NOTATION

The following is a list of acronyms and abbreviations, chemical names, and units of measure used in this document. Some acronyms used only in tables may be defined only in those tables.

GENERAL ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
AC	alternating current
ACC	air-cooled condenser
ACEC	Area of Critical Environmental Concern
ADEQ	Arizona Department of Environmental Quality
ACHP	Advisory Council on Historic Preservation
ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AERMOD	AMS/EPA Regulatory Model
AFC	Application for Certification
AGL	above ground level
AIM	Assessment, Inventory and Monitoring
AIRFA	American Indian Religious Freedom Act
AMA	active management area
AML	animal management level
ANHP	Arizona National Heritage Program
APE	area of potential effect
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
APS	Arizona Public Service
AQCR	Air Quality Control Region
AQRV	air quality–related value
ARB	Air Resources Board
ARRA	American Recovery and Reinvestment Act of 2009
ARRTIS	Arizona Renewable Resource and Transmission Identification Subcommittee
ARS	Agricultural Research Service
ARZC	Arizona and California
ATSDR	Agency for Toxic Substances and Disease Registry
AUM	animal unit month
AVSE	Arlington Valley Solar Energy
AVWS	Audio Visual Warning System
AWBA	Arizona Water Banking Authority
AWEA	American Wind Energy Association
AWRM	Active Water Resource Management
AZDA	Arizona Department of Agriculture
AZGFD	Arizona Game and Fish Department

AZGS	Arizona Geological Survey
BA	biological assessment
BAP	base annual production
BEA	Bureau of Economic Analysis
BISON-M	Biota Information System of New Mexico
BLM	Bureau of Land Management
BLM-CA	Bureau of Land Management, California
BMP	best management practice
BNSF	Burlington Northern Santa Fe
BO	biological opinion
BOR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration
BRAC	Blue Ribbon Advisory Council on Climate Change
BSE	Beacon Solar Energy
BSEP	Beacon Solar Energy Project
BTS	Bureau of Transportation Statistics
CAA	Clean Air Act
CAAQS	California Air Quality Standards
CAISO	California Independent System Operator
Caltrans	California Department of Transportation
C-AMA	California-Arizona Maneuver Area
CAP	Central Arizona Project
CARB	California Air Resources Board
CAReGAP	California Regional Gap Analysis Project
CASQA	California Stormwater Quality Association
CASTNET	Clean Air Status and Trends NETwork
CAWA	Colorado Agricultural Water Alliance
CCC	Civilian Conservation Corps
CDC	Centers for Disease Control and Prevention
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CDNCA	California Desert National Conservation Area
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife (now Colorado Parks and Wildlife)
CDPHE	Colorado Department of Public Health and Environment
CDWR	California Department of Water Resources
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CES	constant elasticity of substitution
CESA	California Endangered Species Act
CESF	Carrizo Energy Solar Farm
CFR	*Code of Federal Regulations*
CGE	computable general equilibrium
CHAT	crucial habitat assessment tool

CIRA	Cooperative Institute for Research in the Atmosphere
CLFR	compact linear Fresnel reflector
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNHP	Colorado National Heritage Program
Colorado DWR	Colorado Division of Water Resources
CO_2e	carbon dioxide equivalent
CPC	Center for Plant Conservation
CPUC	California Public Utilities Commission
CPV	concentrating photovoltaic
CRBSCF	Colorado River Basin Salinity Control Forum
CREZ	competitive renewable energy zone
CRPC	Cultural Resources Preservation Council
CRSCP	Colorado River Salinity Control Program
CSA	Candidate Study Area
CSC	Coastal Services Center
CSFG	carbon-sequestration fossil generation
CSP	concentrating solar power
CSQA	California Stormwater Quality Association
CSRI	Cultural Systems Research, Incorporated
CTG	combustion turbine generator
CTPG	California Transmission Planning Group
CTSR	Cumbres & Toltec Scenic Railroad
CUP	Conditional Use Permit
CVP	Central Valley Project
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
CWHRS	California Wildlife Habitat Relationship System
DC	direct current
DEM	digital elevation model
DHS	U.S. Department of Homeland Security
DIMA	Database for Inventory, Monitoring and Assessment
DLT	dedicated-line transmission
DNA	Determination of NEPA Adequacy
DNI	direct normal insulation
DNL	day-night average sound level
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOL	U.S. Department of Labor
DOT	U.S. Department of Transportation
DRECP	California Desert Renewable Energy Conservation Plan
DSM	demand-side management
DSRP	Decommissioning and Site Reclamation Plan
DTC/C-AMA	Desert Training Center/California–Arizona Maneuver Area

DWMA	Desert Wildlife Management Area
DWR	Division of Water Resources
EA	environmental assessment
EBID	Elephant Butte Irrigation District
ECAR	East Central Area Reliability Coordination Agreement
ECOS	Environmental Conservation Online System (USFWS)
EERE	Energy Efficiency and Renewable Energy (DOE)
Eg	band gap energy
EIA	Energy Information Administration (DOE)
EIS	environmental impact statement
EISA	Energy Independence and Security Act of 2007
EMF	electromagnetic field
E.O.	Executive Order
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
EQIP	Environmental Quality Incentives Program
ERCOT	Electric Reliability Council of Texas
ERO	Electric Reliability Organization
ERS	Economic Research Service
ESA	Endangered Species Act of 1973
ESRI	Environmental Systems Research Institute
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FLPMA	Federal Land Policy and Management Act of 1976
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRCC	Florida Reliability Coordinating Council
FSA	Final Staff Assessment
FTE	full-time equivalent
FY	fiscal year
G&TM	generation and transmission modeling
GCRP	U.S. Global Climate Research Program
GDA	generation development area
GHG	greenhouse gas
GIS	geographic information system
GMU	game management unit
GPS	global positioning system
GTM	Generation and Transmission Model

GUAC	Groundwater Users Advisory Council
GWP	global warming potential
HA	herd area
HAP	hazardous air pollutant
HAZCOM	hazard communication
HCE	heat collection element
HCP	Habitat Conservation Plan
HMA	herd management area
HMMH	Harris Miller Miller & Hanson, Inc.
HRSG	heat recovery steam generator
HSPD	Homeland Security Presidential Directive
HTF	heat transfer fluid
HUC	hydrologic unit code
HVAC	heating, ventilation, and air-conditioning
I	Interstate
IARC	International Agency for Research on Cancer
IBA	important bird area
ICE	internal combustion engine
ICPDS	Imperial County Planning & Development Services
ICWMA	Imperial County Weed Management Area
IDT	interdisplinary team
IEC	International Electrochemical Commission
IFR	instrument flight rule
IID	Imperial Irrigation District
IM	Instruction Memorandum
IMPS	Iron Mountain Pumping Station
IMS	interim mitigation strategy
INA	Irrigation Non-Expansion Area
IOP	Interagency Operating Procedure
IOU	investor-owned utility
IPCC	Intergovernmental Panel on Climate Change
ISA	Independent Science Advisor; Instant Study Area
ISB	Intermontane Seismic Belt
ISCC	integrated solar combined cycle
ISDRA	Imperial Sand Dunes Recreation Area
ISEGS	Ivanpah Solar Energy Generating System
ISO	independent system operator; iterative self-organizing
ITFR	Interim Temporary Final Rulemaking
ITP	incidental take permit
IUCNNR	International Union for Conservation of Nature and Natural Resources
IUCNP	International Union for Conservation of Nature Pakistan
KGA	known geothermal resources area
KML	keyhole markup language

KOP	key observation point
KSLA	known sodium leasing area
LCC	Landscape Conservation Cooperative
LCCRDA	Lincoln County Conservation, Recreation, and Development Act of 2004
LCOE	levelized cost of energy
L_{dn}	day-night average sound level
LDWMA	Low Desert Weed Management Area
L_{eq}	equivalent sound pressure level
LiDAR	light detection and ranging
LLA	limited land available
LLRW	low-level radioactive waste (waste classification)
LPN	listing priority number
LRG	Lower Rio Grande
LSA	lake and streambed alteration
LSE	load-serving entity
LTMP	long-term monitoring and adaptive management plan
LTVA	long-term visitor area
MAAC	Mid-Atlantic Area Council
MAIN	Mid-Atlantic Interconnected Network
MAPP	methyl acetylene propadiene stabilizer; Mid-Continent Area Power Pool
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MEB	Marine Expeditionary Brigade
MFP	Management Framework Plan
MIG	Minnesota IMPLAN Group
MLA	maximum land available
MOA	military operating area
MOU	Memorandum of Understanding
MPDS	maximum potential development scenario
MRA	Multiple Resource Area
MRI	Midwest Research Institute
MRO	Midwest Reliability Organization
MSDS	Material Safety Data Sheet
MSL	mean sea level
MTR	military training route
MVEDA	Mesilla Valley Economic Development Alliance
MWA	Mojave Water Agency
MWD	Metropolitan Water District
MWMA	Mojave Weed Management Area
NAAQS	National Ambient Air Quality Standard(s)
NADP	National Atmospheric Deposition Program
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission (California)
NAIC	North American Industrial Classification System

NASA	National Aeronautics and Space Administration
NCA	National Conservation Area
NCCAC	Nevada Climate Change Advisory Committee
NCDC	National Climatic Data Center
NCES	National Center for Education Statistics
NDAA	National Defense Authorization Act
NDCNR	Nevada Department of Conservation and Natural Resources
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWP	Nevada Division of Water Planning
NDWR	Nevada Division of Water Resources
NEAP	Natural Events Action Plan
NEC	National Electric Code
NED	National Elevation Database
NEP	Natural Events Policy
NEPA	National Environmental Policy Act of 1969
NERC	North American Electricity Reliability Corporation
NGO	non-governmental organization
NHA	National Heritage Area
NHD	National Hydrography Dataset
NHNM	National Heritage New Mexico
NHPA	National Historic Preservation Act of 1966
NID	National Inventory of Dams
NLCS	National Landscape Conservation System
NMAC	*New Mexico Administrative Code*
NMBGMR	New Mexico Bureau of Geology and Mineral Resources
NMDGF	New Mexico Department of Game and Fish
NM DOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMED-AQB	New Mexico Environment Department-Air Quality Board
NMFS	National Marine Fisheries Service
NMOSE	New Mexico Office of the State Engineer
NMSU	New Mexico State University
NNHP	Nevada Natural Heritage Program
NNL	National Natural Landmark
NNSA	National Nuclear Security Administration
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NP	National Park
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NPV	net present value
NRA	National Recreation Area

NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	*National Register of Historic Places*
NRS	*Nevada Revised Statutes*
NSC	National Safety Council
NSO	no surface occupancy
NSTC	National Science and Technology Council
NTHP	National Trust for Historic Preservation
NTS	Nevada Test Site
NTTR	Nevada Test and Training Range
NVCRS	Nevada Cultural Resources Inventory System
NV DOT	Nevada Department of Transportation
NWCC	National Wind Coordinating Committee
NWI	National Wetlands Inventory
NWIS	National Water Information System (USGS)
NWPP	Northwest Power Pool
NWR	National Wildlife Refuge
NWSRS	National Wild and Scenic River System
O&M	operation and maintenance
ODFW	Oregon Department of Fish and Wildlife
OHV	off-highway vehicle
ONA	Outstanding Natural Area
ORC	organic Rankine cycle
OSE/ISC	Office of the State Engineer/Interstate Stream Commission
OSHA	Occupational Safety and Health Administration
OTA	Office of Technology Assessment
PA	Programmatic Agreement
PAD	Preliminary Application Document
PAH	polycyclic aromatic hydrocarbon
PAT	peer analysis tool
PCB	polychlorinated biphenyl
PCM	purchase change material
PCS	power conditioning system
PCU	power converting unit
PEIS	programmatic environmental impact statement
PFYC	potential fossil yield classification
PGH	Preliminary General Habitat
PIER	Public Interest Energy Research
P.L.	Public Law
PLSS	Public Land Survey System
PM	particulate matter
$PM_{2.5}$	particulate matter with a diameter of 2.5 μm or less
PM_{10}	particulate matter with a diameter of 10 μm or less
PPA	Power Purchase Agreement

P-P-D	population-to-power density
PPH	Preliminary Priority Habitat
POD	plan of development
POU	publicly owned utility
PPA	Power Purchase Agreement
PPE	personal protective equipment
PSD	Prevention of Significant Deterioration
PURPA	Public Utility Regulatory Policy Act
PV	photovoltaic
PVID	Palo Verde Irrigation District
PWR	public water reserve
QRA	qualified resource area
R&I	relevance and importance
RAC	Resource Advisory Council
RCE	Reclamation Cost Estimate
RCI	residential, commercial, and industrial (sector)
RCRA	Resource Conservation and Recovery Act of 1976
RD&D	research, development, and demonstration; research, development, and deployment
RDBMS	Relational Database Management System
RDEP	Restoration Design Energy Project
REA	Rapid Ecoregional Assessment
REAT	Renewable Energy Action Team
REDA	Renewable Energy Development Area
REDI	Renewable Energy Development Infrastructure
REEA	Renewable Energy Evaluation Area
ReEDS	Regional Energy Deployment System
REPG	Renewable Energy Policy Group
RETA	Renewable Energy Transmission Authority
RETAAC	Renewable Energy Transmission Access Advisory Committee
RETI	Renewable Energy Transmission Initiative
REZ	renewable energy zone
RF	radio frequency
RFC	Reliability First Corporation
RFDS	reasonably foreseeable development scenario
RGP	Rio Grande Project
RGWCD	Rio Grande Water Conservation District
RMP	Resource Management Plan
RMPA	Rocky Mountain Power Area
RMZ	Resource Management Zone
ROD	Record of Decision
ROI	region of influence
ROS	recreation opportunity spectrum
ROW	right-of-way

RPG	renewable portfolio goal
RPS	Renewable Portfolio Standard
RRC	Regional Reliability Council
RSEP	Rice Solar Energy Project
RSI	Renewable Systems Interconnection
RTO	regional transmission organization
RTTF	Renewable Transmission Task Force
RV	recreational vehicle
SAAQS	State Ambient Air Quality Standard(s)
SAMHSA	Substance Abuse and Mental Health Services Administration
SCADA	supervisory control and data acquisition
SCE	Southern California Edison
SCRMA	Special Cultural Resource Management Area
SDRREG	San Diego Regional Renewable Energy Group
SDWA	Safe Drinking Water Act of 1974
SEGIS	Solar Energy Grid Integration System
SEGS	Solar Energy Generating System
SEI	Sustainable Energy Ireland
SEIA	Solar Energy Industrial Association
SES	Stirling Energy Systems
SETP	Solar Energy Technologies Program (DOE)
SEZ	solar energy zone
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SLRG	San Luis & Rio Grande
SMA	Special Management Area
SMART	specific, measurable, achievable, relevant, and time sensitive
SMP	suggested management practice
SNWA	Southern Nevada Water Authority
SPP	Southwest Power Pool
SRMA	Special Recreation Management Area
SSA	Socorro Seismic Anomaly
SSI	self-supplied industry
ST	solar thermal
STG	steam turbine generator
SUA	special use airspace
SWAT	Southwest Area Transmission
SWIP	Southwest Intertie Project
SWPPP	Stormwater Pollution Prevention Plan
SWReGAP	Southwest Regional Gap Analysis Project
TAP	toxic air pollutant
TCC	Transmission Corridor Committee
TDS	total dissolved solids
TEPPC	Transmission Expansion Planning Policy Committee

