Indicator	Quantitative Measurement Method	Key Quantitative Assessment Indicator
Soil/site stability	• Rills • Water flow patterns • Pedestals and/or terracettes • Bare ground • Gullies • Wind-scoured, blowout, and/or depositional areas • Litter movement • Soil surface resistance to erosion • Soil surface loss or degradation • Compaction layer	Line-point intercept	Bare ground
		Canopy gap intercept	Proportion of soil surface covered by canopy gaps longer than a defined minimum
		Soil stability test	Soil macro-aggregate stability in water
Hydrologic function	• Rills • Water flow patterns • Pedestals and/or terracettes • Bare ground • Gullies • Soil surface resistance to erosion • Soil surface loss or degradation • Plant community composition and distribution relative to infiltration and runoff • Compaction layer • Litter amount	Line-point intercept	Bare ground
		Canopy gap intercept	Proportion of soil surface covered by canopy gaps longer than a defined minimum
		Soil stability test	Soil macro-aggregate stability in water
Biotic integrity	• Soil surface resistance to erosion • Soil surface loss or degradation • Compaction layer • Functional/structural groups • Plant mortality/decadence • Litter amount • Annual production • Invasive plants • Reproductive capability of perennial plants	Soil stability test	Soil macro-aggregate stability in water
		Line-point intercept	Plant canopy (foliar) cover by functional group
		Line-point intercept	Plant basal cover by functional group
		Line-point intercept	Litter cover
		Line-point intercept	Invasive plant cover

Step 3. Develop Sampling Schema

Based on the management questions, monitoring goals, measurable outcomes, and the indicators developed in Steps 1 and 2, the BLM interdisciplinary team will determine the temporal and spatial scale of data collection activities. To develop the sampling schema, the following work will be conducted:

Develop a Statistically Valid and Scalable Sampling Design. Ecological sites are areas of land with the potential to produce similar types and amounts of vegetation based on soils and climate, and are the basic units for stratifying landscapes for BLM monitoring activities. Because ecological site descriptions describe the ecological states (plant communities) that can occur within the ecological site and can provide expected indicator values for reference states, they are the foundation upon which BLM monitoring data are evaluated. These data are also fundamental for terrestrial upland land health standards and land health evaluations. Where ecological site descriptions have not been developed, land potential metrics can be developed using a combination of field and remote sensing data to describe current and potential future conditions at broad scales.

Incorporate Status and Trend Monitoring. The monitoring locations are determined through a statistically based (i.e., randomized) selection of monitoring sites. Once the monitoring extent (i.e., inference area) is determined for each scale, a stratified random technique will be used to select monitoring sites such that every location within the monitoring extent has a known and nonzero probability of being selected for sampling. Strata will be based on ecological sites (or groupings of sites with similar ecological characteristics) to allow for adequate representation of ecological characteristics and linear features (e.g., ephemeral washes). See Figure 2-14 for an example sampling schema for the Dry Lake Valley North SEZ and a 2-mile buffer area. Locations would be monitored in a manner consistent with the BLM's AIM Strategy (Toevs et al. 2011) in order to understand status and trends in monitored resources. This example of a sampling schema could also be applied to the candidate mitigation sites once site boundaries have been delineated.

Incorporate Monitoring of Effectiveness of Actions. The sampling schema for an implementation action follows the criterion from the previous paragraph, with the sample population based on the geospatial footprint of the project area and the addition of control sites to determine effectiveness of the action. Control sites are chosen outside of the action area based on the similarity of the soils and the existing vegetation community in the action area. Control sites can be a selection from existing statistically valid monitoring efforts, such as the long-term monitoring sites that are a part of the BLM Landscape Monitoring Framework.

To account for the variability among sites of similar potential, a minimum of three control sites are selected for each strata present in the treatment area. Sample sufficiency analysis will be conducted after the first year of sampling to examine indicator variability within each stratum to determine whether additional sites are needed in the implementation action or control areas.

Integrate Remote Sensing Monitoring Technologies. Considerable work has been done to develop methodologies for processing and analyzing remote sensing data in order to extract information suitable for assessing changes in certain environmental conditions over time. The AIM Strategy emphasizes the value of integrating remote sensing technologies into long-term monitoring programs, wherever feasible, in order to provide cost-effective methods for collecting data and analyzing effects (Toevs et al. 2011).

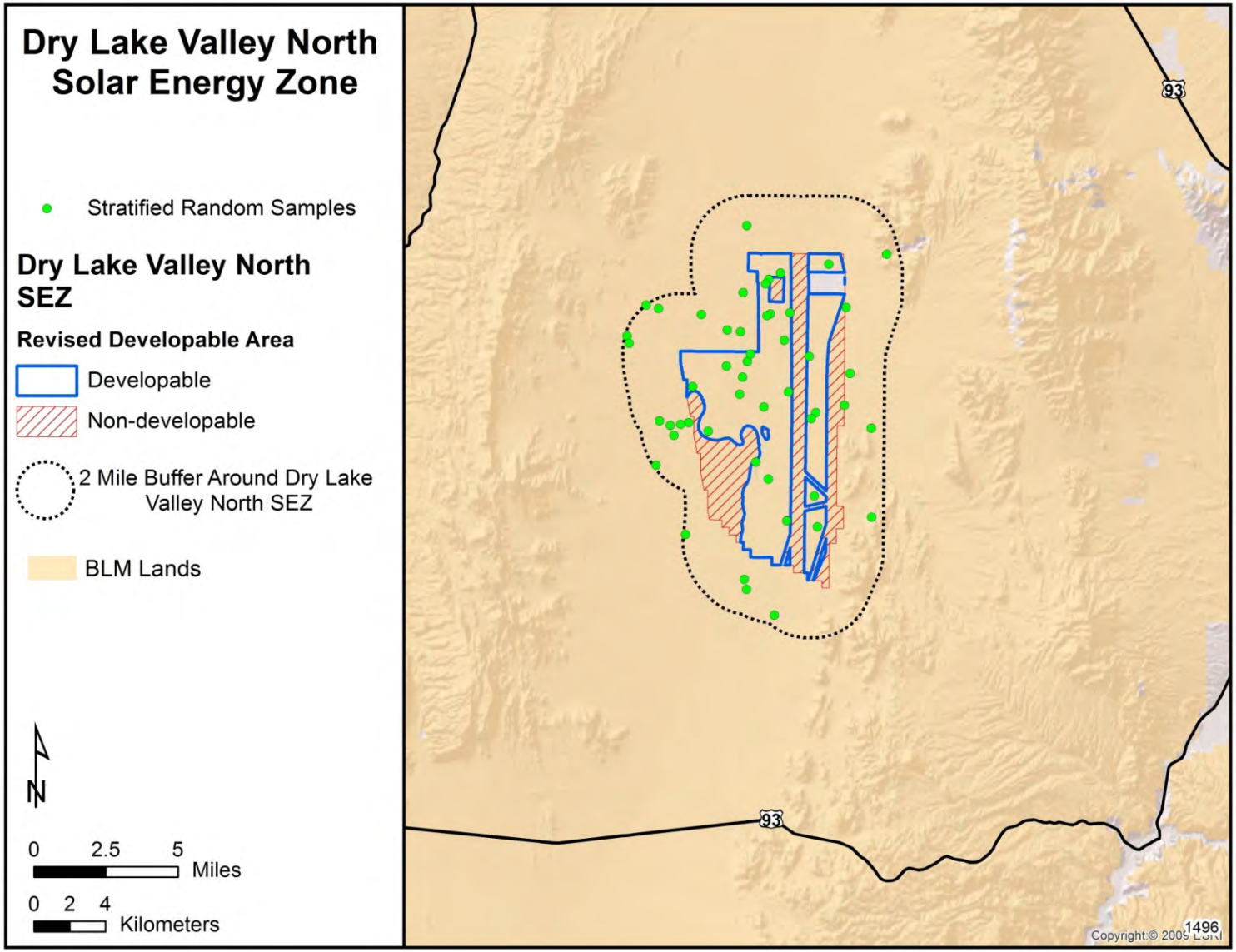


Figure 2-14. Example of a Random Stratified, Nonbiased Sampling Schema for the Dry Lake Valley North Solar Energy Zone

Remote sensing technologies provide several benefits. They support the collection of spatially comprehensive datasets that are not otherwise readily available. In addition, the collection of data from a satellite or aircraft is nonintrusive — a very valuable feature for assessing ecologically and culturally sensitive areas. Semi-automated data processing of remotely sensed images can be a cost-effective way to detect and identify features reliably and to quantify parameters over large areas more frequently. This feature is desirable for monitoring spatially heterogeneous and temporally dynamic arid and semiarid environments. Historic archives of remotely sensed data permit retrospective assessments and are thus suitable for long-term monitoring (Washington-Allen et al. 2006).

The limitations of remote sensing are that such measurements are indirect, and the spatial sampling unit (i.e., pixel) is arbitrary. In remote sensing, spectral reflectance signals from elements on the ground are assumed to be isolated from environmental and instrumental noise (Stow 2005). Further, targets are assumed to be spectrally separable from background, and different target types are assumed to have unique spectral signatures (Friedl, McGwire, and McIver 2001). The BLM interdisciplinary team should consult the AIM Strategy guidance and remote sensing experts to investigate cost-effective ways to incorporate the use of remote sensing technologies into the monitoring of mitigation actions.

Step 4. Develop Analysis and Reporting System

Interpreting the data to determine the status, departure, or rate of change requires comparison of data collected via field sampling and/or remote sensing against indicators of ecological attributes for reference conditions. These reference conditions will be based on site or landscape potential, which is described in ecological site descriptions or documented through reference sites. Ecological sites, or groupings of sites with similar ecological characteristics, are the basis for the monitoring schema because they react similarly to factors like disturbance or degradation (historic or current), which can lead to alternative stable plant communities outside the historic potential of the site. For this reason, ecological groupings are a basic unit for analysis and reporting. Elements of an ecological description that are helpful for defining reference conditions and interpreting departure from reference conditions include: state-and-transition conceptual models of plant community changes in response to disturbance or management; descriptions of the range of plant communities that could exist on the site in addition to the potential vegetation; descriptions of anthropogenic and natural disturbances and their potential to cause changes in plant communities; descriptions of dynamic soil properties (e.g., organic matter content, soil aggregate stability); and amount of bare ground. Report frequency will be established at the time that mitigation and monitoring actions are selected. Reports would be made publicly available through various media (e.g., available on public websites).

Step 5. Define Adaptive Management Approach

The BLM will use information derived from the Dry Lake Valley North monitoring plan to determine whether resource management objectives described in the Ely RMP—the Dry Lake Valley North SEZ, the 2-mile buffer zone around the Dry Lake Valley North SEZ, and the areas where regional compensatory mitigation actions will occur—are being met. If the objectives are not being met, the monitoring program information will be used to make necessary management adjustments to the mitigation actions. Reporting at multiple scales will inform decision makers on the effectiveness of management and mitigation actions, opportunities for adaptive management (e.g., adjusting operational parameters, modifying mitigation actions, and/or adding new mitigation actions), refinement of conceptual models, and evaluation of the monitoring program itself. Adaptive changes will be subject to environmental analysis, land use planning, and public involvement, as appropriate.

2.10 Implementation Strategy

This project considered impacts that are likely to occur with the full build-out of the Dry Lake Valley North SEZ identified in the Final Solar PEIS. The project team found that while many potential impacts can be avoided and/or minimized, several residual impacts are likely to remain and may warrant regional compensatory mitigation[14]:

- The loss of habitat and the potential loss of individual animals for the following BLM special status species: Blaine fishhook cactus, Great Basin fishhook cactus, Eastwood milkweed, golden eagle, western burrowing owl, and Desert Valley kangaroo mouse.