TES	thermal energy storage
TRACE	Transmission Routing and Configuration Estimator
TSA	Transportation Security Administration
TSCA	Toxic Substances Control Act of 1976
TSDF	treatment, storage, and disposal facility
TSP	total suspended particulates
UACD	Utah Association of Conservation Districts
UBWR	Utah Board of Water Resources
UDA	Utah Department of Agriculture
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDOT	Utah Department of Transportation
UDWQ	Utah Division of Water Quality
UDWR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey
UNEP	United Nations Environmental Programme
UNPS	Utah Native Plant Society
UP	Union Pacific
UREZ	Utah Renewable Energy Zone
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	*United States Code*
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Utah DWR	Utah Division of Water Rights
UTTR	Utah Test and Training Range
UWS	Underground Water Storage, Savings and Replenishment Act
VACAR	Virginia–Carolinas Subregion
VCRS	Visual Contrast Rating System
VFR	visual flight rule
VOC	volatile organic compound
VRHCRP	Virgin River Habitat Conservation & Recovery Program
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WA	Wilderness Area
WECC	Western Electricity Coordinating Council
WECC CAN	Western Electricity Coordinating Council–Canada
WEG	wind erodibility group
Western	Western Area Power Administration
WGA	Western Governors' Association
WGFD	Wyoming Game and Fish Department

WHA	wildlife habitat area
WHO	World Health Organization
WIA	Wyoming Infrastructure Authority
WRAP	Water Resources Allocation Program; Western Regional Air Partnership
WRCC	Western Regional Climate Center
WREZ	Western Renewable Energy Zones
WRRI	Water Resources Research Institute
WSA	Wilderness Study Area
WSC	wildlife species of special concern
WSMR	White Sands Missile Range
WSR	Wild and Scenic River
WSRA	Wild and Scenic Rivers Act of 1968
WWII	World War II
WWP	Western Watersheds Project
YPG	Yuma Proving Ground
ZITA	zone identification and technical analysis
ZLD	zero liquid discharge

CHEMICALS

CH_4	methane	NO_2	nitrogen dioxide
CO	carbon monoxide	NO_x	nitrogen oxides
CO_2	carbon dioxide		
		O_3	ozone
H_2S	hydrogen sulfide		
Hg	mercury	Pb	lead
N_2O	nitrous oxide	SF_6	sulfur hexafluoride
NH_3	ammonia	SO_2	sulfur dioxide
		SO_x	sulfur oxides

UNITS OF MEASURE

ac-ft	acre-foot (feet)	dBA	A-weighted decibel(s)
bhp	brake horsepower		
		°F	degree(s) Fahrenheit
°C	degree(s) Celsius	ft	foot (feet)
cf	cubic foot (feet)	ft^2	square foot (feet)
cfs	cubic foot (feet) per second	ft^3	cubic foot (feet)
cm	centimeter(s)		
		g	gram(s)
dB	decibel(s)	gal	gallon(s)

GJ	gigajoule(s)
gpcd	gallon per capita per day
gpd	gallon(s) per day
gpm	gallon(s) per minute
GW	gigawatt(s)
GWh	gigawatt hour(s)
GWh/yr	gigawatt hour(s) per year
h	hour(s)
ha	hectare(s)
Hz	hertz
in.	inch(es)
J	joule(s)
K	degree(s) Kelvin
kcal	kilocalorie(s)
kg	kilogram(s)
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
kPa	kilopascal(s)
kV	kilovolt(s)
kVA	kilovolt-ampere(s)
kW	kilowatt(s)
kWh	kilowatt-hour(s)
kWp	kilowatt peak
L	liter(s)
lb	pound(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mg	milligram(s)
Mgal	million gallons
mi	mile(s)
mi^2	square mile(s)
min	minute(s)
mm	millimeter(s)
MMt	million metric ton(s)
MPa	megapascal(s)
mph	mile(s) per hour
MVA	megavolt-ampere(s)
MW	megawatt(s)
MWe	megawatt(s) electric
MWh	megawatt-hour(s)
ppm	part(s) per million
psi	pound(s) per square inch
psia	pound(s) per square inch absolute
rpm	rotation(s) per minute
s	second(s)
scf	standard cubic foot (feet)
TWh	terawatt hour(s)
VdB	vibration velocity decibel(s)
W	watt(s)
yd^2	square yard(s)
yd^3	cubic yard(s)
yr	year(s)
µg	microgram(s)
µm	micrometer(s)

11 UPDATE TO AFFECTED ENVIRONMENT AND IMPACT ASSESSMENT FOR PROPOSED SOLAR ENERGY ZONES IN NEVADA

The U.S. Department of the Interior Bureau of Land Management (BLM) has carried 17 solar energy zones (SEZs) forward for analysis in this Final Solar Programmatic Environmental Impact Statement (PEIS). These SEZs total approximately 285,000 acres (1,153 km^2) of land potentially available for development. This chapter includes analyses of potential environmental impacts for the proposed SEZs in Nevada—Amargosa, Dry Lake, Dry Lake Valley North, Gold Point, and Millers—as well as summaries of the previously proposed Delamar Valley and East Mormon Mountain SEZs and why they were eliminated from further consideration. The SEZ-specific analyses provide documentation from which the BLM will tier future project authorizations, thereby limiting the required scope and effort of project-specific National Environmental Policy Act of 1969 (NEPA) analyses.

The BLM is committed to collecting additional SEZ-specific resource data and conducting additional analysis in order to more efficiently facilitate future development in SEZs. The BLM developed action plans for each of the 17 SEZs carried forward as part of the Supplement to the Draft Solar PEIS (BLM and DOE 2011). These action plans described additional data that could be collected for individual SEZs and proposed data sources and methods for the collection of those data. Work is underway to collect additional data as specified under these action plans (e.g., additional data collection to support evaluation of cultural, visual, and water resources has begun). As the data become available, they will be posted on the project Web site (http://solareis.anl.gov) for use by applicants and the BLM and other agency staff.

To accommodate the flexibility described in the BLM's program objectives and in light of anticipated changes in technologies and environmental conditions over time, the BLM has removed some of the prescriptive SEZ-specific design features presented in the Draft Solar PEIS (BLM and DOE 2010) and the Supplement to the Draft (e.g., height restrictions on technologies used to address visual resource impacts). Alternatively, the BLM will give full consideration to any outstanding conflicts in SEZs as part of the competitive process being developed through rulemaking (see Section 2.2.2.2.1).

In preparing selected parcels for competitive offer, the BLM will review all existing analysis for an SEZ and consider any new or changed circumstances that may affect the development of the SEZ. The BLM will also work with appropriate federal, state, and local agencies, and affected tribes, as necessary, to discuss SEZ-related issues. This work would ultimately inform how a parcel would be offered competitively (e.g., parcel size and configuration, technology limitations, mitigation requirements, and parcel-specific competitive process). Prior to issuing a notice of competitive offer, the BLM would complete appropriate NEPA analysis to support the offer. This analysis would tier to the analysis for SEZs in the Solar PEIS to the extent practicable.

It is the BLM's goal to compile all data, information, and analyses for SEZs from the Draft Solar PEIS, the Supplement to the Draft, and this Final Solar PEIS into a single location

accessible via the project Web site (http://solareis.anl.gov) for ease of use by applicants and the BLM and other agency staff.

This chapter is an update to the information on Nevada SEZs presented in the Draft Solar PEIS. As stated previously, the Delamar Valley and East Mormon SEZs were dropped from further consideration through the Supplement to the Draft Solar PEIS. For the remaining five Nevada SEZs—Amargosa, Dry Lake, Dry Lake Valley North, Gold Point, and Millers—the information presented in this chapter supplements and updates, but does not replace, the information provided in the corresponding Chapter 11 on proposed SEZs in Nevada in the Draft Solar PEIS. Corrections to incorrect information in Sections 11.1, 11.3, 11.4, 11.6, and 11.7 of the Draft Solar PEIS and in Sections C.4.1, C.4.2, C.4.3, C.4.4, and C.4.5 of the Supplement to the Draft are provided in Sections 11.1.26, 11.3.26, 11.4.26, 11.6.26, and 11.7.26 of this Final Solar PEIS.

11.1 AMARGOSA VALLEY

11.1.1 Background and Summary of Impacts

11.1.1.1 General Information

The proposed Amargosa Valley SEZ is located in Nye County in southern Nevada near the California border. In 2008, the county population was 44,175, while adjacent Clark County to the southeast had a population of 1,879,093. The closest towns to the SEZ are Beatty, about 11 mi (18 km) north on U.S. 95, and Amargosa Valley, about 12 mi (20 km) southeast on U.S. 95. Las Vegas is about 84 mi (135 km) southeast. The nearest major road access to the proposed Amargosa Valley SEZ is via U.S. 95, which is adjacent to the northeast boundary of the SEZ. Access to the interior of the SEZ is by dirt roads. The nearest railroad access is approximately 100 mi (161 km) away, and one small airport near Beatty serves the area. The Nevada Test Site (NTS) lies about 10 mi (16 km) east, and the Nellis Air Force Range lies a similar distance northeast of the proposed SEZ. As of October 28, 2011, there was one pending solar application adjacent to the southeast boundary of the SEZ.

As published in the Draft Solar PEIS, the proposed Amargosa Valley SEZ had a total area of 31,625 acres (128.0 km^2). In the Supplement to the Draft Solar PEIS, the size of the proposed Amargosa Valley SEZ was reduced to eliminate the area south and west of the Amargosa River and the area northeast of U.S. 95, a total of 21,888 acres (88.6 km^2) (see Figure 11.1.1.1-1). Eliminating these areas is primarily intended to avoid or minimize many potential impacts, including impacts on Death Valley National Park (NP) and the desert tortoise. In addition, 1,258 acres (5.1 km^2) of Amargosa River floodplain north of the river but within the SEZ boundaries has been identified as a non-development area (see Figure 11.1.1.1-2); the remaining developable area within the SEZ is 8,479 acres (34.3 km^2).