- The loss of ecosystem services and the human uses depending on them as a result of development and until the lease expires and the site is restored. The primary components of an ecological system are: soils, vegetation, water, air, wildlife, and visual resource quality.

In addition, the following residual impacts were identified as having the potential to occur, depending on the way the area is developed, the success of onsite mitigation activities, results of investigations to fill data gaps, and/or the discovery of unanticipated resources:

- Introduction and spread of invasive/noxious weeds.

- Loss and fragmentation of wildlife habitat.

- Alterations to surface hydrology.

- Visual resources as seen from nearby specially designated areas.

- Loss of cultural resources.

- Certain Native American concerns (e.g., loss of habitat and spiritual values).

Any authorized mitigation activities will be intended to provide mitigation through the duration of the project impacts with intensive monitoring and adaptive management for 50 years. This extended time period is critical for effective implementation of mitigation. The proposed mitigation sites and actions will offset anticipated impacts of solar development in the Dry Lake Valley North SEZ while allowing the BLM to sustain the yield of impacted resources for present and future generations.

All of the recommended actions and sites are consistent with the goals, objectives, and recommendations given in the current Ely RMP (BLM 2008) and the Dry Lake Valley Watershed Evaluation Report (BLM 2014b). The findings and recommendations offered here are intended to inform the decision-making process associated with leasing land in the Dry Lake Valley North SEZ for utility-scale solar development. At the discretion of the BLM authorized officer, all or part of these recommendations should be included in applicable NEPA analyses and the decision-making process.

[14] The residual impacts listed in this section warranting regional compensatory mitigation differ from those impacts listed in Section 2.4.3.2.2. Impacts to visual resources described in Section 2.4.3.2.2 are subsumed by impacts to ecosystem services and human uses in this section.

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4 GLOSSARY

***Adaptive management*:** a system of management practices based on clearly identified outcomes and monitoring to determine whether management actions are meeting desired outcomes; and, if not, facilitating management changes that will best ensure that outcomes are met or re-evaluated. Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain.

***Additionality*:** improves the baseline conditions of the impacted resource, and is demonstrably new and would not have occurred without the compensatory mitigation action.

***Avoidance*:** avoiding the impact altogether by not taking a certain action or parts of an action (40 CFR 1508.20(a)).

***Baseline*:** the pre-existing condition of a resource, at all relevant scales, which can be quantified by an appropriate attribute(s). During environmental reviews, the baseline is considered the affected environment that exists absent the project's implementation, and is used to compare predictions of the effects of the proposed action or a reasonable range of alternatives.

***Best management practices (BMPs)*:** state-of-the-art, efficient, effective, and practicable mitigation measures for avoiding, minimizing, rectifying, and reducing or eliminating impacts over time. BMPs for solar development in Nevada are identified in BLM's Western Solar Plan and Restoration Design Energy Project.

***Change agents*:** an environmental phenomena or human activity that can alter or influence the future condition and/or trend of a resource. Some change agents (e.g., roads) are the result of direct human actions or influence; others (e.g., climate change, wildland fire, and invasive species) may involve natural phenomena or be partially or indirectly related to human activities.

Coarse filter: elements such as vegetation communities, ecosystems, or land classes for planning and management across landscape- and regional-level management units.

***Compensation*:** compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20(e)).

***Compensatory mitigation action*:** an activity, process, or measure that may include restoration, establishment, enhancement, and preservation of resources offsetting residual effects.

***Compensatory mitigation obligation*:** the compensatory mitigation actions required by the BLM to mitigate residual effects to resources from a land use activity, or fees paid to BLM or other entities to be used to mitigate residual effects to resources from a land use activity.

***Compensatory mitigation site*:** the areas where compensatory mitigation actions are located.

Conservation elements: resources with regional conservation importance, including: species, species assemblages, ecological systems, habitats, physical resources (e.g., air, soils, and hydrology), cultural resources, and visual resources.

Design features: required measures or procedures incorporated into the proposed action or alternatives which could avoid, minimize, mitigate, or otherwise reduce adverse impacts of a project proposal. Design features for solar development in Nevada are identified in BLM's Western Solar Plan and Restoration Design Energy Project.

Durability**:** a state in which the measurable environmental benefits of mitigation will be sustained, at minimum, for as long as the associated harmful impacts of the authorized activity continue. The "durability" of a mitigation measure is influenced by: (1) the level of protection or type of designation provided; and (2) financial and long-term management commitments.

Duration of the impact**:** the temporal extent of resource impacts resulting from permitted actions. The duration of some impacts may be indefinite or perpetual.

Effective**:** produces the desired outcome.

Effects**:** the adverse direct, indirect, and cumulative impacts from a land use activity; effects and impacts as used in this document are synonymous.

Enhancement**:** the manipulation of resources to heighten, intensify, or improve a specific resource.

Fine filter: meant to complement the coarse filter by targeting species with requirements that will not be met through the broad brush of dominant vegetation communities — rare, threatened or endangered species, wildlife species of management interest, or those species that consistently use ecotones or multiple habitats on a diurnal or seasonal basis.

Goal (regional goal or land use plan goal): a broad statement of a desired outcome. Goals are usually not quantifiable and may not have established time frames for achievement.

Impacts**:** the adverse direct, indirect, and cumulative effects from a land use activity; effects and impacts as used in this document are synonymous.

Landscape**:** a geographic area encompassing an interacting mosaic of ecosystems and human systems that is characterized by a set of common management concerns. The landscape is not defined by the size of the area, but rather by the interacting elements that are relevant and meaningful in a management context.

Minimization**:** minimizing impacts by limiting the degree or magnitude of the action and its implementation (40 CFR 1508.20(b)).

Mitigation**:** includes, avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

Mitigation Desired Outcome**:** a clearly-defined and measurable result of a compensatory mitigation action.

***Mitigation hierarchy*:** see *Mitigation*, the process and order of preference for the application of mitigation, i.e., avoidance, minimization, remediation, reduction over time, and/or compensation, in order.

***Mitigation Strategy*:** a document that identifies, evaluates, and communicates potential mitigation needs and mitigation measures in a geographic area, at relevant scales, in advance of anticipated land use activities.

***NEPA process/analysis*:** analysis prepared pursuant to the National Environmental Policy Act, such as a planning- or project-level environmental assessment (EA) or environmental impact statement (EIS).

***No net loss*:** when mitigation results in no negative change to baseline conditions (e.g. fully offset or balanced).

***Objective (regional objective or land use plan objective)*:** a description of a desired outcome for a resource in a land use plan. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

***Onsite Mitigation*:** mitigation implemented in the project area.

Operations and Maintenance: a budgeting term including costs of operation and maintenance of, for example, a mitigation feature.

Performance Monitoring: Short-term monitoring of the restoration effort success. In this SRMS, it refers to a 5-year initial implementation time period.

***Preservation*:** the removal of a threat to, or preventing the decline of, resources. Preservation may include the application of new protective designations on previously unprotected land or the relinquishment or restraint of a lawful use that adversely impacts resources.

***Proponent-responsible compensatory mitigation*:** resources that are restored, established, enhanced, and/or preserved, by an authorized land user (or an authorized agent or contractor), for the purpose of compensating for residual effects to resources from land use activities.

***Residual impacts*:** any adverse reasonably foreseeable effects that remain after the application of the first four steps in the mitigation hierarchy; also referred to as unavoidable impacts.

Resources (and their values, services, and/or functions)*: *resources are natural, social, or cultural objects or qualities; ***resource values*** are the importance, worth, or usefulness of resources; ***resource services*** are the benefits people derive from resources; and ***resource functions*** are the physical, chemical, and/or biological processes that involve resources.

***Restoration*:** the manipulation of degraded resources in order to return the resources to an un-degraded condition.

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APPENDIX A

Impact Assessment Summary Table

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APPENDIX A: IMPACT ASSESSMENT SUMMARY TABLE

The following table summarizes responses from Bureau of Land Management (BLM) and Argonne National Laboratory subject matter experts to the process steps and criteria used to identify the residual (i.e., unavoidable) impacts that are likely to occur as a result of solar development in the Dry Lake Valley North Solar Energy Zone (SEZ). The process steps and criteria for identifying residual impacts are outlined in Section 2.4.3.1 of this document.

Table A-1. Dry Lake Valley North Solar Energy Zone Impact Assessment Summary Table