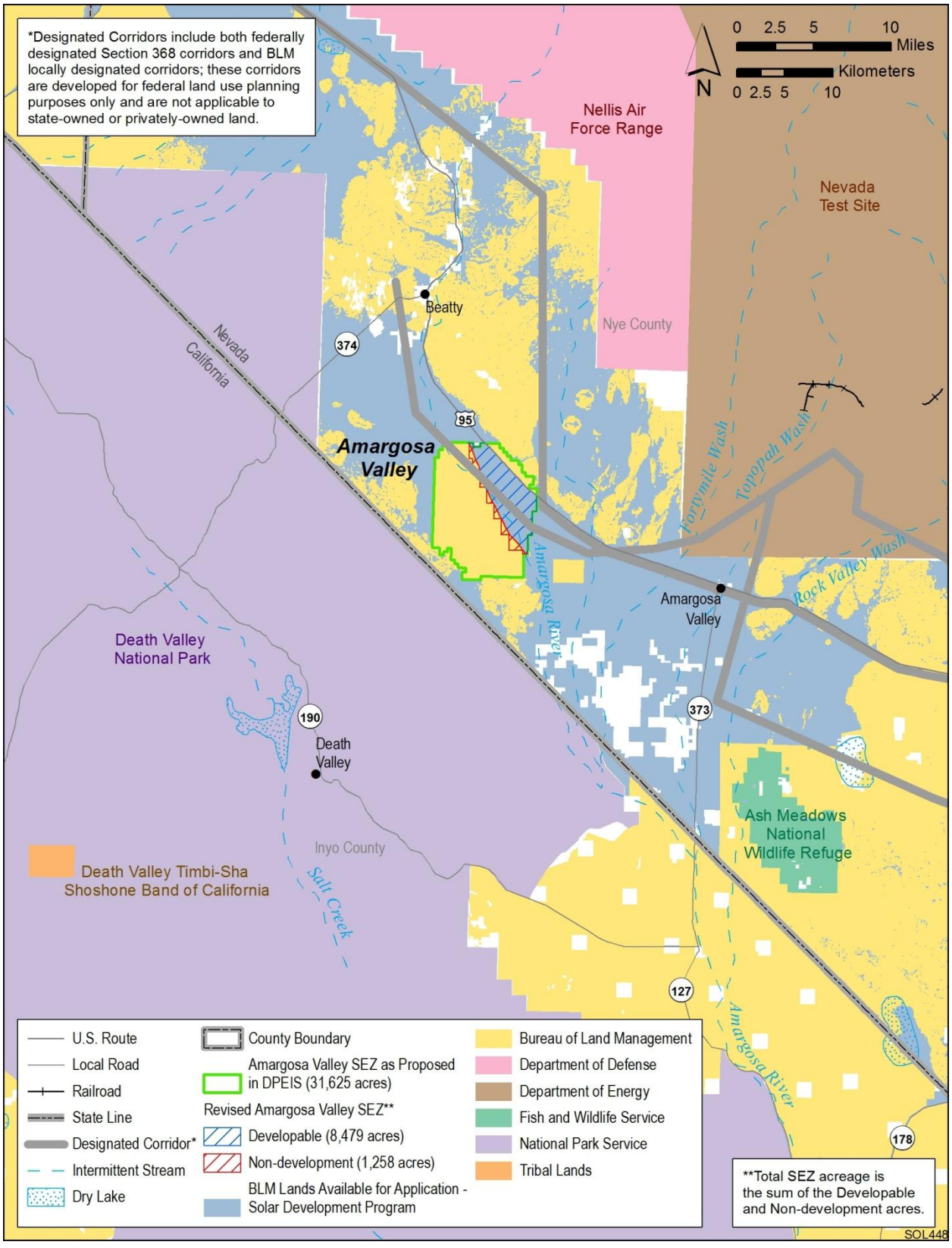


FIGURE 11.1.1.1-1 Proposed Amargosa Valley SEZ as Revised

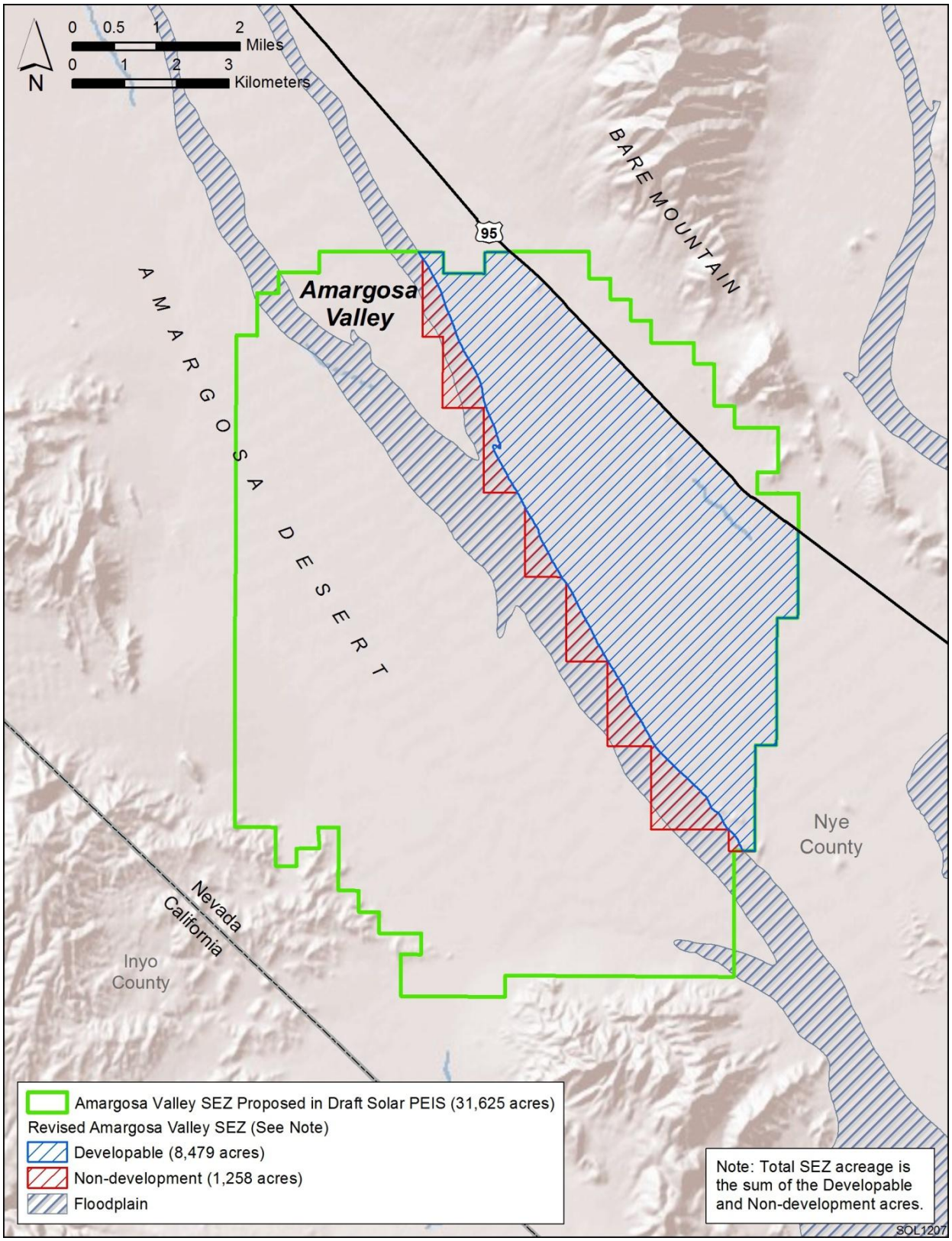


FIGURE 11.1.1.1-2 Developable and Non-development Areas for the Proposed Amargosa Valley SEZ as Revised

Because of the extensive potential impacts from solar development in the portion of the Amargosa Valley SEZ that has been eliminated, those lands are proposed as solar right-of-way (ROW) exclusion areas; that is, applications for solar development on those lands will not be accepted by the U.S. Department of the Interior Bureau of Land Management (BLM).

The analyses in the following sections update the affected environment and potential environmental, cultural, and socioeconomic impacts associated with utility-scale solar energy development in the Amargosa Valley SEZ as described in the Draft Solar PEIS.

11.1.1.2 Development Assumptions for the Impact Analysis

Maximum solar development of the proposed Amargosa Valley SEZ is assumed to be 80% of the developable SEZ area over a period of 20 years, a maximum of 6,783 acres (27.4 km^2) (Table 11.1.1.2-1). Full development of the Amargosa Valley SEZ would allow development of facilities with an estimated total of between 754 MW (power tower, dish engine, or photovoltaic [PV] technologies, 9 acres/MW [0.04 km^2/MW]) and 1,357 MW (solar trough technologies, 5 acres/MW [0.02 km^2/MW]) of electrical power capacity.

Availability of transmission from SEZs to load centers will be an important consideration for future development in SEZs. For the proposed Amargosa Valley SEZ, the nearest existing transmission line as identified in the Draft Solar PEIS is a 138-kV line that runs adjacent to the SEZ. It is possible that this existing line could be used to provide access from the SEZ to the

TABLE 11.1.1.2-1 Assumed Development Acreages, Solar MW Output, and Nearest Major Access Road and Transmission Line for the Proposed Amargosa Valley SEZ as Revised

Total Developable Acreage and Assumed Developed Acreage (80% of Total)	Assumed Maximum SEZ Output for Various Solar Technologies	Distance to Nearest State, U.S., or Interstate Highway	Distance and Capacity of Nearest Existing Transmission Line	Assumed Area of Road ROW	Distance to Nearest Designated Transmission Corridor[e]
8,479 acres[a] and 6,783 acres	754 MW[b] 1,357 MW[c]	U.S. 95: 0 mi[d]	0 mi and 138 kV	0 acres and 0 acres	0 mi

[a] To convert acres to km^2, multiply by 0.004047.

[b] Maximum power output if the SEZ were fully developed using power tower, dish engine, or PV technologies, assuming 9 acres/MW (0.04 km^2/MW) of land required.

[c] Maximum power output if the SEZ were fully developed using solar trough technologies, assuming 5 acres/MW (0.02 km^2/MW) of land required.

[d] To convert mi to km, multiply by 1.6093.

[e] BLM-designated corridors are developed for federal land use planning purposes only and are not applicable to state-owned or privately owned land.

transmission grid, but the capacity of the existing line would not be adequate for 754 to 1,357 MW of new capacity. Therefore, at full build-out capacity, new transmission lines and possibly upgrades of existing transmission lines would be required to bring electricity from the proposed Amargosa Valley SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Amargosa Valley SEZ and a general assessment of the impacts of constructing and operating new transmission facilities to those load centers are provided in Section 11.1.23. In addition, the generic impacts of transmission lines and associated infrastructure construction and of line upgrades for various resources are discussed in Chapter 5 of this Final Solar PEIS. 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.

Part of the Amargosa Valley SEZ overlaps a locally designated transmission corridor. For this impact assessment, it is assumed that up to 80% of the proposed SEZ could be developed. This does not take into account the potential limitations to solar development that may result from siting constraints associated with the corridor. The development of solar facilities and the existing corridor will be dealt with by the BLM on a case-by-case basis. See Section 11.1.2.2 for further discussion of impacts on lands and realty.

For the proposed Amargosa Valley SEZ, U.S. 95 passes along the northeast boundary of the SEZ. Existing road access to the proposed Amargosa Valley SEZ should be adequate to support construction and operation of solar facilities. No additional road construction outside of the SEZ was assumed to be required to support solar development. While there are existing dirt/ranch roads within the SEZ, additional internal road construction would likely be required to support solar facility construction.

11.1.1.3 Programmatic and SEZ-Specific Design Features

The proposed programmatic design features for each resource area to be required under the BLM Solar Energy Program are presented in Section A.2.2 of Appendix A of this Final Solar PEIS. These programmatic design features are intended to avoid, minimize, and/or mitigate adverse impacts from solar energy development and will be required for development on all BLM-administered lands including SEZ and non-SEZ lands.

The discussions below addressing potential impacts of solar energy development on specific resource areas (Sections 11.1.2 through 11.1.22) also provide an assessment of the effectiveness of the programmatic design features in mitigating adverse impacts from solar development within the SEZ. SEZ-specific design features to address impacts specific to the proposed Amargosa Valley SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Amargosa Valley SEZ have been updated on the basis of revisions to the SEZ since the Draft Solar PEIS (such as boundary changes and the identification of non-development areas), and on the basis of comments received on the Draft Solar PEIS and Supplement to the Draft. All applicable SEZ-specific design features identified to date (including those from the Draft Solar PEIS that are still applicable) are presented in Sections 11.1.2 through 11.1.22.

11.1.2 Lands and Realty

11.1.2.1 Affected Environment

The developable area of the proposed SEZ has been reduced to 8,479 acres (34.3 km^2). The northeastern boundary of the proposed SEZ has been moved southwest of Highway 95, and the southwestern boundary has been moved northward a distance of 2.3 to 4.9 mi (3.7 to 7.9 km) from the boundary in the Draft Solar PEIS. Access roads to areas west of the proposed SEZ and a transmission line corridor still pass through the revised proposed SEZ. The proposed SEZ is no longer within the floodplain of the Amargosa River.

11.1.2.2 Impacts

Anticipated full development of the proposed SEZ would be reduced from 25,300 acres (102.4 km^2) to 6,783 acres (27.4 km^2). Since the SEZ is undeveloped and rural, utility-scale solar energy development would be a new and discordant land use to the area. However, solar development of a pending application adjacent to the SEZ could result in altering the regional land use character prior to development in the SEZ.

In the Draft Solar PEIS, it was noted that the proximity of the SEZ to National Park Service (NPS) lands to the southwest and topographic features could result in isolated parcels of public land between the SEZ and the NPS lands. This potential impact is no longer a concern because of the change in SEZ boundaries, moving its southern border well away from NPS lands.

Part of the proposed Amargosa Valley SEZ overlaps a locally designated transmission corridor; this corridor does not currently contain a transmission line. This existing corridor will be used primarily for the siting of transmission lines and other infrastructure such as pipelines. The existing corridor will be the preferred location for any transmission development that is required to support solar development and future transmission grid improvements related to the build-out of the Amargosa Valley SEZ. Any use of the corridor lands within the Amargosa Valley SEZ for solar energy facilities, such as solar panels or heliostats, must be compatible with the future use of the existing corridor. The BLM will assess solar projects in the vicinity of the existing corridor on a case-by-case basis. The BLM will review and approve individual project plans of development to ensure compatible development that maintains the use of the corridor.

11.1.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on lands and realty are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some mitigation for the identified impacts but would not mitigate all adverse impacts. For example, impacts related to the exclusion of many existing and potential uses of the public land, the visual impact of an industrial-type solar facility within

an otherwise rural area, and, should they occur, induced land use changes on state and private lands may not be fully mitigated.

No SEZ-specific design features for lands and realty have been identified. Some SEZ-specific design features may be established for parcels within the Amargosa Valley SEZ through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.3 Specially Designated Areas and Lands with Wilderness Characteristics

11.1.3.1 Affected Environment

Nine specially designated areas near the proposed Amargosa Valley SEZ that could be affected by solar energy development were discussed in the Draft Solar PEIS: Death Valley NP and Wilderness Area (WA), the California Desert Conservation Area (CDCA), the Ash Meadows National Wildlife Refuge (NWR) and the Devils Hole unit within it, Funeral Mountains WA, Amargosa Mesquite Trees Area of Critical Environmental Concern (ACEC), Amargosa River ACEC, and the Big Dunes ACEC and Special Recreation Management Area (SRMA). The distances to the specially designated areas discussed in this Final Solar PEIS are the same, with the exception of the distance to Death Valley NP and designated wilderness there. The NP boundary now ranges from 5 to 7.5 mi (8 to 12 km) from the boundary of the developable area of the proposed SEZ.

11.1.3.2 Impacts

With the increased distance between the National Park and Wilderness Area and the developable area of the potential SEZ, adverse visual impacts on the National Park and designated wilderness will be somewhat reduced though not eliminated. Glint and glare from solar facilities within the SEZ would still be visible from about 3% of the area within the National Park, primarily designated wilderness. The level of potential visual impacts will be affected by the choice of solar technologies employed and mitigation measures applied and will have to be determined on a project-by-project basis. Potential impacts on night sky viewing would also be reduced but not eliminated.

In general, the impacts on the other specially designated areas noted in the Draft Solar PEIS have not changed. Impacts from groundwater withdrawals in the Ash Meadows NWR and Devils Hole unit, Amargosa Mesquite Tree ACEC, and the Amargosa River ACEC would be less than those discussed in the Draft Solar PEIS, because the maximum amount of groundwater use at the SEZ has decreased by about 75% (proportional to the decrease in size of the SEZ). More detailed information on potential water issues is contained in Section 11.1.9 of this Final Solar PEIS and of the Draft Solar PEIS.

11.1.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on specially designated areas are described in Section A.2.2 of Appendix A of this Final Solar PEIS (design features for both specially designated areas and visual resources would address impacts). Implementing the programmatic design features will provide some mitigation for the identified impacts. However, some adverse impacts on wilderness characteristics in Death Valley NP and potential impacts on night sky viewing may still occur.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, the following SEZ-specific design feature has been identified:

- Water use for any solar energy development should be reviewed to ensure that impacts on Death Valley NP, the NWR, and ACECs would be neutral or positive.

The need for additional SEZ-specific design features will be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.4 Rangeland Resources

11.1.4.1 Livestock Grazing

11.1.4.1.1 Affected Environment

As presented in the Draft Solar PEIS, no grazing allotments overlap the proposed Amargosa Valley SEZ. The revised area of the SEZ does not alter this finding.

11.1.4.1.2 Impacts

Because the SEZ does not contain any active grazing allotments, solar energy development within the SEZ would have no impact on livestock and grazing.

11.1.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Because there is no livestock grazing in the proposed SEZ, no SEZ-specific design features to protect livestock grazing have been identified in this Final Solar PEIS.

11.1.4.2 Wild Horses and Burros

11.1.4.2.1 Affected Environment

As presented in the Draft Solar PEIS, no wild horse or burro herd management areas (HMAs) occur within the proposed Amargosa Valley SEZ or in close proximity to it. The revised developable area of the SEZ does not alter this finding.

11.1.4.2.2 Impacts

Solar energy development within the revised area of the proposed Amargosa Valley SEZ would not affect wild horses and burros.

11.1.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

Because solar energy development within the proposed Amargosa Valley SEZ would not affect wild horses and burros, no SEZ-specific design features to address wild horses and burros have been identified in this Final Solar PEIS.

11.1.5 Recreation

11.1.5.1 Affected Environment

As stated in the Draft Solar PEIS, off-highway vehicle (OHV) use is likely the major recreational activity in the area of the proposed Amargosa Valley SEZ. A designated route that accommodates desert racing and commercial tours still passes through the SEZ as revised.

11.1.5.2 Impacts

Impacts described in the Draft Solar PEIS are still accurate, although the modified boundary for the proposed SEZ will result in reducing the amount of potential impact on recreational uses. Recreational use would be excluded from any area developed for solar energy production, and the same types of impacts as described in the Draft Solar PEIS would still occur. The route used by desert racing and commercial tours would be adversely affected by solar development within the SEZ. There would be less impact on potential OHV recreation than that described in the Draft Solar PEIS since the area of the SEZ has been reduced. The area removed from the SEZ is designated as "limited to existing roads, trails, and washes" for OHVs and would continue to be available for this use. The most convenient access roads to public lands west of the SEZ still cross within the revised SEZ boundary, and access to those lands could become more difficult.