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Acoustics Section 11.4.15[5]	**Direct:** There would be increased noise levels during construction and operations. Estimated noise levels at the nearest residences do not exceed U.S. Environmental Protection Agency (EPA) guideline level. Noise levels at the Chief Mountains Special Recreation Management Area could exceed EPA's guideline level during both construction and operations, depending on solar technologies used. Noise and associated overpressures created by authorized supersonic flight above and near the SEZ could adversely affect solar technology and/or infrastructure. **Indirect:** None identified. **Cumulative[6]:** Since proposed projects and nearest residents are relatively far from the SEZ and the area is sparsely populated, cumulative noise effects during the construction or operation of solar facilities are unlikely. **Data Gaps[7]:** Impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis.	Solar facilities must be located far enough away from residences, or include engineering and/or operational methods such that county, state, and/or federal regulations for noise are not exceeded. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Noise.pdf).	Programmatic design features state that methods considered may include limiting the hours of daily activities, constructing noise barriers if needed and practicable, and coordinating with nearby residents. Noise dampeners may be attached to equipment to minimize the amount of noise emitted. See programmatic design features.	Maybe .	No. Generally impacts from solar development are expected to be temporary, localized, and readily mitigated onsite.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Air Quality Section 11.4.13	**Direct:** Fugitive dust and equipment exhaust emissions during construction could result in exceedance of Ambient Air Quality Standards (AAQS) for particulate matter (PM) at SEZ boundaries. Specifically, predicted 24-hour and annual PM_{10} concentrations at the SEZ boundary and in the immediate surrounding areas could exceed AAQS during construction of solar facilities, but would decrease quickly with distance. The Prevention of Significant Deterioration increment at Zion National Park in Utah (the nearest Class I area) would not be exceeded. (Note – although Great Basin National Park is closer to the SEZ, it is not classified as a Class I area.) Generation of fugitive dust may result in exposure to respirable particulates and/or microbes (human health impacts). Wind speeds higher than 80 mph can occur in the Dry Lake Valley (particularly in spring), and could increase dust. **Indirect:** None identified. **Cumulative:** Emissions from solar facilities are low and are not expected to contribute to local or regional air pollution problems. Over the long term and across the region, the development of solar energy may have beneficial impacts on air quality in the region. **Data Gaps**: Monitoring for PM during construction and operations will be required to ensure levels remain below AAQS.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Air_Quality_Climate.pdf).	Dust suppression measures will be implemented during construction and operations. See programmatic design features. Also recommend evaluation of certain technologies in project-level NEPA alternatives (e.g., use of elevated solar structures and low emission vehicles, placing gravel on roads, use of "drive and crush" installation) that minimize the amount of grading and surface disturbance to reduce dust emissions and PM levels. Recommend revegetation of the SEZ with native vegetation to increase soil stability and reduce the amount of dust. Vortex generators may be needed to disturb the airflow to protect solar structures from strong valley winds.	Maybe (if large area of site is graded), level of site grading and disturbance to native vegetation would be primary driver of residual impact for full build-out of SEZ.	No, unless monitoring identifies high PM levels.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Climate Change Section 5.11.4 of DPEIS for soil storage capacity; 11.4.13 for emissions avoided	**Direct:** Possible impact through loss of carbon storage capacity of the soil (estimated at 100 g carbon/m^2). Preliminary calculations show loss of CO_2 storage capacity as 1.6 tons/acre/yr (32,088 tons/yr for SEZ full build-out), about 1 percent of the CO_2 emissions avoided by operation of a solar facility (see below). **Positive impact:** Solar power generation reduces demand for energy from fossil fuels, and thereby reduces greenhouse gas (from about 3,032,000–5,458,000 tons/yr CO_2 avoided at full build-out depending on technology), and other emissions. **Cumulative:** Over the long term, the development of solar energy may contribute to reduced greenhouse gas emissions (if the development offsets electricity generation by fossil fuel plants). Data Gaps: None identified.	Maintaining native vegetation cover and soils and minimizing grading. See programmatic design features for vegetation (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf).	See programmatic design features.	No. Impacts are likely to be positive.	No.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Cultural Section 11.4.17	**Direct:** There is potential for impacts on historic properties. Impacts are possible in areas related to the access road improvement. There are four sites located in the SEZ that are known to be eligible for listing in the NRHP. **Indirect:** Indirect impacts from erosion are possible for prehistoric sites in the dry lake, alluvial fan, and dune non-development areas in the southern portion of the SEZ Erosion impacts on the cultural landscape outside of the SEZ resulting from land disturbances and modified hydrologic patterns; increased accessibility and potential for damage to eligible sites outside of the SEZ (if present). **Cumulative:** None expected, but would be dependent on whether any eligible sites are found and impacted in the SEZ and adjacent areas. **Data Gaps**: Pre-development cultural inventory and evaluation will be completed, as part of the Section 106 consultation process.	Avoidance of significant resources clustered in specific areas that retain sufficient integrity is recommended. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Cultural.pdf).	The existing access road that connects the SEZ to U.S. 93 should be upgraded instead of constructing a new access road to reduce ground disturbances and the potential for impacts on cultural resources. A Memorandum of Agreement will be developed and executed if eligible sites are discovered within the SEZ to determine how the eligible properties will be treated (avoided or mitigated to minimize impacts). See programmatic design features.	Yes. Although surveys have not been conducted, it is anticipated that significant resource values may be discovered during pre-development surveys. The discovery of new cultural sites is always a possibility, and adequate mitigation would be dependent on the resources discovered and their relative significance in the region. In addition, impacts on non-renewable resources are both irretrievable and irreversible. Tribal consultation may present situations where data recovery or collection is not possible.	Maybe, pending review of Class III survey data. The impacts might not be fully avoided or minimized onsite.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Ecology – Vegetation and Riparian Areas Section 11.4.10	**Direct:** Development will adversely affect plant communities due to the removal of vegetation (e.g., greasewood flats). Development will result in moderate impacts to the following land types which comprise the majority of the SEZ: Inter-Mountain Basins Mixed Salt Desert Scrub and Inter-Mountain Basins Semi-Desert Grassland. Sensitive habitats on the SEZ include desert dry washes, wetland, and playa. Development, including vegetation removal, land clearing, grading, dust deposition, and lowered groundwater levels, may alter soils and vegetation communities and result in the establishment of invasive species and noxious weeds within the SEZ. Surface disturbances could lead to impacts upstream and downstream of intermittent/ephemeral streams that flow through the SEZ and could have an impact on the critical functions of groundwater recharge, sediment transport, flood conveyance, and ecological habitat in the vicinity of the SEZ. **Indirect:** Loss of native vegetation due to deposition of fugitive dust, groundwater withdrawal, increased surface water runoff and related erosion, and the introduction of invasive species**.** Indirect impacts on habitats associated with the playa, wetlands, or dry washes, including Coyote Wash, within or near the SEZ could occur. Indirect impacts from groundwater use on plant communities in the region that depend on groundwater could also occur. **Cumulative:** Solar energy development could be a contributor to cumulative impacts on some vegetation communities. **Data Gaps:** Potential impacts on springs will be determined through hydrologic studies.	Dry washes, playas, and wetlands within the SEZ, and dry washes within the access road corridor, will be avoided to the extent practicable. A buffer area will be maintained around wetlands, playas, and dry washes to reduce the potential for impacts. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf).	Groundwater withdrawals will be limited to reduce the potential for indirect impacts on groundwater-dependent communities and habitats dependent on springs associated with the Dry Lake Valley basin, Delamar Valley Basin, or other hydrologically connected basins. Appropriate engineering controls will be implemented to minimize impacts on dry wash, playa, marsh, scrub-shrub wetland, riparian, and greasewood flat habitats, including occurrences downstream of solar projects or assumed access road, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls will be determined through agency consultation. Also recommend evaluation of certain technologies in project-level NEPA alternatives (e.g. use of elevated solar structures and low emission vehicles, placing gravel on roads, use of "drive and crush" installation) that minimize the amount of grading and surface disturbance to reduce dust emissions and PM levels. Recommend revegetation of the SEZ with native vegetation to increase soil stability and reduce the amount of dust. See programmatic design features.	Yes to vegetation. Development would result in direct removal or disturbance of these native plant communities, special soil environments, and the ecosystem services they provide. No unavoidable impacts anticipated to riparian areas.	Yes for vegetation, depending on the implementation of onsite minimization measures and BMPs. Native vegetation communities are basic components to the ecosystem; the loss of these communities to solar development in the SEZ would be unavoidable. However, the amount of regional compensatory mitigation required could vary based on the implementation of onsite minimization measures and BMPs chosen by the developer in addition to required programmatic design features. Human development in the ecoregion is expected to increase by 7.7% by 2025 and is expected to contribute to the decline in native vegetation communities. Riparian areas and invasive species will not individually require regional compensatory mitigation. Mitigation measures that conserve intact ecosystems will also mitigate the loss of riparian systems and impacts from invasive species.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Ecology – Invasive and Noxious Weeds Section 11.4.10	**Direct:** Development, including vegetation removal, land clearing, grading, dust deposition, and lowered groundwater levels, may alter soils and vegetation communities and result in the establishment of invasive species and noxious weeds within the SEZ. **Indirect:** There may be loss of native vegetation outside the SEZ due to the introduction of invasive species. Establishment of noxious weeds in the SEZ may result in spread of weeds to adjacent areas. **Cumulative:** Solar energy development could be a contributor to cumulative impacts on some vegetation communities, depending on the type, number, and location of other developments in the region.	Avoid travel through weed-infested areas; inspect and clean vehicles and equipment to avoid spread of weeds; limit ground disturbance, avoid creating soil conditions that promote weed germination and establishment, dispose of seed and plant parts. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf).	Impacts will be minimized through development of a Weed Management Plan and use of weed-free seed to support re-vegetation efforts, control invasive species, and prevent increase in fires. See programmatic design features.	Maybe. Onsite mitigation will reduce, but not eliminate, the potential for invasive species. The degree of disturbance creates a significant opportunity for the establishment of invasive species and weeds.	No, but restoration or protection of intact ecosystems will also restore or protect the ability to resist invasive species.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Ecology – Wildlife and Aquatic Biota Section 11.4.11	**Direct:** Loss of habitat and connectivity (linkages) for several species of reptiles, mammals, birds, and invertebrates. Specifically, need to consider possible loss of connectivity for desert bighorn sheep (occupied habitat exists to west of SEZ; unoccupied habitat to east of SEZ). Ground disturbance, fugitive dust generated by project activities, noise, lighting, vegetation clearing, spread of invasive species, accidental spills, harassment, and ephemeral stream loss could impact wildlife within the SEZ. There may be loss of mule deer winter habitat in the SEZ; a small portion of mapped crucial winter range habitat occurs within the SEZ. There may also be a loss of pronghorn antelope habitat in the SEZ. **Indirect:** Outside the SEZ, impacts could occur from habitat loss or modification related to groundwater depletions, surface runoff, dust, noise, lighting, or accidental spills. **Cumulative:** Cumulative impacts would be small because the wildlife species present within the SEZ that could be affected by other actions have extensive available habitat within the region.	Development will avoid any additional wetlands identified during site-specific fieldwork. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf).	Appropriate engineering controls will be implemented to minimize the amount of contaminants and sediment entering Coyote Wash and the unnamed washes and dry lakes within the SEZ. Fencing on the SEZ should be removed to the extent possible. Fencing that remains near and around the solar energy development should not block the free movement of mammals, particularly big game species. Recommend the evaluation of certain technologies in project-level NEPA alternatives (such as elevated solar structure installation and increased spacing between solar equipment) that increase clearance between ground level and solar infrastructure to better enable native vegetation growth. Such technologies may minimize impacts to understory habitats and allow wildlife movement corridors to remain on the SEZ. See programmatic design features.	Yes, Development of the SEZ will likely impact up to 25,069 acres of wildlife habitat. Level of site grading and disturbance to native vegetation would be primary driver of residual impact for full build-out of SEZ.	Yes, depending on the implementation of onsite minimization measures and BMPs. The impact to vegetation and habitat on the SEZ from solar development would be unavoidable. However, the amount of regional compensatory mitigation required could vary based on the implementation of onsite minimization measures and BMPs chosen by the developer in addition to required programmatic design features. Human development in the ecoregion is expected to increase by 7.7% by 2025 and is expected to contribute to the decline in wildlife habitat.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Ecology – Migratory Birds Section 8.1.11.2	**Direct:** Loss of habitat and connectivity for several species. Noise, lighting, and vegetation clearing could impact migratory birds using the SEZ. Water birds could be attracted to solar fields (because they look like water) and may collide with solar panels. Burning of wings in the solar radiation field between heliostats and power towers has been observed. There may also be impacts to night sky that may alter bird migratory behavior and habitat use. **Indirect:** Outside the SEZ, impacts could occur from habitat loss. **Cumulative:** Impacts to migratory birds could occur; depending on the type, number, and location of other developments in the region. **Data Gaps:** Additional research needed on solar development impacts on migratory birds. Impacts on migratory birds from construction noise would have to be considered on a project-specific basis.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf). Recommend implementation of technologies that minimize the amount of reflective surfaces, or alter how the surfaces are perceived by wildlife, that will reduce the "lake effect" in attracting migratory birds and other wildlife.	See programmatic design features. Also recommend evaluation of technologies in project-level NEPA alternatives that minimize the amount of reflective surfaces, or alter how the surfaces are perceived by wildlife, that will reduce the "lake effect" in attracting migratory birds and other wildlife.	Maybe. Development of the SEZ will likely impact up to 25,069 acres of migratory bird habitat. Some level of bird injury/fatality has been observed for all types of solar facilities (through collisions with equipment or from burns). Research is ongoing to quantify impacts and identify effective mitigation measures.	Maybe.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Ecology — Plant Special Status Species Section 11.4.12	**Direct:** Ground disturbance, land clearing and grading, fugitive dust generated by project activities, and the spread of invasive species would result in loss of special status plant species habitat and might result in loss of individual plants. No Endangered Species Act (ESA)-listed plant species have been identified with suitable habitat within the SEZ. However, several BLM-sensitive species may be directly affected, including the **Blaine fishhook cactus, Great Basin fishhook cactus Eastwood milkweed,**[8] and Needle Mountains milkvetch. **Indirect:** Indirect impacts to individuals and habitat outside of the SEZ could occur due to depletions of groundwater resources, surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, accidental spills, harassment, and lighting. Potentially suitable habitat for 3 BLM-sensitive plant species has been identified within the SEZ affected area (i.e., area within 5 mi [8 km] of the SEZ). No Endangered Species Act (ESA)-listed plant species have been identified with suitable habitat within the SEZ affected area. **Cumulative:** There could be cumulative impacts on some special status plant species due to habitat destruction and overall development and fragmentation of the area, but the likelihood is relatively low. **Data Gaps:** Pre-disturbance surveys are required to identify the presence and abundance of special status species.	Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats (including playa on the SEZ that is habitat for Blaine fishhook cactus, Eastwood milkweed, and Needle Mountains milkvetch) will be used to reduce or eliminate impacts. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf).	Seed collection and banking may reduce impacts by maintaining genetic diversity and opportunities for reestablishment in alternate habitats. If avoidance of Joshua trees, other Yucca species, and cactus species within the SEZ is not possible, individual plants should be salvaged in coordination with the BLM Caliente field office to the extent possible. Recommend evaluation of certain technologies in project-level NEPA alternatives (such as elevated solar structure installation) that minimize the amount of grading and surface disturbance, and increase clearance between ground level and solar infrastructure, to better enable native vegetation growth and minimize impacts to special status plant species. If avoidance is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation may be employed. See programmatic design features.	Yes. Level of site grading and disturbance to native vegetation would be primary driver of residual impact to functional habitat for full build-out of SEZ. Development in the SEZ would result in alteration of habitat If present, little can be done onsite to mitigate the loss of special status plant species. Avoidance of individual plants may not be practical.	Yes. Vegetation is a basic component of the ecosystem. The loss of habitat for special status plant species from solar development is expected to be unavoidable. The loss of individual plants is possible. Special status plant species are expected to continue to decline in the ecoregion due to human development and other change agents. The need for regional compensatory mitigation could vary based on the implementation of onsite minimization measures and BMPs chosen by the developer in addition to required programmatic design features.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Ecology — Animal Special Status Species Section 11.4.12	**Direct:** Ground disturbance, land clearing and grading, fugitive dust generated by project activities, and the spread of invasive species would result in loss of special status animal species habitat, if present, and might result in loss of individual animals. No habitat for Endangered Species Act (ESA)-listed species is known to occur within the SEZ. However, up to 23 BLM-sensitive species may be directly affected, including Brewer's sparrow, **golden eagle**, loggerhead shrike, prairie falcon, **western burrowing owl**, California myotis, **Desert Valley kangaroo mouse**, and Pahranagat Valley montane vole. **Indirect**: Indirect impacts to individuals and animal habitat outside of the SEZ could occur due to depletions of groundwater resources, surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, accidental spills, harassment, and lighting. **Cumulative:** There could be cumulative impacts on some special status animal species due to habitat destruction and overall development and fragmentation of the area, but the likelihood is relatively low. **Data Gaps:** Pre-disturbance surveys are required to identify the presence and abundance of special status species.	Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats (including playa on the SEZ that is potential habitat for western snowy plover, Desert Valley kangaroo mouse, and Pahranagat Valley montane vole) will be used to reduce or eliminate impacts. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf).	Consultation with the USFWS shall be conducted to address the potential for impacts on the golden eagle under the Bald and Golden Eagle Protection Act. Consultation will identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements. Recommend evaluation of certain technologies in project-level NEPA alternatives (such as elevated solar structure installation) that minimize the amount of grading and surface disturbance, and increase clearance between ground level and solar infrastructure, to better enable native vegetation growth. Such technologies may minimize impacts to understory habitats and allow wildlife movement corridors to remain on the SEZ. Also recommend evaluation of technologies that minimize the amount of reflective surfaces, or alter how the surfaces are perceived by wildlife, will reduce the "lake effect" in attracting special status wildlife species. If avoidance is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation may be employed. See programmatic design features.	