In addition, lands that are outside of the proposed SEZ may be acquired or managed for mitigation of impacts on other resources (e.g., sensitive species). Managing these lands for mitigation could further exclude or restrict recreational use, potentially leading to additional losses in recreational opportunities in the region. The impact of acquisition and management of mitigation lands would be considered a part of the environmental analysis of specific solar energy projects.

11.1.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreational are described in Section A.2.2 of Appendix A of this Final Solar PEIS; however, implementing the programmatic design features for recreation will not mitigate the loss of recreational access to public lands developed for solar energy production or the loss of wildlife-related hunting recreation. Implementing the programmatic design features for visual impacts will help minimize recreational impacts of individual solar projects on surrounding areas used by recreationists.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, the following SEZ-specific design feature for recreation has been identified:

- Relocation of the designated route used for desert racing and commercial tours should be considered at the time specific solar development proposals are analyzed.

The need for additional SEZ-specific design features will be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.6 Military and Civilian Aviation

11.1.6.1 Affected Environment

Although the area within the proposed SEZ has been reduced, the remaining area is still completely covered by military training routes (MTRs). One of the training routes has an operating elevation from ground level up to 9,400 ft (2,865 m) mean sea level (MSL). The information on affected environment given in the Draft Solar PEIS remains valid.

11.1.6.2 Impacts

Impacts described in the Draft Solar PEIS remain valid and have been updated with additional input from the U.S. Department of Defense (DoD). Impacts include the following:

- MTR airspace is authorized by the Federal Aviation Administration (FAA) and utilized by DoD aircraft from the surface to 9,400 ft MSL. The proposed SEZ encompasses the entire route. Glare and heat emissions produced by certain types of solar technologies may present both flight and ground safety concerns.

- Light from solar energy facilities could affect DoD nighttime operations.

Through comments on the Draft Solar PEIS and the Supplement to the Draft, the DoD expressed concern for solar energy facilities that might affect military test and training operations. The DoD requested that the technology at the proposed Amargosa Valley SEZ be restricted to low-profile, low-glare PV technologies under 50 ft (15 m) above ground level (AGL), similar to the PV I Array at Nellis Air Force Base.

11.1.6.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on military and civilian aviation are described in Section A.2.2 of Appendix A of this Final Solar PEIS. The programmatic design features require early coordination with the DoD to identify and avoid, minimize, and/or mitigate, if possible, potential impacts on the use of military airspace and military testing activities.

No SEZ-specific design features to address impacts on military and civilian aviation have been identified in this Final Solar PEIS. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.7 Geologic Setting and Soil Resources

11.1.7.1 Affected Environment

11.1.7.1.1 Geologic Setting

Data provided in the Draft Solar PEIS remain valid, with the following update:

- The terrain of the proposed Amargosa Valley SEZ slopes gently to the southeast (Figure 11.1.7.1-1). The boundaries of the proposed SEZ have been changed to eliminate the area south and west of the Amargosa River floodplain and the area northeast of U.S. 95. Within this revised area, 1,258 acres (5.1 km^2) of Amargosa River floodplain were identified as non-development areas. Based on these changes, the elevations range from about 2,800 ft (850 m) in the northwest corner to about 2,540 ft (775 m) in the southeast corner.

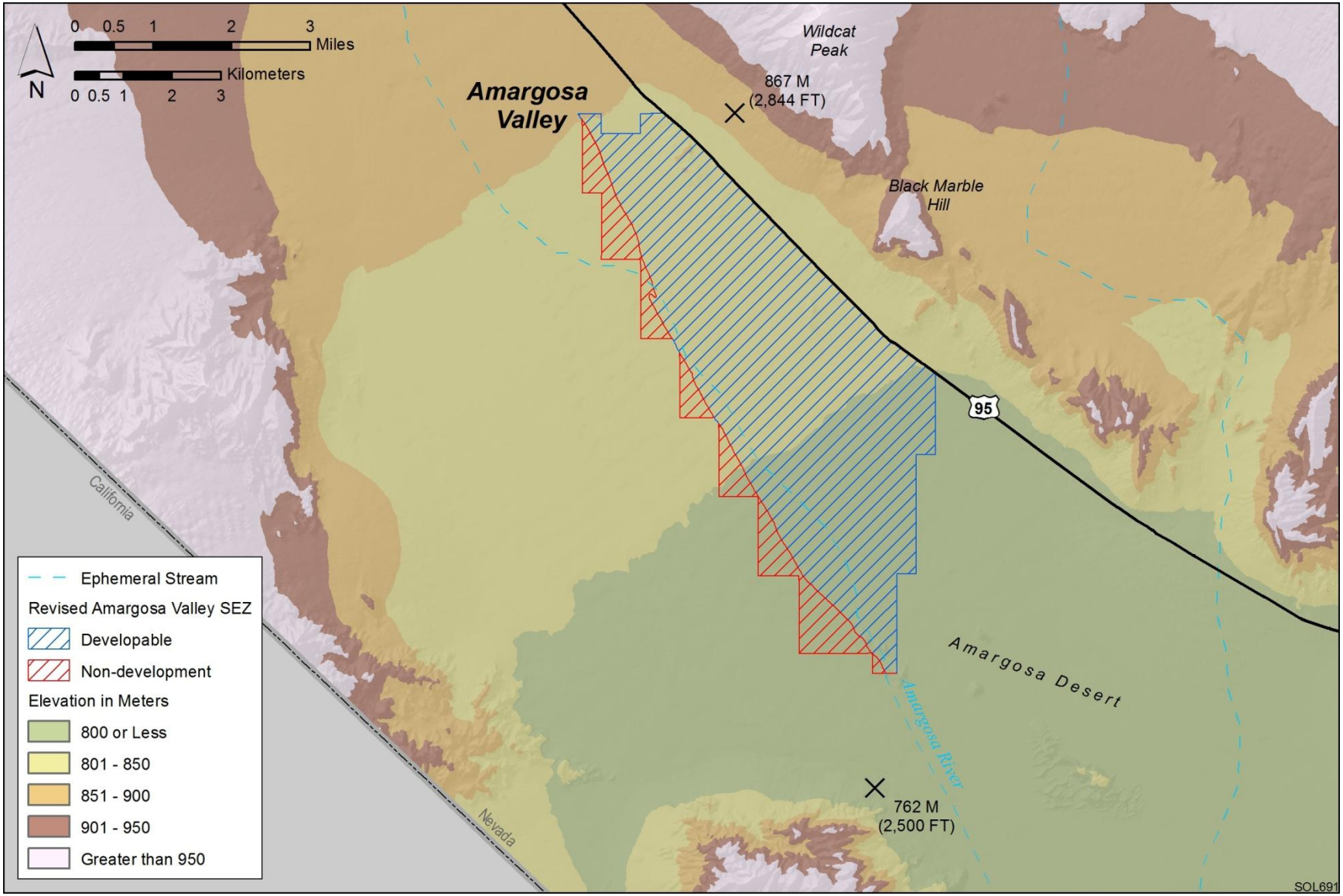


FIGURE 11.1.7.1-1 General Terrain of the Proposed Amargosa Valley SEZ as Revised

11.1.7.1.2 Soil Resources

Data provided in the Draft Solar PEIS remain valid, with the following updates:

- Soils within the proposed Amargosa Valley SEZ as revised are predominantly the gravelly sandy loams and gravelly loams of the Yermo, hot-Yermo, and Arizo Series, which now make up about 94% of the soil coverage at the site (Table 11.1.7.1-1).

- Soil unit coverage at the proposed Amargosa Valley SEZ as revised is shown in Figure 11.1.7.1-2. The designation of new SEZ boundaries and non-development areas eliminates 17,407 acres (70 km^2) of the Yermo, hot–Yermo–Arizo association; 3,883 acres (16 km^2) of the Arizo very gravelly sandy loam; 761 acres (3.1 km^2) (all) of the Arizo–Crobilt–Commski association; 182 acres (0.74 km^2) of the Rock outcrop–Upspring–Rubble land complex; and 768 acres (3.1 km^2) of the Yermo–Greyeagle–Arizo association.

11.1.7.2 Impacts

Impacts on soil resources would occur mainly as a result of ground-disturbing activities (e.g., grading, excavating, and drilling), especially during the construction phase of a solar project. Because impacts on soil resources result from ground-disturbing activities in the project area, soil impacts would be roughly proportional to the size of a given solar facility, with larger areas of disturbed soil having a greater potential for impacts than smaller areas (Section 5.7.2). The assessment provided in the Draft Solar PEIS remains valid, with the following update:

- Impacts related to wind erodibility are reduced because the identification of new SEZ boundaries and non-development areas eliminates 22,188 acres (90 km^2) of moderately erodible soils from development.

11.1.7.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on soils are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will reduce the potential for soil impacts during all project phases.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for soil resources were identified at the Amargosa Valley SEZ. Some SEZ-specific design features may ultimately be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

TABLE 11.1.7.1-1 Summary of Soil Map Units within the Proposed Amargosa Valley SEZ as Revised

Map Unit Symbol	Map Unit Name	Erosion Potential		Description	Area in Acres[c] (percentage of SEZ)
		Water[a]	Wind[b]		
2054	Yermo, hot–Yermo–Arizo association (2 to 4% slopes)	Low (0.05)	Moderate (WEG 5)[d]	Consists of about 30% Yermo stratified extremely gravelly sandy loam to gravelly loam, 40% hot-Yermo very gravelly sandy loam, and 15% Arizo very gravelly sandy loam. Level to nearly level soils on inset fans and fan remnants. Parent material is alluvium from mixed sources. Deep to very deep and well to excessively drained, with moderate surface-runoff potential and moderately rapid to very rapid permeability. Available water capacity is low. Slight rutting hazard. Used mainly as rangeland and wildlife habitat; unsuitable for cultivation.	8,068 (82.9)[e]
2152	Arizo very gravelly sandy loam, moist (0 to 2% slopes)	Low (0.10)	Moderate (WEG 5)	Level to nearly level soils on inset fans and floodplains. Parent material is alluvium from mixed sources. Deep to very deep, well to excessively drained, with low surface-runoff potential (high infiltration rate) and rapid to very rapid permeability. Available water capacity is low. Slight rutting hazard. Used mainly as rangeland and wildlife habitat; unsuitable for cultivation.	656 (6.7)[f]
2393	Commski–Yermo association	Low (0.15)	Moderate (WEG 5)	Consists of 70% Commski very gravelly fine sandy loam and 25% Yermo stratified extremely gravelly sandy loam to gravelly loam. Nearly level soils formed on inset fans and fan remnants. Parent material consists of alluvium derived from mixed sources, including limestone and dolomite. Moderately deep and well drained, with moderate surface runoff potential and moderate to very rapid permeability Low resistance to compaction. Available water capacity is high. Slight rutting hazard. Used mainly as rangeland and wildlife habitat; unsuitable for cultivation.	458 (4.7)

TABLE 11.1.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Erosion Potential		Description	Area in Acres[c] (percentage of SEZ)
		Water[a]	Wind[b]		
2151	Arizo–Bluepoint–Dune land complex (0 to 4% slopes)	Low (0.10)	Moderate (WEG 5)	Consists of 40% Arizo very gravelly sandy loam, 35% Bluepoint loamy fine sand, and 15% Dune land fine sand. Level to nearly level soils on inset fans, sand sheets, and dunes. Parent material consists of alluvium from mixed sources and eolian sands. Deep to very deep and somewhat excessively to excessively drained, with low surface-runoff potential (high infiltration rate) and rapid to very rapid permeability. Available water capacity is low. Moderate rutting hazard. Used mainly as rangeland and wildlife habitat; unsuitable for cultivation.	415 (1)[g]
2020	Weiser–Canoto association	Low (0.15)	Moderate (WEG 5)	Consists of 70% Weiser extremely gravelly loam and 25% Canoto very gravelly sandy loam. Nearly level soils on fan remnants. Parent material consists of alluvium from limestone and dolomite. Very deep and well drained, with moderate infiltration and moderate to moderately rapid permeability. Available water capacity is low. Slight rutting hazard. Used mainly as rangeland, forestland, and wildlife habitat; unsuitable for cultivation.	57 (<1)
2002	Rock outcrop-Upspring–Rubble land complex (8 to 75% slopes)	Not rated	Not rated	Consists of 45% rock outcrop, 30% Upspring very gravelly sandy loam, and 15% rubble land fragments. Steeply sloping soils on hills. Very shallow and somewhat excessively to excessively drained. Parent material (Upspring) consists of colluvium from volcanic rocks over residuum weathered from volcanic rocks. Available water capacity is very low. Slight rutting hazard. Upspring soils used mainly for watershed, wildlife habitat, and recreation land.	46 (<1)[h]

TABLE 11.1.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Erosion Potential		Description	Area in Acres[c] (percentage of SEZ)
		Water[a]	Wind[b]		
2053	Yermo–Greyeagle–Arizo association	Low (0.05)	Moderate (WEG 5)	Consists of 60% Yermo stratified extremely gravelly sandy loam to gravelly loam, 20% Greyeagle very gravelly sandy loam, and 15% Arizo very stony sandy loam. Sloping soils on alluvial fans, inset fans, and fan remnants. Parent material consists of alluvium from mixed sources. Shallow to moderately deep and well to excessively drained, with moderate surface runoff potential and moderately rapid to very rapid permeability. Available water capacity is very low to low. Slight rutting hazard. Used mainly as rangeland, wildlife habitat, and recreation land; unsuitable for cultivation.	36 (<1)

[a] Water erosion potential rates based on soil erosion factor K, which indicates the susceptibility of soil to sheet and rill erosion by water. Values range from 0.02 to 0.69 and are provided in parentheses under the general rating; a higher value indicates a higher susceptibility to erosion. Estimates based on the percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity.

[b] Wind erosion potential here is based on the wind erodibility group (WEG) designation: groups 1 and 2, high; groups 3 through 6, moderate; and groups 7 and 8, low (see footnote d for further explanation).

[c] To convert acres to km^2, multiply by 0.004047.

[d] WEGs are based on soil texture, content of organic matter, effervescence of carbonates, content of rock fragments, and mineralogy, and also take into account soil moisture, surface cover, soil surface roughness, wind velocity and direction, and the length of unsheltered distance (USDA 2004). Groups range in value from 1 (most susceptible to wind erosion) to 8 (least susceptible to wind erosion). The NRCS provides a wind erodibility index, expressed as an erosion rate in tons per acre per year, for each of the wind erodibility groups: WEG 5, 56 tons (51 metric tons) per acre (4,000 m^2) per year.

[e] A total of 674 acres (2.7 km^2) within the Yermo, hot–Yermo–Arizo association is currently categorized as a non-development area (denoted by red areas in Figure 11.1.7.1-2).

[f] A total of 578 acres (2.3 km^2) within the Arizo very gravelly sandy loam is currently categorized as a non-development area (denoted by red areas in Figure 11.1.7.1-2).

Footnotes continued on next page.

TABLE 11.1.7.1-1 (Cont.)

[g] A total of 4 acres (0.016 km^2) within the Arizo–Bluepoint–Dune land complex is currently categorized as a non-development area (denoted by red areas in Figure 11.1.7.1-2).

[h] A total of 2 acres (0.008 km^2) within the Rock Outcrop–Upspring-Rubble land complex is currently categorized as a non-development area (denoted by red areas in Figure 11.1.7.1-2).

Source: NRCS (2010).

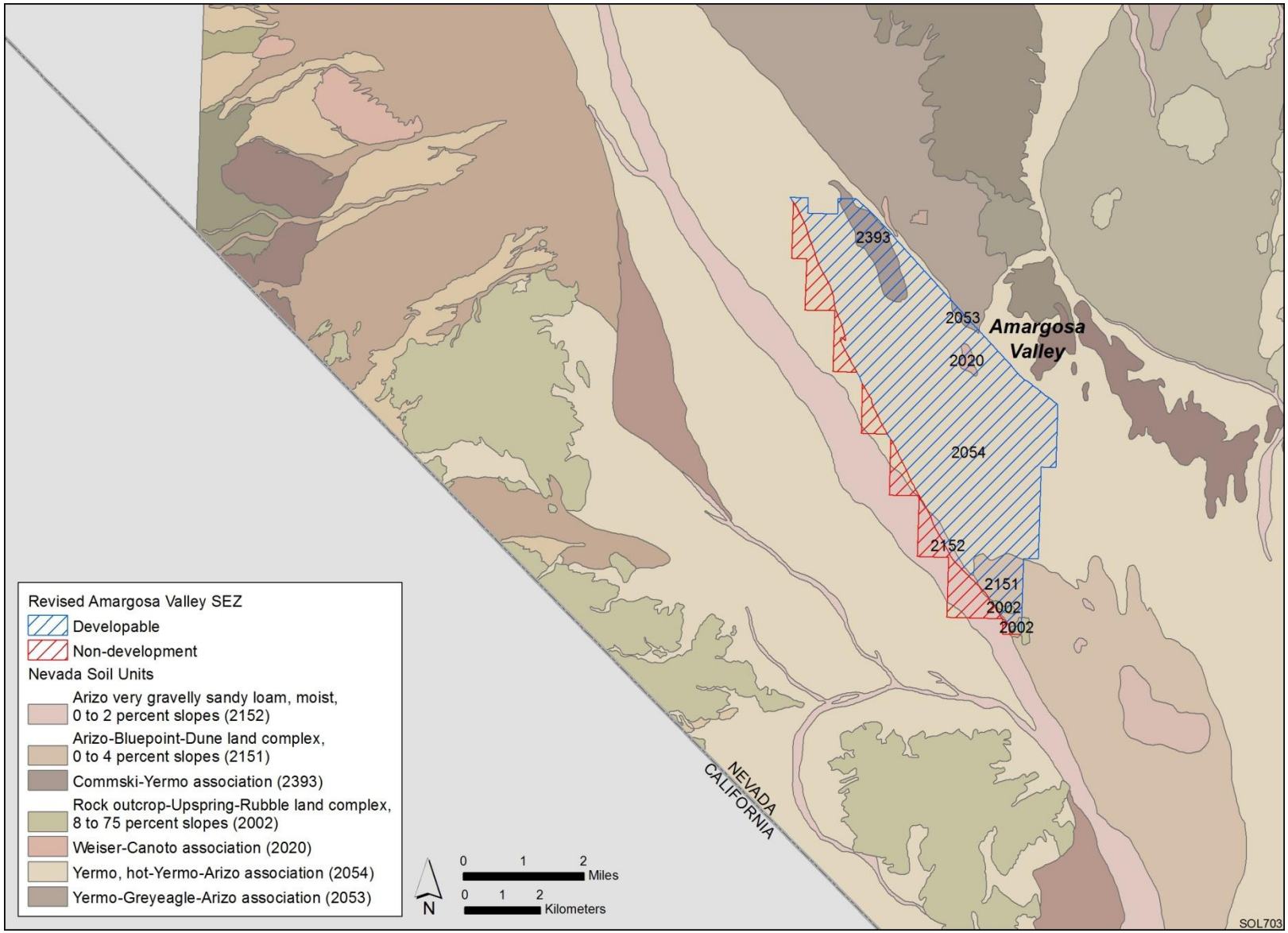


FIGURE 11.1.7.1-2 Soil Map for the Proposed Amargosa Valley SEZ as Revised (NRCS 2008)

11.1.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Amargosa Valley SEZ has been prepared and reviewed by BLM mineral specialists knowledgeable about the region where the SEZ is located (BLM 2012a). The BLM is proposing to withdraw the SEZ from settlement, sale, location, or entry under the general land laws, including the mining laws, for a period of 20 years (see Section 2.2.2.2.4 of the Final Solar PEIS). The potential impacts of this withdrawal are discussed in Section 11.1.24.

11.1.8.1 Affected Environment

The description in the Draft Solar PEIS remains valid. There are no mining claims located in the proposed Amargosa Valley SEZ (as of September 2010). The land of the SEZ was closed to locatable mineral entry in June 2009; however, the area remains open for discretionary mineral leasing for oil and gas and other leasable minerals and for disposal of salable minerals.

11.1.8.2 Impacts

The description in the Draft Solar PEIS remains valid. If the area is identified as an SEZ, it will continue to be closed to all incompatible forms of mineral development. Since the SEZ does not contain existing mining claims, it is assumed there would be no future loss of locatable mineral production. Some future development of oil and gas resources beneath the SEZ would be possible, and production of common minerals could take place in areas not directly developed for solar energy production.

11.1.8.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on mineral resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide adequate protection of mineral resources.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features to address impacts on minerals have been identified in this Final Solar PEIS. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.9 Water Resources

11.1.9.1 Affected Environment

The overall size of the proposed Amargosa Valley SEZ has been reduced by 69% from the area described in the Draft Solar PEIS, resulting in a total area of 9,737 acres (39.4 km^2). The

description of the affected environment given in the Draft Solar PEIS relevant to water resources at the proposed Amargosa Valley SEZ remains valid and is summarized in the following paragraphs.

The Amargosa Valley SEZ is within the Northern Mojave–Mono Lake subbasin of the California hydrologic region. The SEZ is located near the bottom of Bare Mountain, with the Funeral Mountains to the south and the Grapevine Mountains to the west. The average precipitation and snowfall is about 4 in./yr (10 cm/yr) and 3 in./yr (8 cm/yr), respectively, and the estimated pan evaporation rate is about 93 in./yr (236 cm/yr). There are no perennial surface water features within the SEZ. The Amargosa River is a wide feature of braided, intermittent stream channels that flows from the northwest to the southeast though the valley. Several unnamed intermittent/ephemeral washes run from northwest to southeast through the SEZ. The 100-year floodplain of the Amargosa River forms the southwestern boundary of the SEZ; 1,258 acres (5.1 km^2) are identified as non-development areas and fall within the floodplain. Most of the SEZ is classified as having minimal to moderate flood hazard potential and is within a 500-year floodplain. Several important surface water features within the Amargosa Valley are located to the south and southeast of the SEZ and include the wetland, streams, and springs associated with Ash Meadows NWR, Devils Hole, and Death Valley NP, as well as the wild and scenic river reach of the Amargosa River located 56 mi (90 km) to the southeast in California.

The Amargosa Valley SEZ is part of the Amargosa Desert groundwater basin, where the groundwater resources consist of a basin-fill aquifer composed of river channel, playa, alluvial fan, freshwater limestone, and conglomerate deposits of fine-grained material (playa and limestone units) to well-sorted clays to gravels (river channel, alluvial fan, and conglomerate units). The basin-fill aquifer in the northern portion of the Amargosa Desert groundwater basin in the vicinity of the SEZ is approximately 1,500 ft (457 m) thick and is underlain by non-carbonate bedrock material. The southern portion of the Amargosa Desert groundwater basin is underlain by carbonate rock aquifers that are a part of the regional-scale carbonate rock province that covers a large portion of eastern Nevada and western Utah. Groundwater flow in the basin-fill aquifer in the northern portion of the Amargosa Desert groundwater basin is from the northwest to the southeast with groundwater surface elevations ranging from 2,349 to 2,470 ft (716 to 753 m). Complex faulting occurs near the transition of non-carbonate bedrock to the carbonate rock province, which creates a juxtaposition between low-permeability basin-fill deposits and the highly permeable carbonate rock aquifers near the vicinity of the Ash Meadows NWR. The carbonate rock aquifers in the vicinity of the Ash Meadows NWR are a part of an interbasin groundwater system that flows from northeast to southwest and discharges to numerous springs within the Ash Meadows NWR and the collapsed limestone cavern and geothermal pool at Devils Hole. Historical groundwater withdrawals in the basin-fill aquifers of the Amargosa Desert groundwater basin have been linked to water level declines at Devils Hole and springs within the Ash Meadows NWR, which demonstrates the connectivity between the basin-fill and carbonate rock aquifers. Groundwater recharge occurs primarily from mountain front recharge ranging from 600 to 1,200 ac-ft/yr (740,000 to 1.5 million m^3/yr), infiltration from the Amargosa River on the order of 90 ac-ft/yr (111,000 m^3/yr), and discharge from the carbonate rock aquifers, with estimates ranging from 19,000 to 44,000 ac-ft/yr (23.4 million to 54.3 million m^3/yr). Evapotranspiration rates in the Amargosa Desert groundwater basin from phreatophytes, bare soils, and surface springs are on the order of 17,000 to 24,000 ac-ft/yr

(21 million to 29.6 million m^3/yr). Groundwater quality varies in the Amargosa Desert Valley but is generally good except for elevated total dissolved solids (TDS), arsenic, fluoride, and sulfate concentrations.

All waters in Nevada are public property and the Nevada Division of Water Resources (NDWR) is the agency responsible for managing both surface and groundwater resources. The Amargosa Desert Basin is overallocated, with its perennial yield set at 24,000 ac-ft/yr (29.6 million m^3/yr), of which 17,000 ac-ft/yr (21 million m^3/yr) is committed to the USFWS and more than 25,000 ac-ft/yr (30.8 million m^3/yr) to beneficial uses. In 2009, the actual amount of groundwater withdrawals totaled 16,380 ac-ft/yr (22 million m^3/yr). Groundwater management in the Amargosa Desert groundwater basin is largely affected by the U.S. Supreme Court Decision of *Cappaert v. U.S.* (1976), State Engineer's Order 724 (NDWR 1979), State Engineer's Ruling 5750 (NDWR 2007), and State Engineer's Order 1197 (NDWR 2008). These water management decisions were initiated in 1979 to protect the USFWS's senior water right, which is used to protect spring discharges in the Ash Meadows NWR and Devils Hole; the latest Order 1197 (NDWR 2008) stated that new water right applications in the Amargosa Desert Basin would be denied, as would any application seeking to change the point of diversion closer to Devils Hole defined by a 25-mi (40-km) radius around Devils Hole. Solar developers seeking water rights in the Amargosa Desert groundwater basin will have to purchase and transfer existing water rights. In addition, given the overallocated status of the basin and critical groundwater dependency of the Ash Meadows NWR and Devils Hole, it is likely that water right transfers would have to be moved away from Devils Hole and possibly include the transfer and retirement of water rights to help alleviate the overallocation of the basin.

In addition to the water resources information provided in the Draft Solar PEIS, this section provides a planning-level inventory of available climate, surface water, and groundwater monitoring stations within the immediate vicinity of the Amargosa Valley SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 11.1.9.1-1 through 11.1.9.1-7 and in Figures 11.1.9.1-1 and 11.1.9.1-2. Fieldwork and hydrologic analyses to determine jurisdictional water bodies would need to be coordinated with appropriate federal, state, and local agencies. Areas within the Amargosa Valley SEZ determined to be jurisdictional will be subject to the permitting process described in the Clean Water Act (CWA).

11.1.9.2 Impacts

11.1.9.2.1 Land Disturbance Impacts on Water Resources

The discussion of land disturbance effects on water resources in the Draft Solar PEIS remains valid. As stated in the Draft Solar PEIS, land disturbance impacts in the vicinity of the Amargosa Valley SEZ could potentially affect drainage patterns, intermittent flows in the Amargosa River, ecological habitats, and groundwater recharge processes. The alteration of natural drainage pathways during construction can lead to impacts related to flooding, loss of water delivery to downstream regions, and alterations to riparian vegetation and habitats. The

TABLE 11.1.9.1-1 Watershed and Water Management Basin Information Relevant to the Proposed Amargosa Valley SEZ as Revised

Basin	Name	Area (acres)[b]
Subregion (HUC4)[a]	Northern Mojave–Mono Lake (1809)	18,088,041
Cataloging unit (HUC8)	Upper Amargosa (18090202)	2,163,114
Groundwater basin	Amargosa Desert	573,440
SEZ	Amargosa Valley	9,737

[a] HUC = Hydrologic Unit Code; a USGS system for characterizing nested watersheds that includes large-scale subregions (HUC4) and small-scale cataloging units (HUC8).

[b] To convert acres to km^2, multiply by 0.004047.

change in the SEZ boundaries and identification of non-development areas has removed regions of the Amargosa River and its associated 100-year floodplain from the SEZ, which reduces the potential for adverse impacts.

Land clearing, land leveling, and vegetation removal during the development of the SEZ have the potential to disrupt intermittent/ephemeral stream channels. Several programmatic design features described in Section A.2.2 of Appendix A of this Final Solar PEIS would avoid, minimize, and/or mitigate impacts associated with the disruption of intermittent/ephemeral water features. Additional analyses of intermittent/ephemeral streams are presented in this update, including an evaluation of functional aspects of stream channels with respect to groundwater recharge, flood conveyance, sediment transport, geomorphology, and ecological habitats. Only a summary of the results from these surface water analyses is presented in this section; more information on methods and results is presented in Appendix O.

The study region considered for the intermittent/ephemeral stream evaluation relevant to the Amargosa Valley SEZ is a subset of the Upper Amargosa watershed (HUC8), for which information regarding stream channels is presented in Tables 11.1.9.1-3 and 11.1.9.1-4 of this Final Solar PEIS. The results of the intermittent/ephemeral stream evaluation are shown in Figure 11.1.9.2-1, which depicts flow lines from the National Hydrography Dataset (USGS 2012a) labeled as having low, moderate, and high sensitivity to land disturbance. Within the study area, 8% of the intermittent/ephemeral stream channels had low sensitivity, 79% had moderate sensitivity, and 13% had high sensitivity to land disturbance. Of the stream channels located within the SEZ, the majority were classified as moderately sensitive, with a few highly sensitive reaches located along the Amargosa River and along the northern boundary of the SEZ (Figure 11.1.9.2-1).