Yes. Level of site grading and disturbance to native vegetation would be primary driver of residual impact to functional habitat for full build-out of SEZ.	Yes. Special status species, along with other wildlife, represent a basic component of the ecosystem. The loss of habitat for special status species from solar development is expected to be unavoidable. The loss of individuals is possible. Special status animal species are expected to continue to decline in the ecoregion due to human development and other change agents. The need for regional compensatory mitigation could vary based on the implementation of onsite minimization measures and BMPs chosen by the developer in addition to required programmatic design features.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Environmental Justice Section 11.4.20	**Direct:** There are minority and low income individuals within a 50-mi (80-km) radius of the SEZ; 18.5% of the population is classified as minority, while 9.9% is classified as low-income. However, the number of minority individuals and low-income households does not exceed 50% and does not exceed the state average by 20% or more, thus no minority or low-income populations were identified in the aggregate 50-mi radius in the Solar PEIS. However, a low-income population was identified in one census block group in Iron County Utah. Further evaluation of adverse impacts of solar development in the SEZ will be needed to determine whether this Census Block could experience disproportionate adverse impacts. **Indirect:** None identified. **Cumulative:** Contributions from solar development in the SEZ would likely be small and would not be expected to significantly contribute to cumulative impacts on low-income populations within the 50-mi geographic extent of effects.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Environmental_Justice.pdf).	See programmatic design features.	Maybe (if minority or low income populations are disproportionately impacted by development.	No. Project design features are expected to address impacts.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Hydrology — Surface Water Section 11.4.9	**Direct:** Land clearing, land leveling, vegetation removal, and spills and runoff associated with development of the SEZ have the potential to affect drainage patterns, increase surface runoff, reduce infiltration/recharge, cause loss of ephemeral stream networks, cause a reduction in evapotranspiration rates, increase sediment transport (by water), change sediment transport (by wind), and degrade water quality. Eighty-one percent of the intermittent/ephemeral stream channels were classified as having moderate sensitivity to land disturbance; these sensitive channels were concentrated in the northeastern portion of the SEZ. No stream channels were classified as having high sensitivity to land disturbance. **Indirect:** Indirect impacts from development and groundwater use on ephemeral and perennial surface water features could occur. Disturbance to intermittent/ephemeral stream channels within the SEZ could have an impact on the critical functions of groundwater recharge, sediment transport, flood conveyance, and ecological habitat in the vicinity of the SEZ. **Cumulative**: Alterations to ephemeral stream networks can alter groundwater recharge and surface runoff processes potentially impacting the basin-scale water balance and water quality aspects of water features receiving surface runoff.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf).	Recommend evaluation of certain technologies in project-level NEPA alternatives (such as elevated solar structure installation) that minimize the amount of grading and surface disturbance to minimize impacts to natural drainage patterns. See programmatic design features.	Yes. Hydrology is a basic component of the ecosystem. Reconfiguration of topography for solar development would have residual impacts to surface hydrology with potential impacts on other resources, including vegetation.	Yes, depending on the implementation of onsite minimization measures and BMPs in addition to required programmatic design features. Hydrology is a basic component of the ecosystem. Reconfiguration of topography for solar development would have an unavoidable impact to surface hydrology. The distribution of unaltered ephemeral stream channels in the ecoregion is declining.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Hydrology — Water/ Quality and Groundwater Availability Section 11.4.9	**Direct:** Groundwater withdrawals for solar energy development could result in groundwater drawdown in the vicinity of the SEZ. Alteration at the surface could impact groundwater recharge. The availability of groundwater and the impacts of groundwater withdrawal would need to be assessed at the project level. **Indirect:** Groundwater withdrawals for solar energy facilities have the potential to affect other groundwater users in the basin. **Cumulative:** Cumulative impacts of climate change could result in increased evapotranspiration and less recharge in the Dry Lake Valley; impacts on groundwater could occur when combined with other future developments in the region. Water rights are managed and determined by the State Engineer.	Groundwater analyses suggest that full build-out of dry-cooled and wet cooled technologies is not feasible. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf).	For mixed-technology development scenarios, any proposed dry- or wet-cooled projects should utilize water conservation practices. See programmatic design features.	Maybe (depending on compensation requirements).	Not at this time. It is possible for impacts to groundwater aquifers to be avoided or minimized. However, if project-specific impacts are identified, additional regional compensatory mitigation measures may be implemented.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Lands and Realty Section 11.4.2	**Direct:** Development of the SEZ could disturb up to 25,069 acres (102 km^2).There are existing rights of way (ROWs) for one transmission corridor, one Section 368 designated energy corridor, the Southern Nevada Water Authority Groundwater Development ROW, and a short segment of road ROW. An additional land withdrawal for the Yucca Mountain Railroad ROW will expire in 2015. Existing roads that cross or enter the SEZ could be closed or relocated if solar development occurs. **Indirect:** Impacts from excluding many existing and potential uses of the land on public, state, and private lands in the vicinity of the SEZ. **Cumulative:** Cumulative impacts due to changing land use could occur with multiple developments in the region.	Where proposed development intersects existing designated energy corridors, the BLM will review and approve individual project plans of development to ensure compatible development that maintains the use of the corridor. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Lands_and_Realty.pdf).	Priority consideration shall be given to utilizing existing county roads to provide construction and operational access to the SEZ. See programmatic design features.	No. By regulation, any new activity must occur in deference to existing rights. Thus, potential impacts have been avoided.	No.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Livestock Grazing Section 11.4.4.1	**Direct:** The SEZ includes a portion of one grazing allotment, the Ely Springs Cattle allotment, which supports production of 2,761 animal unit months (AUMs) of forage per year. The grazing permit for this allotment is transferable. County would lose tax revenues. BLM would also lose some revenue. **Indirect:** Removal of current fencing and loss of access to water supplies due to solar development could impact grazing. Loss of existing range improvements could increase costs to the permittee. **Cumulative:** Multiple projects in the region, including potential future solar and wind projects, could result in cumulative impacts on grazing allotments, particularly if current fencing were removed. Wind facilities generally have a low impact on grazing.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Rangeland_Resources.pdf).	Within the cattle allotment, solar development could be sited to minimize the number of pastures affected, and existing range improvements (e.g., fencing) could be relocated in coordination with the grazing permittee. See programmatic design features.	Yes. If development occurs within existing grazing allotments, little can be done onsite to mitigate the loss to the allotments and the loss of grazing. Residual impacts to be evaluated based on locations of development within the SEZ and project-level NEPA.	No. Project design features are expected to address impacts.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Military and Civilian Aviation Section 11.4.6	**Direct:** Portions of the SEZ are covered by two military training routes with 200-ft (61-m) above ground level operating limits and a major special use airspace. The area is completely included within the airspace use boundary of the Nellis Testing and Training Range (NTTR), which conducts anti-missile defense exercises over SEZ airspace. Supersonic speeds are authorized at and above 500 AGL (1,524 m) in the NTTR in this area; there is a potential for supersonic flights to damage solar installation equipment. A NTTR patriot site occurs within the SEZ. Solar development could result in adverse impacts on military training and testing missions. Light from solar energy facilities could affect nighttime military operations. **Indirect**: None identified. **Cumulative**: Additional solar and particularly wind facilities northeast of the SEZ could present cumulative impacts for military aviation, depending on the eventual location of such facilities with respect to training routes.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Military_Civilian_Aviation.pdf).	Coordination with the military will be required on a project-specific basis to ensure that solar facilities do not interfere with operations. See programmatic design features.	Yes, residual impacts will be evaluated based on coordination with the military and project-level NEPA analyses.	No. Coordination with the military and possible height restrictions will address most impacts.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Minerals Section 11.4.8	The SEZ contains two existing oil and gas leases that are classified as nonproducing, but there are no existing mining claims or geothermal leases within the SEZ. The SEZ has been withdrawn from receiving new mining claims for a period of 20 years, precluding impacts from many types of mining activities. **Indirect:** None identified. **Cumulative:** None identified. **Data Gaps**: The specific locations of mining claims will be identified during project-specific analyses.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Mineral_Resources.pdf).	See programmatic design features.	No.	No.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Native American Concerns Section 11.4.18	**Direct:** It is likely that some plants traditionally important to Native Americans will be destroyed and that habitat of traditionally important animals will be lost if grading of the project area is required for development. **Indirect:** Development within the SEZ could result in visual impacts on Dry Lake Valley from surrounding elevated areas and mountain tops and may affect the spiritual connection that the Southern Paiute and Western Shoshone tribes have to water as well as the quantity of water naturally stored in underground aquifers. **Cumulative:** Although SEZ development would result in loss of habitat for some culturally-important species, these species have extensive habitat in the area, which reduces the cumulative effect. However, tribes are concerned over the adverse effects of energy projects on a wide range of resources in the area, including water. **Data Gaps**: Government-to-government consultation will be required to determine issues of Native American concern.	Known human burial sites and rock art (panels of petroglyphs and/or pictographs) will be avoided. Where there is a reasonable probability of encountering undetected human remains and associated funerary objects by a solar project, the BLM will carry out discussions with Indian tribes before the project is authorized, in order to provide general guidance on the treatment of any cultural items that might be exposed. Visual intrusion on sacred sites will be avoided to the extent practicable. Springs and other water sources that are or may be sacred or culturally important will be avoided to the extent practicable. Culturally important plant and wildlife species will be avoided to be extent practicable. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Native_American_Concerns.pdf).	The Duckwater Shoshone Tribe signed the Programmatic Agreement produced as part of the Solar PEIS project. Coordination with the Duckwater Shoshone will continue through the Mitigation project. See programmatic design features.	Maybe.	Unknown at this time. Consultation on project applications will determine whether regional compensatory mitigation for Native American Concerns is warranted.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Paleontological Section 11.4.16	**Direct:** Few, if any, impacts on significant paleontological resources are likely to occur in the SEZ. **Indirect:** None identified. **Cumulative:** Cumulative impacts would be dependent on whether significant resources are found within the SEZ and in additional project areas in the region. **Data Gaps**: A more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted.	If surveys find that geological formations with potential for significant paleontological resources are present, they would be avoided to the extent possible. See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Paleo.pdf).	Programmatic design features require that the BLM will be notified immediately upon discovery of fossils. Work will be halted at the fossil site and continued elsewhere until qualified personnel, such as a paleontologist, can visit the site, determine the significance of the find, and, if significant, make site specific recommendations for collection or other resource protection. See programmatic design features.	No. Any paleontological resources that are discovered will be preserved.	No.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Public Access and Recreation Section 11.4.5	**Direct:** If east–west travel across the SEZ were prevented by solar energy development, a detour around the site would be required. Solar development within the SEZ would affect public access along off-highway vehicle (OHV) routes designated open and available for public use. The SEZ and surrounding area are also used for hunting. The Silver State Off-Highway Vehicle Trail is located from 3 to 6 mi (5 to 10 km) from the SEZ's western, eastern, and southern boundaries; development in the SEZ would be visible from more than 40 mi (64 km) of the trail. Special recreation permits are issued for several OHV and motorcycle events on the trail each year. Portions of the SEZ itself are used for these events, which result in substantially elevated dust levels. Solar development would have an undetermined level of impact on these events and other uses of the area trail; these events could also affect solar facility operations. **Indirect:** Indirect effects on recreation use would occur primarily on lands near the solar facilities and would result from the change in the overall character of undeveloped BLM-administered lands to an industrialized, developed area, displacing people who are seeking more rural or primitive surroundings for recreation. Changes of surrounding undeveloped lands to an industrialized character can result in impacts to the visual landscape, impacts on vegetation, and displacement of wildlife species resulting in reduction in recreational opportunities and/or degraded recreational experience. **Cumulative:** Multiple developments could cumulatively reduce recreational opportunities in the vicinity of the SEZ.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Public_Access_and_Recreation.pdf).	Because of the length of the SEZ and the potential for solar development severing current east–west travel, legal vehicular access through the area should be maintained. See programmatic design features.	Yes. If new vehicle routes are established, a NEPA analysis would be required for those routes. Impacts to the Silver State Trail may be unavoidable.	Maybe. Impacts to the Silver State Trail may require regional compensatory mitigation.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Socioeconomics Section 4.11.19	**Direct:** Positive impacts to local economy as a result of expenditures of wages and salaries and the collection of state sales and income taxes. From 263 to 3,488 direct construction jobs and from 44 to 874 direct operations jobs could be created (low end of range corresponds to PV facilities and high end to parabolic trough facilities). Adverse impacts could occur due to the need for procurement of goods and services for new workers in the area during project construction and operation (e.g., housing, police, fire-fighters, schools for services to new area workers). **Indirect:** From 194 to 2,560 indirect construction jobs and from 15 to 473 indirect operations jobs could be created. Positive impacts associated with project wages and salaries and tax revenues subsequently circulating through the economy. Construction and operation could adversely affect existing grazing allotments and/or recreational events in the area, resulting in the loss of jobs and income. **Cumulative:** Cumulative impacts from the presence of a large numbers of construction workers could place a short-term strain on local resources. Cumulative impacts during operations would be positive through the creation of additional jobs and income; negative impacts during operations would not be expected to be large.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Socioeconomics.pdf).	See programmatic design features.	Maybe. For grazing and/or impacts on recreation, depends on mitigation measures implemented on the basis of project-level NEPA.	No. Project design features are expected to address impacts.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Soils/Erosion Section 11.4.7	**Direct:** Soils in the SEZ likely to be impacted as a result of ground-disturbing activities, especially during the construction phase. Impacts include soil compaction, soil horizon mixing, soil erosion and deposition by wind, soil erosion by water and surface runoff, sedimentation, and soil contamination. Soils within the SEZ are predominantly a mix of sandy loams, silt loams, loamy sands, and loams; the Saltydog–Ambush–Panacker and Koyen–Geer associations make up about 46% of the soil coverage. Some soils in the SEZ, primarily near to the dry lake, are not suitable for roads because of a severe rutting hazard. **Indirect:** None identified. **Cumulative:** Solar energy development could contribute to cumulative impacts on soil from foreseeable development in the region.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Soil_Geologic_Hazards.pdf).	Implementation of certain technologies (such as elevated solar structures and use of "drive and crush" installation) that minimize the amount of grading and surface disturbance will minimize disturbance to soils. Revegetation of the SEZ with native vegetation will increase soil stability and reduce the amount of dust. See programmatic design features.	Yes. Soils represent a basic component of the ecosystem. Solar development on the SEZ is expected to result in a residual loss of sensitive soils and soil functions.	Yes.. The need for regional compensatory mitigation could vary based on the implementation of onsite minimization measures and BMPs chosen by the developer in addition to required programmatic design features.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Specially Designated Areas and Lands with Wilderness Characteristics Section 11.4.3	**Direct:** There are 14 specially designated areas (SDAs) within 25 mi (40 km) of the SEZ. The developed SEZ may also be visible from areas further than 25 mi (40 km) from the SEZ (e.g., Mount Grafton). The Visual Resource Inventory report for the SEZ states that some of these areas have a high level of public interest (e.g., the Chief Mountains Special Recreation Management Area [SRMA] less than 1 mile from the southern SEZ boundary). Visual impacts to areas beyond 25 mi (e.g., Grafton Wilderness Area, Far South Egan Wilderness Area) are possible but likely to be small based on visualizations included in the Solar PEIS. A recently maintained inventory of wilderness characteristics of public lands within the SEZ found that these lands do not contain wilderness characteristics. **Indirect:** Solar development in the SEZ could result in moderate to strong visual contrasts in the Big Rocks Wilderness Area, Chief Mountains SRMA, and the Weepah Springs Wilderness Area, and along some portions of the Silver State Off-Highway Vehicle trail and U.S. 93 Scenic Highway. **Cumulative:** Currently proposed solar and wind projects lie far enough away from the SEZ that sensitive areas would not likely be cumulatively affected by facilities within the geographic extent of effects. However, facilities and associated roads and transmission lines would add to the visual clutter of the area.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf).	See programmatic design features.	Yes, residual impacts will be evaluated based on locations of development within the SEZ and project level NEPA.	Maybe, if project-specific analysis reveals that visual and other impacts to SDAs are large and of regional importance. For visual impacts, consideration of visual resources should be included as a part of the site selection criteria for mitigating other resources that warrant regional compensatory mitigation.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Transportation Section 11.4.21	**Direct:** Development will add traffic to existing roads serving the area. During construction, the volume of traffic on U.S. 93 could represent an increase in traffic of about a factor of 2 or 4, maximum, in the area of the SEZ. Because higher traffic volumes would be experienced during shift changes, traffic on U.S. 93 could experience moderate slow down during these time periods in the general area of the SEZ. Local road improvements would be needed on U.S. 93 near any site access point(s). State Route 318 could also be impacted if an access road were constructed from it to the SEZ, but the Solar PEIS stated that this is not recommended due to potential ecological and other impacts. Solar development within the SEZ would affect public access along OHV routes designated open and available for public use. **Indirect:** None identified. **Cumulative:** Cumulative impacts to traffic could occur with multiple developments in the region.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Transportation.pdf).	Local road improvements, multiple site access locations, staggered work schedules, and ride-sharing, would all provide some relief to traffic congestion on local roads leading to the site. See programmatic design features.	Yes (for OHV use).	Maybe. Similar to public access and recreation impacts, impacts to transportation associated with OHV use of the SEZ and the Silver State Trail may be unavoidable and may require regional compensatory mitigation.