TABLE 11.1.9.1-2 Climate Station Information Relevant to the Proposed Amargosa Valley SEZ as Revised

Climate Station (COOP ID[a])	Elevation[b] (ft)[c]	Distance to SEZ (mi)[d]	Period of Record	Mean Annual Precipitation (in.)[e]	Mean Annual Snowfall (in.)
Amargosa Farms Garey, Nevada (260150)	2,450	15	1965–2011	4.40	0.30
Beatty, Nevada (260714)	3,304	14	1917–1972	4.24	3.40
Lathrop Wells 16 SSE, Nevada	2,182	27	1970–1977	3.37	0

[a] National Weather Service's Cooperative Station Network station identification code.

[b] Surface elevations for the proposed Amargosa Valley SEZ range from 2,500 to 2,825 ft.

[c] To convert ft to m, multiply by 0.3048.

[d] To convert mi to km, multiply by 1.6093.

[e] To convert in. to cm, multiply by 2.540.

Source: NOAA (2012).

TABLE 11.1.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ-scale Relevant to the Proposed Amargosa Valley SEZ as Revised

Water Feature	Subregion, HUC4 (ft)[a]	Cataloging Unit, HUC8 (ft)	SEZ (ft)
Unclassified streams	60,802	0	0
Perennial streams	12,296,888	353,101	0
Intermittent/ephemeral streams	334,367,739	42,604,594	239,371
Canals	2,932,127	206,939	0

[a] To convert ft to m, multiply by 0.3048.

Source: USGS (2012a).

TABLE 11.1.9.1-4 Stream Discharge Information Relevant to the Proposed Amargosa Valley SEZ as Revised

Parameter	Monitoring Station (USGS ID)		
	Amargosa River near Beatty, Nevada (10251220)	Carson Slough at Ash Meadows, Nevada (10251275)	Big Spring (362230116162001)
Period of record	1993–2000	1993–1997	1916–1993
No. of observations	3	34	94
Discharge, median (ft^3/s)[a]	0.422	1.05	2.08
Discharge, range (ft^3/s)	0.03–40	0.019–7.93	1.51–2.49
Discharge, most recent observation (ft^3/s)	40	0.019	2.23
Distance to SEZ (mi)[b]	12	26	32

[a] To convert ft^3 to m^3, multiply by 0.0283.

[b] To convert mi to km, multiply by 1.6093.

Source: USGS (2012b).

11.1.9.2.2 Water Use Requirements for Solar Energy Technologies

Changes to the Amargosa Valley SEZ boundaries resulted in a reduction in the estimated water use requirements (Table 11.1.9.2-1). This section examines the updated water use estimates relative to additional analyses of groundwater resources. The additional analyses of groundwater include a basin-scale groundwater budget and a simplified, one-dimensional groundwater model of potential groundwater drawdown. Only a summary of the results from these groundwater analyses is presented in this section; more information on methods and results is presented in Appendix O.

TABLE 11.1.9.1-5 Surface Water Quality Data Relevant to the Proposed Amargosa Valley SEZ as Revised

Parameter	Station (USGS ID)[a]		
	10251220	362230116162001	361910116224201
Period of record	1993	1987–1996	1988–1993
No. of records	1	6	3
Temperature (°C)[b]	NA[c]	27.5 (27–31.5)	9.5 (8–11)
Turbidity (nephelometric turbidity units)	NA	0.6 (0.4–2)	NA
Dissolved oxygen (mg/L)	NA	3.8	NA
pH	NA	7.4 (7.3–7.5)	NA
Total nitrogen (mg/L)	NA	0.38 (0.32–0.44)	NA
Phosphorus (mg/L as P)	NA	0.01	NA
Organic carbon (mg/L)	NA	0.4 (0.1–0.5)	NA
Calcium (mg/L)	32	43 (41–44)	19 (9–20)
Magnesium (mg/L)	5.3	18 (18–19)	17 (6.7–51)
Sodium (mg/L)	540	96 (93–100)	310 (210–650)
Chloride (mg/L)	230	27 (23–31)	150 (84–250)
Sulfate (mg/L)	360	110 (110–120)	390 (210–780)
Arsenic (µg/L)	NA	27 (3–29)	NA

[a] Median values are listed; the range in values is shown in parentheses.

[b] To convert °C to °F, multiply by 1.8, then add 32.

[c] NA = no data collected for this parameter.

Source: USGS (2012b).

The estimated total water use requirements during the peak construction year are as high as 1,629 ac-ft/yr (2 million m^3/yr). The total annual water requirements for operations were categorized as low, medium, and high groundwater pumping scenarios that represent full build-out of the SEZ assuming PV, dry-cooled parabolic trough, and wet-cooled parabolic trough, respectively (a 30% operational time was considered for all the solar facility types on the basis of operations estimates for proposed utility-scale solar energy facilities). This categorization results in water use estimates that range from 39 to 6,802 ac-ft/yr (48,100 to 8.4 million m^3/yr), or a total of 780 to 136,040 ac-ft (962,100 to 168 million m^3) over the 20-year analysis period.

A basin-scale groundwater budget was assembled by using available data on groundwater inputs, outputs, and storage (Table 11.1.9.2-2) for comparison with water use estimates relating to solar energy development. The groundwater budget includes the perennial yield value set by the NDWR in order to guide water right allocations. The peak construction year water requirements represent 4% of the total groundwater inputs and 7% of the perennial yield of the Amargosa Desert Basin. Given the short duration of construction activities, impacts associated with the construction water demand are considered minimal. The long duration of groundwater pumping during operations (20 years) poses a greater threat to groundwater resources. The high

TABLE 11.1.9.1-6 Water Quality Data from Groundwater Samples Relevant to the Proposed Amargosa Valley SEZ as Revised

Parameter	Station (USGS ID)[a] 363835116234001	364556116413501	362835116264102
Period of record	1991–1998	1989–1999	1992–1998
No. of records	12	3	10
Temperature (°C)[b]	26 (25–28.5)	28.5	23.5 (22–31)
Total dissolved solids (mg/L)	376 (367–385)	NA	254 (252–256)
Dissolved oxygen (mg/L)	5.5 (5.1–5.7)	5.4	5.6 (5.4–5.9)
pH	8 (7.8–8.1)	7.5	8 (7.8–8.1)
Nitrate + nitrite (mg/L as N)	2.17 (2.1–2.2)	0.22	1.64 (1.6–1.68)
Phosphate (mg/L)	< 0.031	0.061	< 0.031
Organic carbon (mg/L)	NA[c]	0.8	NA
Calcium (mg/L)	16.5 (16–17.1)	47.8 (47–48.5)	18.8 (18.5–19)
Magnesium (mg/L)	0.82 (0.8–0.83)	17.95 (17.9–18)	2.17 (2.14–2.2)
Sodium (mg/L)	100.5 (97–110)	161 (160–162)	41.5 (41–42)
Chloride (mg/L)	14 (12.7–16)	79.8 (79–80.6)	8.21 (7.22–9.2)
Sulfate (mg/L)	110 (109–110)	194 (190–198)	30.6 (28.2–33)
Arsenic (mcg/L)	21.5 (8–22)	5	11
Fluoride (mg/L)	1.9 (1.79–2)	3.19 (2.98–3.4)	1.64 (1.59–1.7)
Uranium, natural (µg/L)	0.89	NA	0.3
Radon-222 (pCi/L)	30 (28–32)	31	31 (26–36)

[a] Median values are listed; the range in values is shown in parentheses.

[b] To convert °C to °F, multiply by 1.8, then add 32.

[c] NA = no data collected for this parameter.

Source: USGS (2012b).

pumping scenario represents 15% of the annual groundwater inputs to the basin and 6% of the storage in the basin-fill aquifer over the 20-year analysis period. The medium pumping scenario represents 2% of the annual groundwater inputs to the basin and 1% of the storage in the basin fill aquifer over the 20-year analysis period. The low pumping scenario is negligible in comparison to the groundwater budget components in the Amargosa Desert Basin.

Groundwater budgeting allows for quantification of complex groundwater processes at the basin scale, but it ignores the temporal and spatial components of how groundwater withdrawals affect groundwater surface elevations, groundwater flow rates, and connectivity to surface water features such as streams, wetlands, playas, and riparian vegetation. A one-dimensional groundwater modeling analysis was performed to present a simplified depiction of the spatial and temporal effects of groundwater withdrawals by examining groundwater drawdown in a radial direction around the center of the SEZ for the low, medium, and high pumping scenarios. A detailed discussion of the groundwater modeling analysis is presented in Appendix O. Note, however, that the aquifer parameters used for the one-dimensional

TABLE 11.1.9.1-7 Groundwater Surface Elevations Relevant to the Proposed Amargosa Valley SEZ as Revised

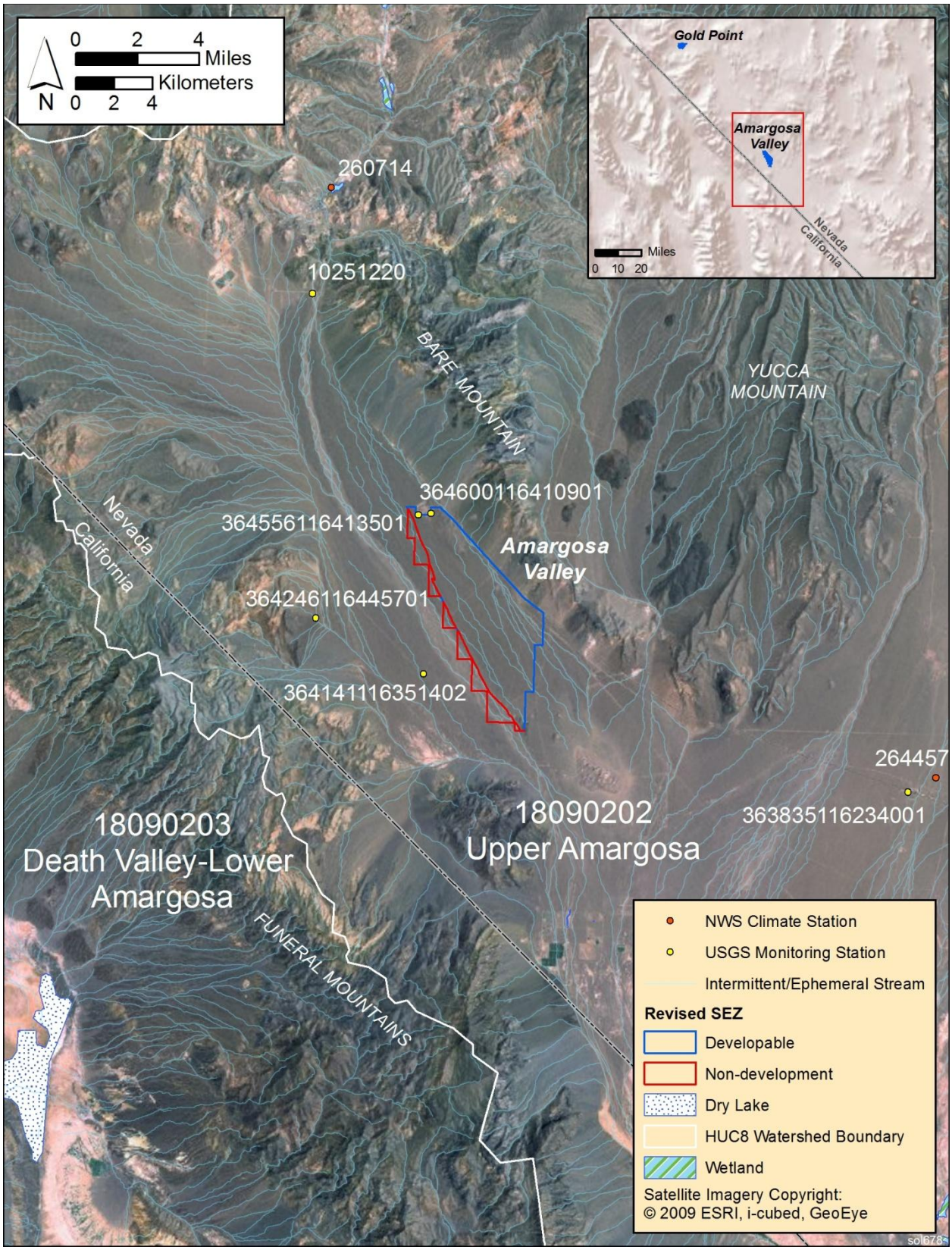
	Station (USGS ID)						
	362425116181001	362532116172700 (Devils Hole)	363310116294001	363317116270801	364141116351402	364246116445701	364600116410901
Period of record	1969–2011	1937–2009	1953–2011	1995–2011	1986–2011	1986–2011	1988–2006
No. of observations	90	690	292	59	215	86	62
Surface elevation (ft)[a]	2,248	2,360	2,376	2,396	2,628	2,730	2,772
Well depth (ft)	280	NA[c]	348	1,859	320	1,400	324
Depth to water, median (ft)	19.96	2.15	128.54	123.84	269.77	281.9	301
Depth to water, range (ft)	18–29.8	0.95–3.8	103–144.59	119.04–128.55	269.36–270.45	280.4–282.2	300–307
Depth to water, most recent observation (ft)	20.25	2.03	144.59	128.55	270.45	282.03	302
Distance to SEZ (mi)[b]	29	29	14	16	3	5	4

[a] To convert ft to m, multiply by 0.3048.

[b] To convert mi to km, multiply by 1.6093.

[c] NA = data not available for this parameter.

Source: USGS (2012b).



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2 **FIGURE 11.1.9.1-1 Water Features near the Proposed Amargosa Valley SEZ as Revised**

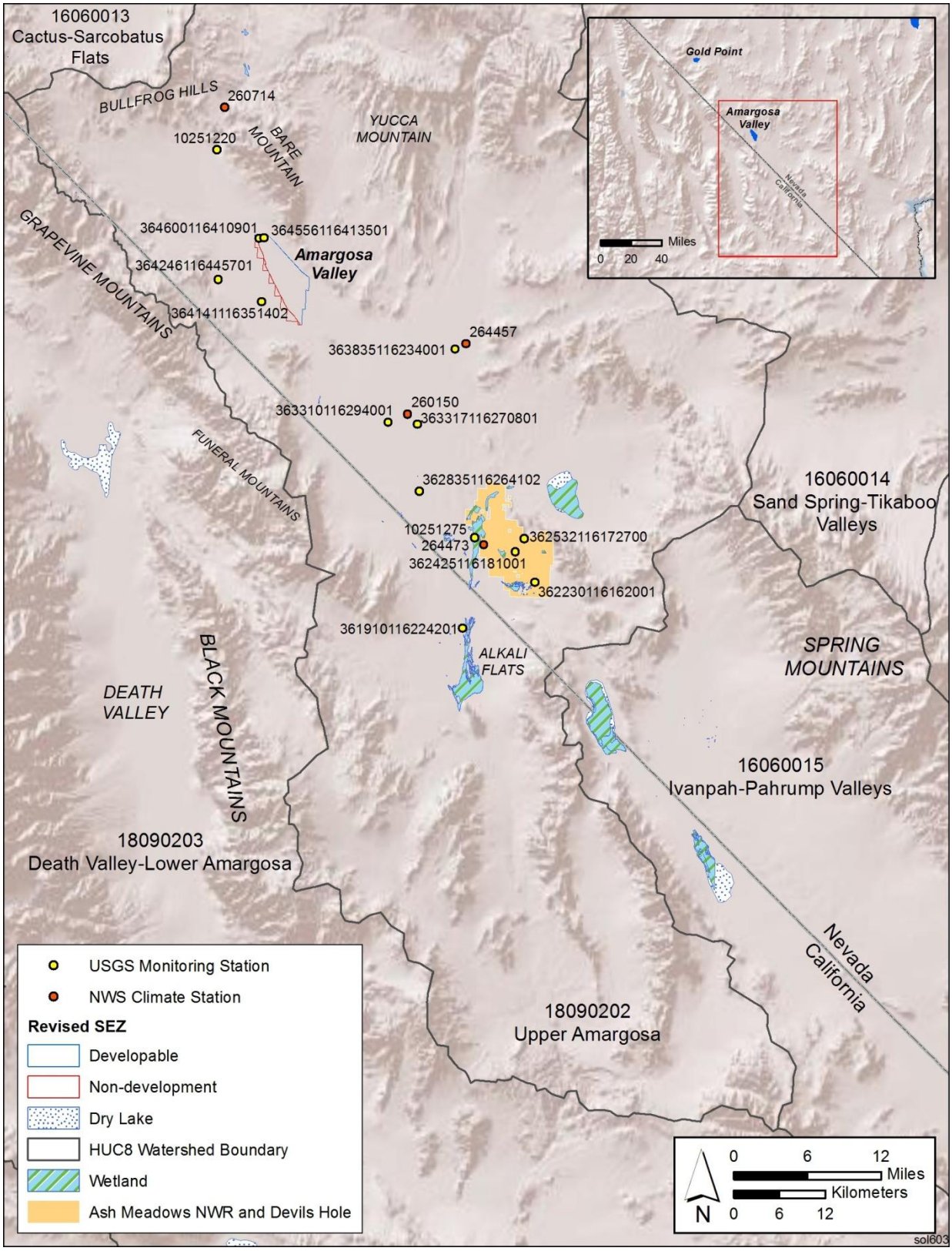

FIGURE 11.1.9.1-2 Water Features within the Upper Amargosa Watershed, Which Includes the Proposed Amargosa Valley SEZ as Revised

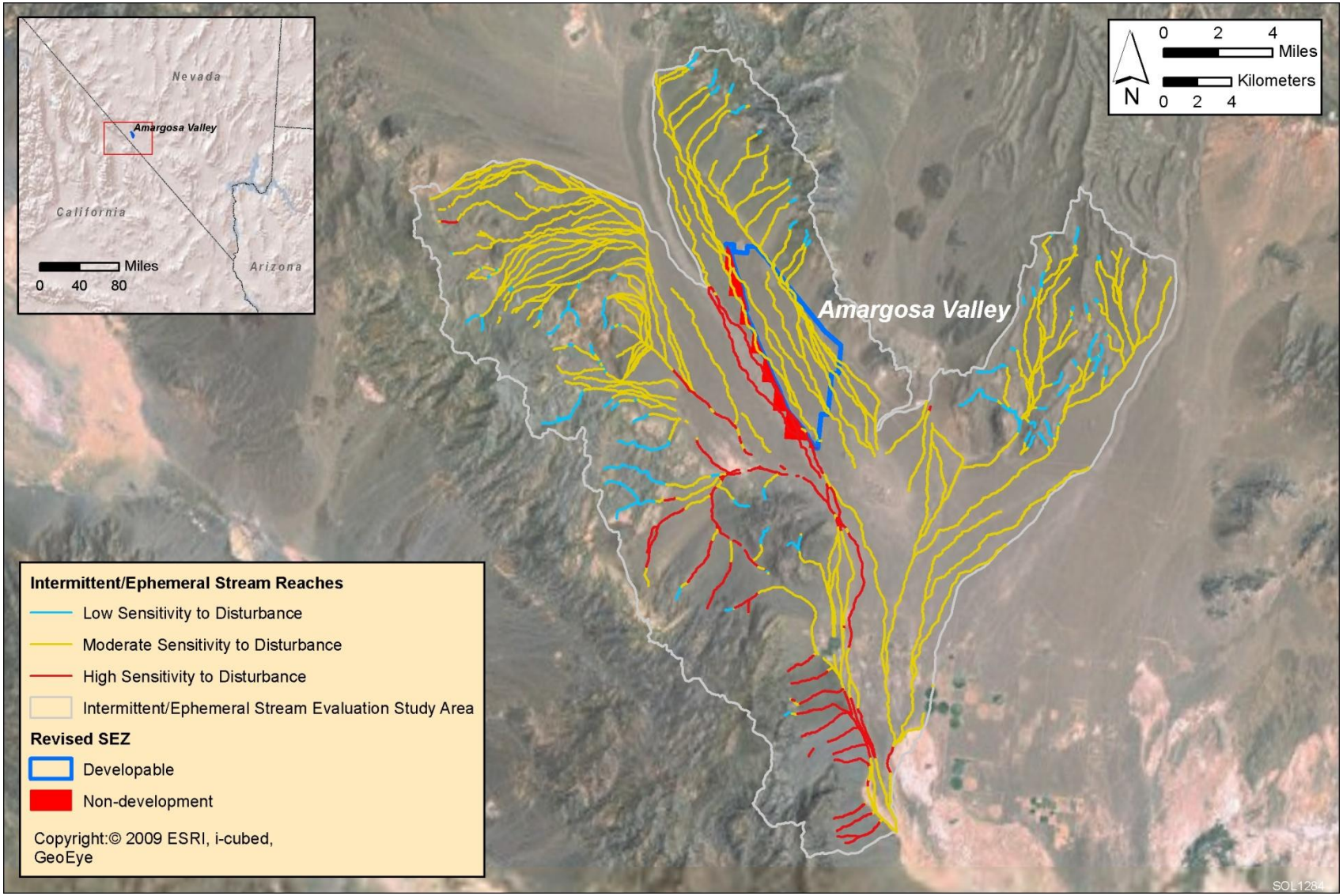

FIGURE 11.1.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Proposed Amargosa Valley SEZ as Revised

TABLE 11.1.9.2-1 Estimated Water Requirements for the Proposed Amargosa Valley SEZ as Revised[a]

Activity	Parabolic Trough	Power Tower	Dish Engine	PV
Construction—Peak Year				
Water use requirements				
Fugitive dust control (ac-ft)[b]	1,056	1,584	1,584	1,584
Potable supply for workforce (ac-ft)	74	45	19	9
Total water use requirements (ac-ft)	1,130	1,629	1,603	1,593
Wastewater generated				
Sanitary wastewater (ac-ft)	74	45	19	9
Operations				
Water use requirements				
Mirror/panel washing (ac-ft/yr)	678	377	377	38
Potable supply for workforce (ac-ft/yr)	19	8	8	1
Dry cooling (ac-ft/yr)	271–1,357	151–754	NA	NA
Wet cooling (ac-ft/yr)	6,105–19,671	3,392–10,928	NA	NA
Total water use requirements				
Non-cooled technologies (ac-ft/yr)	NA[c]	NA	385	39
Dry-cooled technologies (ac-ft/yr)	968–2,054	536–1,139	NA	NA
Wet-cooled technologies (ac-ft/yr)	6,802–20,368	3,777–11,313	NA	NA
Wastewater generated				
Blowdown (ac-ft/yr)	385	214	NA	NA
Sanitary wastewater (ac-ft/yr)	19	8	8	1

[a] See Section M.9.2 of Appendix M of the Draft Solar PEIS for methods used in estimating water use requirements.

[b] To convert ac-ft to m^3, multiply by 1,234.

[c] NA = not applicable.

groundwater model (Table 11.1.9.2-3) represent available literature data and that the model aggregates these value ranges into a simplistic representation of the aquifer.

Depth to groundwater is on the order of 300 ft (91 m) below the surface in the vicinity of the SEZ. The one-dimensional groundwater modeling results suggest that groundwater withdrawals for solar energy development would result in groundwater drawdown in the vicinity of the SEZ (approximately a 2-mi [3.2-km] radius) that ranges up to 23 ft (7 m) for the high pumping scenario, up to 4 ft (1.2 m) for the medium pumping scenario, and less than 1 ft (0.3 m) for the low pumping scenario (Figure 11.1.9.2-2). The majority of the groundwater drawdown occurs within the vicinity of the SEZ with the exception of the high pumping scenario, for which estimates are 4 ft (1.2 m) of drawdown occurring at about 10 mi (16 km) away from the SEZ.

TABLE 11.1.9.2-2 Groundwater Budget for the Amargosa Desert Groundwater Basin, Which Includes the Proposed Amargosa Valley SEZ as Revised

Process	Amount[a]
Inputs	
Amargosa River seepage (ac-ft/yr)	90[b]
Precipitation recharge (ac-ft/yr)	600–1,200
Underflow from surrounding valleys (ac-ft/yr)	19,000–44,000
Outputs	
Evapotranspiration (ac-ft/yr)	17,000–24,000
Underflow to Death Valley (ac-ft/yr)	19,000[c]
Groundwater withdrawals in 2010 (ac-ft/yr)	15,393[d]
Storage	
Storage – basin fill aquifer (ac-ft)	2,300,000
Storage – carbonate rock aquifer (ac-ft)	3,600,000
Perennial yield (ac-ft/yr)	24,000[e]

[a] To convert ac-ft to m^3, multiply by 1,234.

[b] Stonestrom et al. (2007).

[c] Ruling 5750 (NDWR 2007).

[d] NDWR pumping inventory for 2010 (NDWR 2010).

[e] Defined by NDWR (2012).

Source: Burbey (1997).

11.1.9.2.3 Off-Site Impacts: Roads and Transmission Lines

As stated in the Draft Solar PEIS, impacts associated with the construction of roads and transmission lines primarily deal with water use demands for construction, water quality concerns relating to potential chemical spills, and land disturbance effects on the natural hydrology. Water needed for transmission line construction activities (e.g., for soil compaction, dust suppression, and potable supply for workers) could be trucked to the construction area from an off-site source. If this occurred, water use impacts at the SEZ would be negligible. The Draft Solar PEIS assessment of impacts on water resources from road and transmission line construction remains valid.

11.1.9.2.4 Summary of Impacts on Water Resources

The additional information and analyses of water resources presented in this update agree with information provided in the Draft Solar PEIS. The Amargosa Valley SEZ is located in an

TABLE 11.1.9.2-3 Aquifer Characteristics and Assumptions Used in the One-Dimensional Groundwater Model for the Proposed Amargosa Valley SEZ as Revised

Parameter	Value[a]
Aquifer type/conditions	Basin fill/unconfined
Aquifer thickness (ft)	1,400–5,000 (1,500)
Hydraulic conductivity (ft/day)	0.003–427 (36)
Transmissivity (ft^2/day)	0.02–64,600 (54,134)
Storage coefficient	0.0004–0.2 (0.03)
Analysis period (yr)	20
High pumping scenario (ac-ft/yr)[b]	6,802
Medium pumping scenario (ac-ft/yr)	969
Low pumping scenario (ac-ft/yr)	39

[a] Values used for modeling in parentheses.

[b] To convert ac-ft to m^3, multiply by 1,234.

Sources: Belcher et al. (2001); Sweetkind et al. (2001).

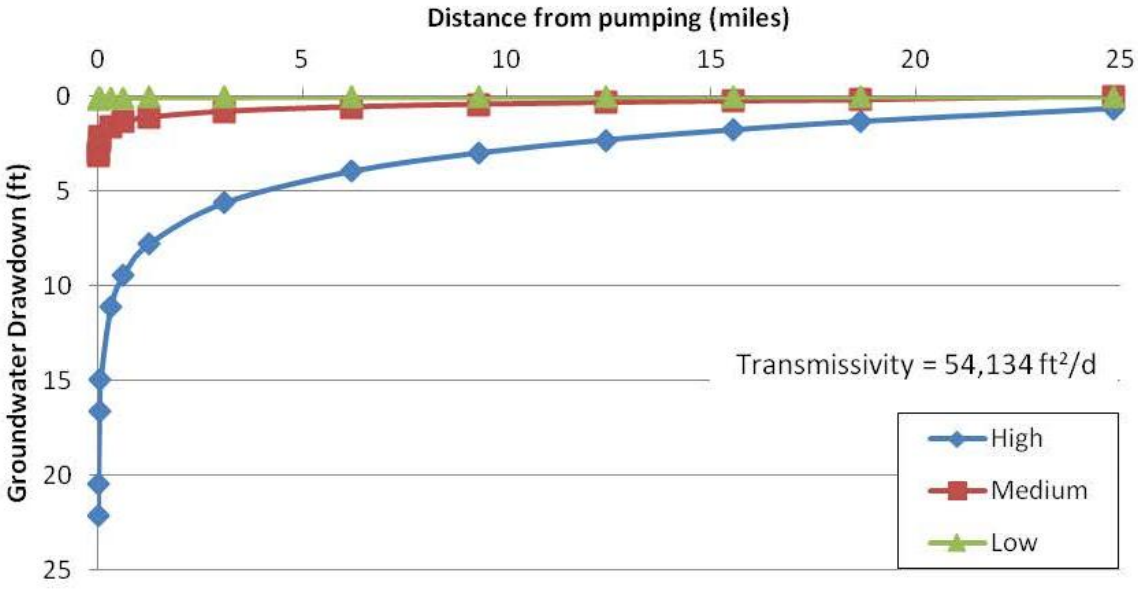

FIGURE 11.1.9.2-2 Estimated One-Dimensional Groundwater Drawdown Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Amargosa Valley SEZ as Revised

arid desert valley where water resources are primarily groundwater in the basin-fill and regional-scale carbonate rock aquifer, and surface water features are primarily the intermittent Amargosa River and several intermittent/ephemeral streams. Water resources are strictly managed resulting from a U.S. Supreme Court decision in 1976 and subsequently by several management actions by the NDWR in order to protect water resources that support Devils Hole, Ash Meadows NWR, and the Wild and Scenic River reach of the Amargosa River in California (see Section 11.1.9.1.3 in the Draft Solar PEIS).