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Visual Resources Section 11.4.14	**Direct:** The Visual Resource Inventory (VRI) class for the SEZ is VRI Class III, indicating moderate scenic quality for the SEZ and its immediate surroundings. Solar development will involve major modification of the existing character of the landscape, and likely will dominate the views from most locations within the SEZ. Development will adversely impact visual resources and may impact night skies. The Solar PEIS identified moderate to strong visual contrasts due to solar development in the SEZ for the Big Rocks and Weepah Springs Wilderness Areas, U.S. 93 Scenic Highway, Silver State OHV trail, and Chief Mountain SRMA. **Indirect:** Solar development within the viewshed would result in modification of the landscape and would be visible from the adjoining areas. **Cumulative:** If several projects become visible from one location or in succession as viewers move through the landscape (such as driving on local roads), the resulting visual disharmony could exceed the visual absorption capability of the landscape and add significantly to the cumulative visual impact. Since only potential wind developments to the northeast of the SEZ have been identified, small cumulative visual impacts are expect within the geographic extent of effects from solar, wind, and other existing and future developments.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Visual.pdf).	See programmatic design features.	Yes. While onsite mitigation would reduce visual contrasts caused by solar facilities within the SEZ, it would not likely reduce impacts to less than moderate or strong levels for nearby viewers.	Yes. For visual impacts, consideration of visual resources should be included as a part of the site selection criteria for mitigating other resources that warrant regional compensatory mitigation (e.g., protection and/or restoration of ecosystem intactness will slow the regional decline in visual resource quality).

Table A-1. (Cont.)

Resource/ Issue[1]	Impacts[2]	Onsite Mitigation[3] — To what degree are impacts likely to be mitigated onsite?		Residual or Unavoidable Adverse Impacts[4] (include justification)?	Regional Compensatory Mitigation Warranted?
		Avoidance	Minimization		
Wild Horses and Burros Section 11.4.4.2	**Direct**: A small portion (0.02 percent) of a Silver King HMA would be in the area of direct impact for the SEZ, resulting in a small potential impact on the HMA's wild horse population. Wild horses outside of the HMA may be displaced. **Indirect:** None identified. **Cumulative:** The effects of multiple projects, including pending solar and wind applications in the region would not likely result in cumulative impacts on wild horses because of the small number and distance of the proposed facilities from the SEZ and the generally low impact of wind facilities on wild horses.	See programmatic design features (http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Wild_Horses_Burros.pdf).	Installation or preservation of fencing and access control, provision for movement corridors, delineation of open range, traffic management, compensatory habitat restoration, and access to or development of water sources will be coordinated with the BLM. See programmatic design features.	Maybe. A small portion of an HMA would be affected.	No. Project design features are expected to address impacts.

[1] The section refers to the appropriate resource section in the Solar PEIS (BLM and DOE 2012).
[2] The impacts assessment assumed 80% of the SEZ area will be used for solar development.
[3] Avoidance is accomplished by imposing spatial and/or temporal restrictions, including those specified in programmatic and SEZ-specific design features (DFs) (as presented in the Record of Decision for the Final Solar PEIS). Minimization is accomplished using programmatic and SEZ-specific DFs and/or best management practices. In general, only SEZ-specific DFs and SEZ-specific application of programmatic DFs are presented in this table.
[4] Residual impacts are those that cannot be adequately mitigated onsite by avoidance and/or minimization. Preliminary assessments are provided for comment.
[5] Section numbers are the same in both the Draft and Final Solar PEIS.
[6] Sections 11.4.22.4 of the Draft and Final Solar PEIS address cumulative impacts, which consider ongoing and reasonably foreseeable activities in the vicinity of the SEZ such as wind, geothermal, mining, agricultural, and commercial development; new roads, traffic, and OHV use; and infrastructure including transmission lines, pipelines, canals, fences, and communication systems.
[7] Data gaps have not been identified for all resources in this table. Additional data gaps may be identified during future SEZ- or project-specific assessments.
[8] Species in bold text have been recorded or have designated critical habitat within 5 mi (8 km) of the SEZ.

APPENDIX B

Conceptual Models

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APPENDIX B: CONCEPTUAL MODELS

Conceptual models are used to understand ecosystem interactions at an ecoregional scale (Tier 1, Table B-1), the solar development scale (Tier 2, Table B-2), and the solar energy zone (SEZ)-specific scale (Tier 3, Table B-3). The models used for the pilot Dry Lake Solar Energy Zone Solar Regional Compensatory Mitigation Planning Project (as revised with stakeholder input) are presented here. Additional, more complex models may be constructed if needed to support impact assessment in the future.

Tier 1 Conceptual Model, Central Basin and Range Ecoregion

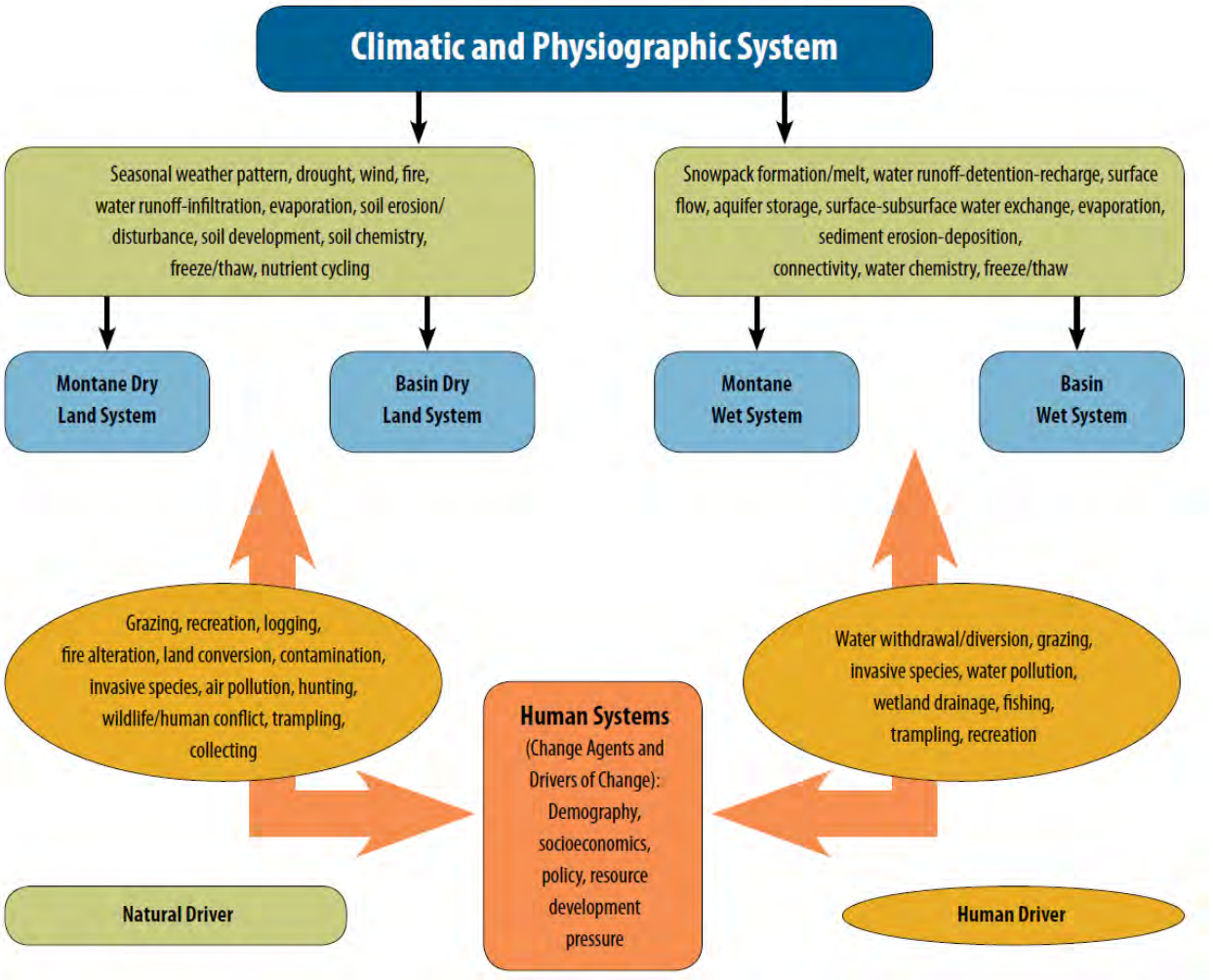


Figure B-1. Tier 1 Conceptual Model, Central Basin and Range Ecoregion

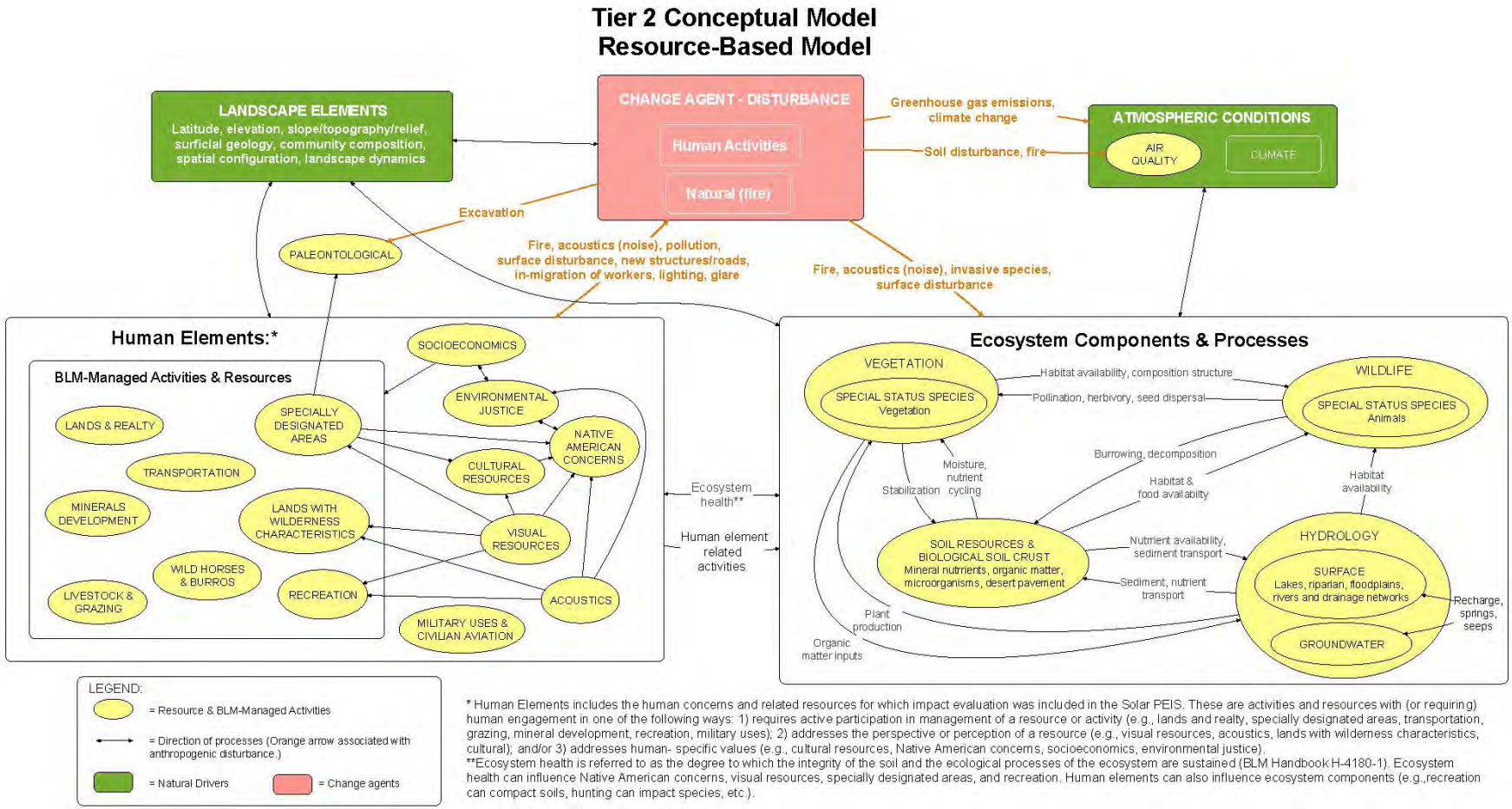
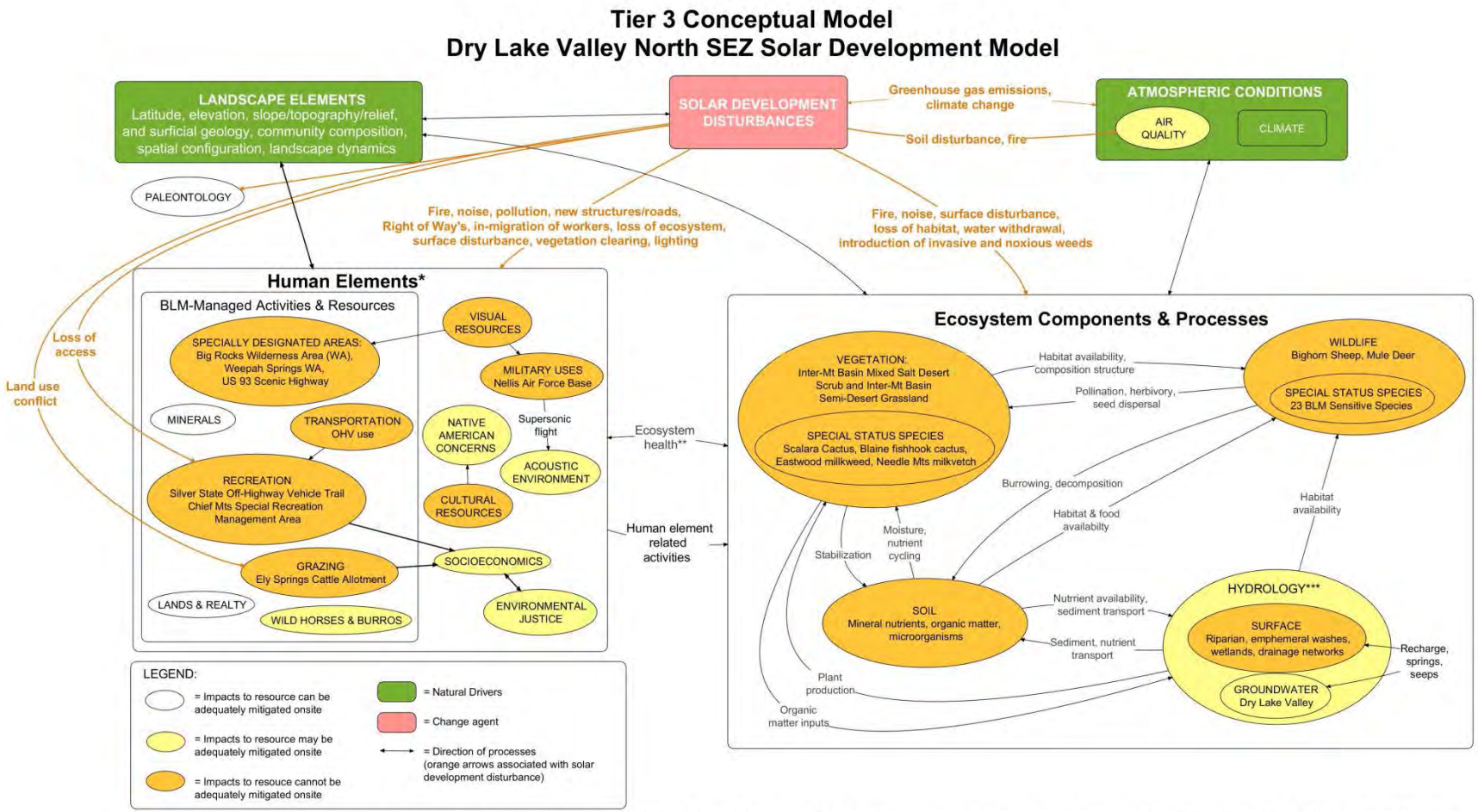


Figure B-2. Tier 2 Conceptual Model, Resource-Based Model



* Human Elements includes the human concerns and related resources for which impact evaluation was included in the Solar PEIS. These are activities and resources with (or requiring) human engagement in one of the following ways: 1) requires active participation in management of a resource or activity (e.g., lands and realty, specially designated areas, transportation, grazing, mineral development, recreation, military uses); 2) addresses the perspective or perception of a resource (e.g., visual resources, acoustics, lands with wilderness characteristics, cultural); and/or 3) addresses human- specific values (e.g., cultural resources, Native American concerns, socioeconomics, environmental justice).
**Ecosystem health is referred to as the degree to which the integrity of the soil and the ecological processes of the ecosystem are sustained (BLM Handbook H-4180-1). Ecosystem health can influence Native American concerns, visual resources, specially designated areas, and recreation. Human elements can also influence ecosystem components (e.g.,recreation can compact soils, hunting can impact species, etc.).
***Residual hydrologic impacts may occur due to changes in drainage and recharge patterns. Potential impacts to water availability will be mitigated on-site through the implementation of a net neutral use policy (water rights must be purchased).

Figure B-3. Tier 3 Conceptual Model, Dry Lake Valley North SEZ Solar Development Model

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APPENDIX C

Summary Table: Impacts that May Warrant Regional Compensatory Mitigation for the Dry Lake Valley North Solar Energy Zone

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APPENDIX C: SUMMARY TABLE: IMPACTS THAT MAY WARRANT REGIONAL COMPENSATORY MITIGATION FOR THE DRY LAKE VALLEY NORTH SOLAR ENERGY ZONE

Table C-1 summarizes impacts that may warrant regional compensatory mitigation for the Dry Lake Valley North Solar Energy Zone (SEZ).

Table C-1. Dry Lake Valley North Solar Energy Zone –Summary Table: Impacts that May Warrant Regional Compensatory Mitigation for the Dry Lake Valley North Solar Energy Zone

Resource/Issue	Residual Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Dry Lake Valley North in the region (Central Basin and Range)?	Role in the Ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional compensatory mitigation?
Acoustics	Maybe	Depends on technology			Human Element	Impacts on terrestrial wildlife	No. Generally impacts from solar development are expected to be temporary, localized, and readily mitigated.
Air Quality	Maybe	Depends if the site is graded			Human Element	Particulate matter (PM) levels	No, unless monitoring identifies high PM levels.
Cultural	Yes	Low	Depends on the results of the Class III inventory of the SEZ and if eligible sites are discovered.		Human Element	Onsite mitigation measures were determined to be adequate for addressing known cultural resources.	Maybe. If significant resource values are discovered during pre-development surveys, implementing required protection measures as established in the MOA could result in regional compensatory mitigation measures.

Table C-1. (Cont.)

Resource/Issue	Residual Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Dry Lake Valley North in the region (Central Basin and Range)?	Role in the Ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional compensatory mitigation?
Ecology: Vegetation and Riparian Areas	Yes for vegetation. No for riparian areas	Certain	Very – expect the loss of all vegetation over the developable area of the SEZ, though mitigation may result in some remaining or replanted vegetation.		Basic Component	Natural regeneration of native vegetation is slow in the region.	Yes, vegetation is a critical component of a functioning ecosystem.
Ecology: Invasive and Noxious Weeds	Maybe	Possible. Depends on degree of vegetation disturbance and adequacy of Design Features	Low			Impacts will be minimized through development of a Weed Management Plan and use of weed-free seed to support re-vegetation efforts, control invasive species, and prevent increase in fires.	No, but restoration or protection of intact ecosystems will also restore or protect the ability to resist invasive species.
Ecology: Terrestrial Wildlife and Aquatic Biota	Yes	Certain	Very – expect the loss of habitat for most general wildlife species over the entire developable area.		Basic Component		Yes
Ecology: Migratory Birds	Maybe	Data Needed (migratory bird monitoring)	Unknown; will be re-evaluated when more information is available.		Basic Component (along with other wildlife).		Maybe

Table C-1. (Cont.)

Resource/Issue	Residual Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Dry Lake Valley North in the region (Central Basin and Range)?	Role in the Ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional compensatory mitigation?
Ecology: Plant Special Status Species (SSS)	Yes	Loss of habitat is certain, loss of plants is likely.	Very – expect the total loss of plant SSS and/or habitat in the developable area.		Basic Component (along with other vegetation).	Mitigation of SSS is required by BLM policy.	Yes
Ecology: Animal SSS	Yes	Loss of habitat is certain. Loss of animals is possible.	Very – expect the total loss of habitat for SSS animal species over the entire developable area.		Basic Component (along with other wildlife).	Mitigation of SSS may be used, according to BLM policy (MS 6840).	Yes
Environmental Justice	Maybe		Depends on mitigation measures implemented on the basis of project-level National Environmental Policy Act (NEPA).		Human Element		No. Project design features are expected to address impacts.
Hydrology: Surface Water	Yes	Likely		The distribution of unaltered ephemeral stream channels in the ecoregion is declining.	Basic Component		Yes
Hydrology: Water Quality and Groundwater	Maybe	Unlikely, the BLM will review all applications to validate net neutral water use.	Depends on compensation requirements.		Basic Component		Not at this time. It is possible for impacts to groundwater aquifers to be avoided or minimized. However, if project specific impacts are identified, additional regional compensatory mitigation measures may be implemented.

Table C-1. (Cont.)

Resource/Issue	Residual Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Dry Lake Valley North in the region (Central Basin and Range)?	Role in the Ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional compensatory mitigation?
Livestock Grazing	Yes	Depends on infrastructure of development.	Impacts to be evaluated based on locations of development within the SEZ and project-level NEPA.		Land Use		No. Project design features are expected to address impacts.
Military and Civilian Aviation	Yes			Somewhat, coordination with the military and possible height restrictions will address most impacts.	Land Use	Difficult impact to mitigate.	No. Coordination with the military and possible height restrictions will address most impacts.
Native American Concerns	Maybe	Likely that traditionally important plants will be destroyed and that habitat for traditionally important animals will be lost. Unknown for cultural resources until Class III cultural inventories are completed.	See Wildlife and SSS entries in this table.	See Wildlife and SSS entries in this table.	Human element		Unknown at this time. Consultation on project applications will determine whether regional compensatory mitigation for may be warranted.
Public Access and Recreation	Yes		Depends on mitigation measures implemented on the basis of project-level NEPA.		Land Use (human element).		Maybe. Impacts to the Silver State Trail may be residual and regional compensatory mitigation may be required.

Table C-1. (Cont.)

Resource/Issue	Residual Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Dry Lake Valley North in the region (Central Basin and Range)?	Role in the Ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional compensatory mitigation?
Socioeconomics	Maybe		Depends on mitigation measures implemented on the basis of project-level NEPA.		Human element		No. Project design features are expected to address impacts.
Soils/Erosion	Yes	Certain	Very – expect disturbance to over the entire developable area.		Basic component		Yes
Specially Designated Areas and Lands with Wilderness Characteristics	Yes	Likely. Some impacts to offsite user experience is expected.	Depends on locations of development within the SEZ and project-level NEPA.		Human element	For visual impacts, consideration of visual resources should be included as a part of the site selection criteria for mitigating other resources that warrant regional compensatory mitigation.	Maybe. If project specific analysis reveals that visual and other impacts to SDAs are large and of regional importance.

Table C-1. (Cont.)

Resource/Issue	Residual Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Dry Lake Valley North in the region (Central Basin and Range)?	Role in the Ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional compensatory mitigation?
Transportation	Yes, for off-highway vehicle (OHV) use				Human element	Similar to recreation, impacts to transportation associated with OHV use of the SEZ and Silver State Trail may be residual and require regional compensatory mitigation.	Maybe
Visual	Yes	Certain	Depends on locations of development within the SEZ and project-level NEPA.		Land use (human element)	Other resource mitigation that involved restoring the physical and biological integrity to the landscape may also mitigate visual resources as long as the visual design elements of form, line, color, and texture are factored into the restoration planning and design.	Yes. For visual impacts, consideration of visual resources should be included as a part of the site selection criteria for mitigating other resources that warrant regional compensatory mitigation (e.g., protection and/or restoration of ecosystem intactness will slow the regional decline in visual resource quality).
Wild Horses and Burros	Maybe	Unlikely			Land use		No. Project design features are expected to address impacts.

APPENDIX D

BLM Screening of Candidate Regional Compensatory Mitigation Sites for the Dry Lake Valley North Solar Energy Zone

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APPENDIX D: BLM SCREENING OF CANDIDATE REGIONAL COMPENSATORY MITIGATION SITES FOR THE DRY LAKE VALLEY NORTH SOLAR ENERGY ZONE

The Bureau of Land Management (BLM) interdisciplinary team used this matrix for evaluating and recommending candidate sites to the BLM authorized officer (see definitions for criteria categories in Section 4).

Table D-1. Matrix for Evaluation and Recommendation of Candidate Sites to the BLM Authorized Officer

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser Areas of Critical Environmental Concern (ACECs)	Restoration of Areas Degraded by Vehicle Traffic	
SITE CHARACTERISTICS						
1. Contiguous area of site (acres)	Up to 17,827 (but likely 14,260 or 80% of developable area)	571,299	Not specified	11,830 (6,900 Highland and 4,930 Schlesser)	571,299	The size, in acres, of the candidate site.
BLM acres	14,300	571,299	0	11,830 (6,900 Highland and 4,930 Schlesser)	571,299	
Private acres	0	0	Not specified	0	0	
State Trust acres	0	0	0	0	0	
2. For ACECs, reason for designation	N/A[2]	N/A	N/A	Already designated in the resource management plan (RMP) for rare plants and globally rare butterflies	N/A	If the candidate site encompasses land in an ACEC, this field represents the value(s) present that the ACEC was established to protect.
3. Visual Resource Management (VRM) Class	IV					If the VRM class of a candidate site is higher than that of the SEZ, improvements provided by off-site mitigation would result in improvements to a higher VRM class.
4. Consistent with the Resource Management Plan?		Y	Y	Y	Y	Evaluate candidate sites with "Y."

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
SITE CHARACTERISTICS						
5. Same Hydrologic Unit Code (HUC) 4 watershed?		Y	Y	N – these areas occur in an adjacent HUC 4 watershed	Y	Evaluate candidate sites with "Y." The HUC 4 watershed is used to evaluate the sites; sites not in the same HUC 4 watershed as the SEZ would have a fairly strong hydrologic disconnect from the SEZ.
6. Mitigation tool (restoration/enhancement, banking, withdrawal, special designation, etc.)		Restoration	Acquisition (Not Likely)	Protection and restoration	Resource protection and restoration	The type(s) of mitigation tool that would implemented at the site
7. In SEZ Ecoregion?	Central Basin and Range	Y	Maybe	Y	Y	Evaluate candidate sites with "Y."
8. In SEZ ecological subregion?	Central region (based on Nevada's hydrographic regions)	Y	N	N	Y	Evaluate candidate sites with "Y."
9. If applicable, meets priorities for Endangered Species Act (ESA) critical habitat?	Currently no critical habitat in the SEZ	N/A	N/A	N/A	N/A	Evaluate candidate sites with "Y."

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
SITE CHARACTERISTICS						
10. Mitigates for all or most identified unavoidable impacts that warrant offsite mitigation?	Unavoidable impacts at the Dry Lakes Valley North SEZ that warrant regional compensatory mitigation include special status species, ecosystem services, visual resources, and cultural resources	Y	Y	Y	N	Evaluate candidate sites with "Y."
11. Similar landscape value, ecological functionality, biological value, species, habitat types, and/or natural features?		Y	Y	Y	Y	Evaluate candidate sites with "Y," depending on whether site includes resources critical to meet mitigation outcomes.
12. Dominant vegetation community with moderate-high integrity (acres)	Inter-Mountain Basins Mixed Salt Desert Scrub	Inter-Mountain Basins Mixed Salt Desert Scrub			N/A	
13. Provides adequate geographic extent of SEZ?	n/a	Y	N	N	Y	Evaluate candidate sites with "Y," depending on whether site provides area for mitigation at least as large as the entire developable area of the SEZ.
14. Feasibility of action?		4	2	4	4	Evaluate candidate sites with "Y."

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
SITE CHARACTERISTICS						
15. Links two or more protected areas?		Y	Y	N	N	Evaluate candidate sites with "Y."
16. Site and its proposed actions meet regional goals and objectives?		Y	Y	Y	Y	Evaluate candidate sites with "Y."
17. Presence of unique/valuable resources or features		Y	Y	Y	Y	Calculate score on the basis of the number of unique/valuable resources or features present at the candidate site, as listed for criteria 17a through 17g.
17a. Perennial, protected sources of water?	None in the SEZ	Y	Y	Y	Maybe	Evaluate candidate sites with Y; list specific resource(s).
17b. Unique species assemblages?		Y	Y	Y	N/A	Evaluate candidate sites with Y; list specific resource(s).
17c. Protected species and/or critical habitat?		Y	Y	Y	N/A	Candidate sites containing occupied and/or critical habitat for any ESA-listed or BLM-sensitive species should receive a Y; candidate sites not containing occupied or critical habitat for ESA-listed or BLM-sensitive species should receive N.
17d. Cultural resources eligible for listing in the National Register of Historic Places?		TBD	TBD	TBD	N/A	To be determined (TBD) based on review of cultural Class III survey data.

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
SITE CHARACTERISTICS						
17e. VRI Class	VRI III	I, II, and III	Unknown	III and IV	All	Candidate sites with higher visual values than that of the SEZ (e.g., SEZ is VRI Class III and candidate site is VRI Class II) should receive a Y; candidate sites with lower visual values than the SEZ (e.g., SEZ is VRI Class III and candidate site is VRI Class IV) should receive an N; if the candidate site is within a VRI class of the same value to that of the SEZ, then the score should not be affected.
17f. Desert washes (miles) or ephemeral playas (acres)? If yes, quantify amount.	Y	Y	Y	Y	Y	List specific resource(s).
17g. Other?		Grazing and Recreation	Recreation	Recreation	Recreation	List specific resource(s).
18. Sources of data for the site	Solar PEIS; BLM interdisciplinary team, stakeholders	Dry Lake Valley Watershed EDD; RMP	RMP, EIS, MSHCP	RMP	RMP	

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
EFFECTIVENESS/ADDITIONALITY						
19. To what extent can the full spectrum of regional compensatory mitigation goals/objectives be met simultaneously? Use scale of 1 (low) to 5 (high).		4	3 (limited by size)	2	4	Rate the extent to which the regional compensatory mitigation goals/objectives can be met simultaneously through mitigation actions at the site, based on the following scale: all (100%) of the goals and objectives can be met (score of 5); 75–99% can be met (score of 4); 50–74% (score of 3); 25–49% can be met (score of 2); less than 25% can be met (score of 1); none of the goals/objectives can be met (score of 0).
20. How effective will the mitigation be in the context of achieving mitigation goals/objectives for conserving/restoring ecosystem intactness? Use scale of 1 (low) to 5 (high).	Effectiveness depends on monetary input	4	4	4	3	Rate the effectiveness of the mitigation actions at the site in terms of achieving mitigation goals/objectives, based on the following scale: highly effective (score of 5); moderately effective (scores of 2-4), and minimally effective (score of 1).
21. For mitigation on BLM-administered lands, mitigation consists of actions not eligible for Bureau or other sources of funding.		Maybe	Maybe	Maybe	Maybe	Evaluate candidate sites with "Y."

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
FEASIBILITY						
22. What level of documentation is available to demonstrate effectiveness of mitigation action? Use scale of 1 (little or no documentation) to 5 (well documented).						For special status species, a relatively greater amount of documentation exists for some species such as golden eagles than others (e.g., desert valley kangaroo mouse).
23. Based on action required (e.g., restoration, BLM land management action, land acquisition, Congressional action), how difficult will implementation be? Use scale of 1 (difficult) to 5 (relatively easy). See note 1.		5	1	4	3	Rate the mitigation action, based on the following scale: restoration/enhancement actions (score of 5); BLM planning decisions (score of 3–4); land acquisition actions (score of 1–3); Congressional actions (score of 1). Ratings should be adjusted on the basis of factors such as cost of the action; time and effort requirements; public and/or BLM support for or opposition to action; and, for land acquisitions, willingness of seller.
24. Time frame needed to establish site as mitigation site (estimated years)		0	10	2	10	Enter the estimated number or range of years required to establish the site as the location for mitigation action (e.g., number of years to establish priority on restoration actions at the site, number of years to acquire parcel of land).

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
FEASIBILITY						
25. Time frame for achieving mitigation goals and objectives from implementation (estimated years)		30	0	3	5	From first date of implementation, enter the estimated number or range of years required to implement actions and achieve mitigation goals and objectives.
26. Cost estimate		?	Determined by current market value estimated at or above $7,000 per acre	?	?	Enter a total and per-acre cost estimate for the proposed mitigation action(s) at the site, including cost of restoration and enhancement actions, future maintenance costs (e.g., weed management), enforcement costs, BLM management costs.

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
DURABILITY						
27. How durable would the mitigation be from a timeframe and management perspective? Use scale of 1 (low) to 5 (high).		2	2	5	2	Rate the temporal and managerial durability of the mitigation action, based on the following scale: Congressionally protected lands would be very durable (score of 5); other federally administered lands specifically designated in land use plans or withdrawn by public land order would be moderately to very durable (score of 4–5); federally administered lands without any special designation but with enforcement oversight would have limited durability (score of 2); lands without special designation or enforcement oversite would not be very durable (score of 1).
28. How durable would the mitigation be in the context of permanence of conservation and biodiversity protections? Use scale of 1 (low) to 5 (high).		2	2	4	2	

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
RISK						
29. What are the constraints or threats to success? Include acreage of prior land use designation if they exist (e.g., corridors, mining rights, oil and gas leases, grazing, OHV trails, etc.).		Invasives, geographical extent of some species, climate change, fire, trespass off-highway vehicle (OHV), grazing, wild horses	Development, public concern, availability of land	Invasives, geographical extent of some species, climate change, fire, trespass OHV, grazing, wild horses	Fire, trespass OHV, increasing OHV use, grazing, wild horses	List the constraints or threats present at the site or in the surrounding area that could jeopardize long-term success of the mitigation action(s).

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
RISK						
30. To what extent will surrounding land uses impact mitigation success? Use scale of 1 (considerable) to 5 (low).		4	2	4	4	Rate the extent to which surrounding land uses and stressors (e.g., proximity to expanding urban areas, pressures on region for recreational land use, excessive groundwater withdrawal and drawdown conditions that could affect resources on the mitigation site) would jeopardize long-term success of the mitigation actions, based on the following scale: if surrounding land uses are similar to or compatible with mitigation actions, the impact would be low (score of 5); if surrounding land uses are incompatible with mitigation actions or present significant pressure for use of the site for incompatible uses, the impact would be considerable (score of 1); surrounding land uses falling within this range would be assessed to determine degree of impact (score of 2–4).

Table D-1. (Cont.)

Criteria	SEZ	Candidate Sites and Actions				Notes
		CM01	CM02	CM03	CM04	
	Dry Lake Valley North	Restoration of Public Lands in the Dry Lake Valley Watershed	Acquisition and Restoration of Private Land in Coyote Springs Valley[1]	Restoration of the Highland Range and Schlesser ACECs	Restoration of Areas Degraded by Vehicle Traffic	
RISK						
31. What is the relative probability of success? Use scale of 1 (low) to 5 (high).		4	2	4	2	Rate the relative probability of success of the actions at the mitigation site, based on the combination of factors evaluated in criteria 15 through 24, giving a score of 5 (high probability of success), a score of 1 (low probability of success), and scores of 2–4 to represent moderate degrees of probability of success.
32. Cumulative benefit for resources? Use scale 1 (low) to 5 (high).		4	4	4	1	
PRELIMINARY RANKING	N/A	39	22	25	28	Calculate score by summing the entries in blue-shaded cells. Scores are calculated based on entries in blue-shaded cells as follows: all scaled values (i.e., ratings from 1 to 5) are summed; 1 point is added for each Y; 2 points are deleted for each N.

[1] Because most lands in the vicinity of the Dry Lake Valley North SEZ are already under federal management, acquisition is not a likely mitigation option for this SRMS. Protection and restoration of similar areas on BLM-administered lands are more likely mitigation options than acquisition.

[2] N/A = not applicable.