The intermittent/ephemeral stream evaluation identified several reaches with a moderate sensitivity to disturbance within the SEZ. Disturbances to intermittent/ephemeral stream reaches associated with the stream channels of the Amargosa River could potentially affect the groundwater recharge, flood and sediment conveyance, and ecological habitat value of these reaches (Figure O.1-4 in Appendix O). The reduction of the SEZ boundaries and identification of non-development areas have removed the Amargosa River and its floodplain from the SEZ, thereby reducing potential impacts associated with flooding, debris flows, and groundwater recharge.

Groundwater withdrawals associated with the various groundwater pumping scenarios suggest that the majority of groundwater drawdown will be less than 25 ft (8 m) and localized near the SEZ. The high pumping scenario has the potential for groundwater drawdown impacts more than 10 mi (16 km) away from the SEZ, which potentially affects the Amargosa Farms area of the basin, which has experienced historical groundwater drawdown from agricultural irrigation withdrawals (see Section 11.1.9.1.2 in the Draft Solar PEIS).

Ultimately, water rights and management administered by the NDWR will determine acceptable groundwater withdrawals that can be used to support solar energy development. Given the overallocated condition of the basin, the connectivity of the basin-fill and carbonate rock aquifers, and the sensitivity of groundwater dependency of Devils Hole and Ash Meadows NWR, the NDWR currently limits the transfer of water rights to those that can move groundwater wells farther away from Devils Hole and help alleviate the overallocated conditions of the basin. It is very likely that solar energy developers will have to secure water right allocations that include the retirement of some existing water rights (NDWR 2007, 2008, 2012).

Predicting impacts associated with groundwater withdrawals is often difficult given the heterogeneity of aquifer characteristics, the long time period between the onset of pumping and its effects, and limited data. One of the primary mitigation measures for protecting water resources is the implementation of long-term monitoring and adaptive management. For groundwater, this requires the combination of monitoring and modeling to fully identify the temporal and spatial extent of potential impacts. The BLM is currently working on developing a groundwater modeling framework, which would more accurately predict potential impacts on groundwater and help support long-term monitoring activities. Initial efforts are focused on modifying the Death Valley Regional Flow System Model (http://regmod.wr.usgs.gov/) for use at the Amargosa Valley SEZ. This modeling framework can also be used to interpret groundwater monitoring data and guide adaptive management plans. When the detailed modeling is completed, it will be made available at the project Web site (http://solareis.anl.gov) for use by applicants, the BLM, and other stakeholders.

11.1.9.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on surface water and groundwater are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some protection of and reduce impacts on water resources.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, the following SEZ-specific design feature has been identified:

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

The need for additional SEZ-specific design features will be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.10 Vegetation

11.1.10.1 Affected Environment

Revisions to the boundaries of the Amargosa Valley SEZ have eliminated the Amargosa River and most of the associated floodplain. In addition, the remaining Amargosa River floodplain within the SEZ, consisting of 1,258 acres (5.1 km^2), was identified as a non-development area.

As presented in Section 11.1.10.1 of the Draft Solar PEIS, 4 cover types were identified within the area of the proposed Amargosa Valley SEZ, while 18 cover types were identified in the area of indirect effects. Sensitive habitats on the SEZ include desert dry washes, desert chenopod scrub/mixed salt desertscrub, and playas. Because of the changes to the SEZ boundaries, the Sonora-Mojave Mixed Salt Desert Scrub and North American Warm Desert Wash cover types no longer occur within the SEZ, and the North American Arid West Emergent Marsh, North American Warm Desert Pavement, North American Warm Desert Riparian Woodland and Shrubland, Inter-Mountain Basins Shale Badland, and Inter-Mountain Basins Greasewood Flat cover types no longer occur within 5 mi (8 km) of the SEZ boundary. Figure 11.1.10.1-1 shows the cover types within the affected area of the Amargosa Valley SEZ as revised.

11.1.10.2 Impacts

As presented in the Draft Solar PEIS, the construction of solar energy facilities within the proposed Amargosa Valley SEZ would result in direct impacts on plant communities because of

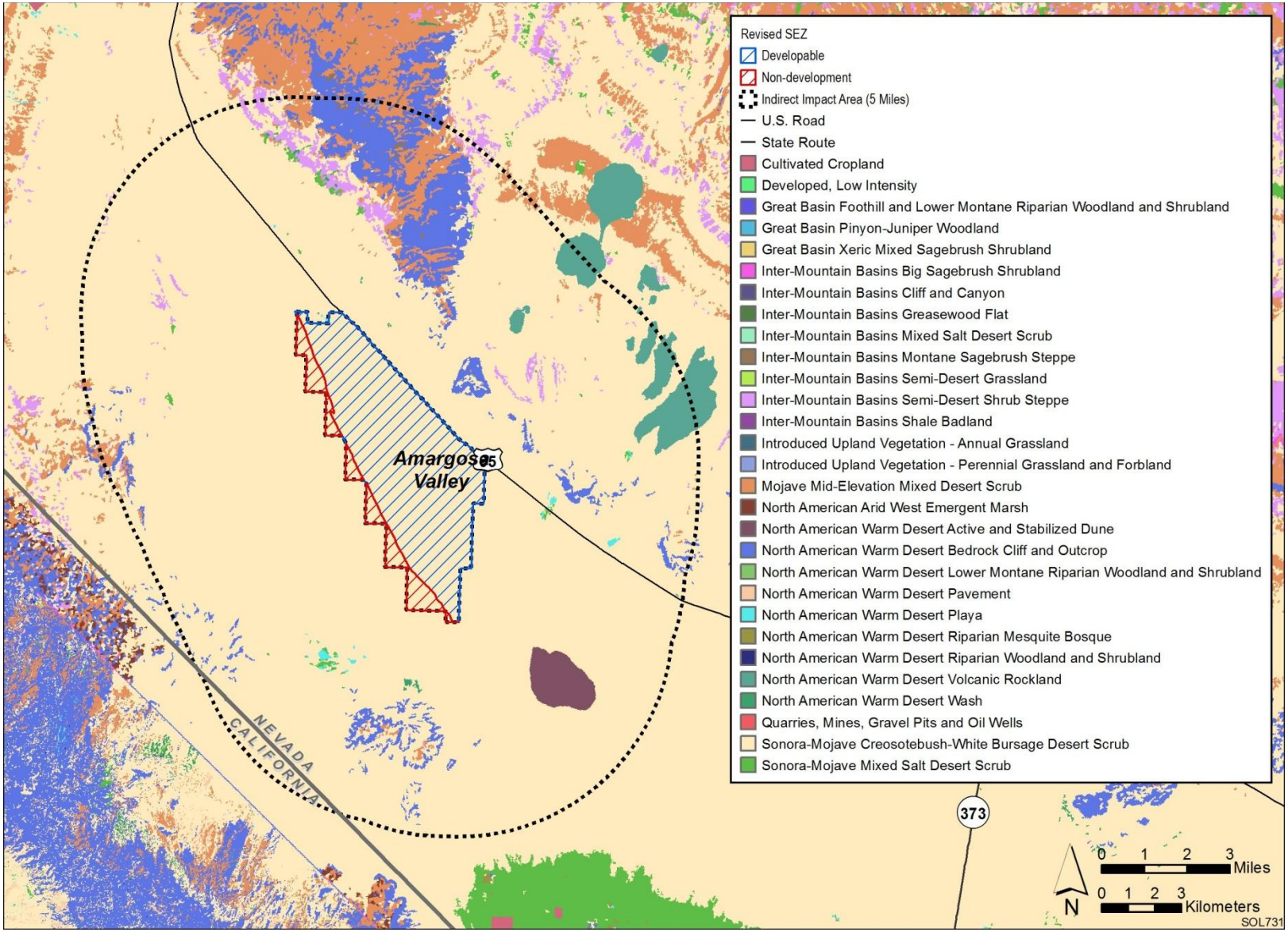

FIGURE 11.1.10.1-1 Land Cover Types within the Proposed Amargosa Valley SEZ as Revised

the removal of vegetation within the facility footprint during land-clearing and land-grading operations. Approximately 80% of the SEZ would be expected to be cleared with full development of the SEZ. As a result of the new configuration of the SEZ boundaries, approximately 6,783 acres (27 km^2) would be cleared.

Overall impact magnitude categories were based on professional judgment and include (1) *small*: a relatively small proportion (≤1%) of the cover type within the SEZ region would be lost; (2) *moderate*: an intermediate proportion (>1 but ≤10%) of a cover type would be lost; and (3) *large*: >10% of a cover type would be lost.

11.1.10.2.1 Impacts on Native Species

The analysis presented in the Draft Solar PEIS for the Amargosa Valley SEZ indicated that development would result in a moderate impact on one land cover type and a small impact on all other land cover types occurring within the SEZ (Table 11.1.10.1-1 in the Draft Solar PEIS). Development within the revised Amargosa Valley SEZ could still directly affect some of the cover types evaluated in the Draft Solar PEIS, with the exception of Sonora-Mojave Mixed Salt Desert Scrub and North American Warm Desert Wash; the reduction in the developable area would result in reduced impact levels on all cover types in the affected area. The impact magnitude for Sonora-Mojave Creosotebush-White Bursage Desert Scrub (previously moderate) would be reduced to small, but the impact magnitudes for all other cover types would remain unchanged compared to original estimates in the Draft Solar PEIS. Because of the change in the area of indirect effects, the North American Arid West Emergent Marsh, North American Warm Desert Pavement, North American Warm Desert Riparian Woodland and Shrubland, Inter-Mountain Basins Shale Badland, and Inter-Mountain Basins Greasewood Flat cover types would not be indirectly affected.

Indirect impacts on wetlands, playas, or other intermittently flooded areas downgradient from the SEZ, as described in the Draft Solar PEIS, could still occur. Potential indirect impacts from groundwater use on communities in the region that depend on groundwater, such as mesquite bosque or wetlands at Ash Meadows or those associated with the Amargosa River, could also still occur.

11.1.10.2.2 Impacts from Noxious Weeds and Invasive Plant Species

As presented in the Draft Solar PEIS, land disturbance from project activities and indirect effects of construction and operation within the Amargosa Valley SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 11.1.10.1 of the Draft Solar PEIS. Impacts such as reduced restoration success and possible widespread habitat degradation could still occur; however, a small reduction in the potential for such impacts would result from the reduced developable area of the SEZ.

11.1.10.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on vegetation are described in Section A.2.2 of Appendix A of this Final Solar PEIS. SEZ-specific species and habitats will determine how programmatic design features are applied, for example:

- All playa and desert dry wash habitats shall be avoided to the extent practicable, and any impacts minimized and mitigated in consultation with appropriate agencies. A buffer area shall be maintained around playas and dry washes to reduce the potential for impacts on these habitats on or near the SEZ.

- Appropriate engineering controls shall be used to minimize impacts on the Amargosa River and on dry wash, playa, riparian, and wetland habitats, including downstream occurrences, 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. Appropriate measures to minimize impacts on Big Dunes habitats should be determined through agency consultation.

- Groundwater withdrawals shall be limited to reduce the potential for indirect impacts on groundwater-dependent habitats in the Amargosa Desert groundwater basin or in other hydraulically connected basins, such as springs at Ash Meadows and Death Valley NP, other locations of groundwater discharge, such as the Amargosa River, or other groundwater-dependent habitats in the vicinity of the SEZ, such as mesquite bosque communities.

It is anticipated that implementation of these programmatic design features will reduce a high potential for impacts from invasive species and potential impacts on dry washes, playas, chenopod scrub, mesquite bosque, springs, riparian habitats, wetlands, and dune habitats to a minimal potential for impact. Residual impacts on wetlands could result from remaining groundwater withdrawal and so forth; however, it is anticipated that these impacts would be avoided in the majority of instances.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for vegetation have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.11 Wildlife and Aquatic Biota

For the assessment of potential impacts on wildlife and aquatic biota, overall impact magnitude categories were based on professional judgment and include (1) *small*: a relatively

small proportion (≤1%) of the species' habitat within the SEZ region would be lost; (2) *moderate*: an intermediate proportion (>1 but ≤10%) of the species' habitat would be lost; and (3) *large*: >10% of the species' habitat would be lost.

11.1.11.1 Amphibians and Reptiles

11.1.11.1.1 Affected Environment

As presented in Section 11.1.11.1 of the Draft Solar PEIS, representative amphibian and reptile species expected to occur within the Amargosa Valley SEZ include the red-spotted toad (*Bufo punctatus*), desert horned lizard (*Phrynosoma platyrhinos*), Great Basin collared lizard (*Crotaphytus bicinctores*), long-nosed leopard lizard (*Gambelia wislizenii*), side-blotched lizard (*Uta stansburiana*), western fence lizard (*Sceloporus occidentalis*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), groundsnake (*Sonora semiannulata*), nightsnake (*Hypsiglena torquata*), and sidewinder (*Crotalus cerastes*). The reduction in the size of the Amargosa Valley SEZ does not alter the potential for these species to occur in the affected area.

11.1.11.1.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Amargosa Valley SEZ could affect potentially suitable habitats for the representative amphibian and reptile species. The analysis presented in the Draft Solar PEIS for the Amargosa Valley SEZ indicated that development would result in a small overall impact on most representative amphibian and reptile species and a moderate impact on the glossy snake and sidewinder (Table 11.1.11.1-1 in the Draft Solar PEIS). The reduction in the developable area of the Amargosa Valley SEZ would result in reduced habitat impacts for all representative amphibian and reptile species; the resultant impact levels for all the representative species would be small.

11.1.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features are described in Section A.2.2 of Appendix A of this Final Solar PEIS. With the implementation of required programmatic design features, impacts on amphibian and reptile species will be reduced.

Because of the change in boundaries of the SEZ, the SEZ-specific design feature identified in Section 11.1.11.2.3 of the Draft Solar PEIS (i.e., the Amargosa River should be avoided) is no longer applicable. On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for amphibian and reptile

species have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.11.2 Birds

11.1.11.2.1 Affected Environment

As presented in Section 11.1.11.2.1 of the Draft Solar PEIS, a large number of bird species could occur or have potentially suitable habitat within the affected area of the proposed Amargosa Valley SEZ. Representative bird species identified in the Draft Solar PEIS included (1) shorebirds: killdeer (*Charadrius vociferus*); (2) passerines: ash-throated flycatcher (*Myiarchus cinerascens*), Bewick's wren (*Thryomanes bewickii*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), common poorwill (*Phalaenoptilus nuttallii*), common raven (*Corvus corax*), Costa's hummingbird (*Calypte costae*), greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), ladder-backed woodpecker (*Picoides scalaris*), Le Conte's thrasher (*Toxostoma lecontei*), lesser nighthawk (*Chordeiles acutipennis*), loggerhead shrike (*Lanius ludovicianus*), northern mockingbird (*Mimus polyglottos*), rock wren (*Salpinctes obsoletus*), sage sparrow (*Amphispiza belli*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), and western kingbird (*Tyrannus verticalis*); (3) raptors: American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*); and (4) upland gamebirds: chukar (*Alectoris chukar*), Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), and white-winged dove (*Zenaida asiatica*). The reduction in the size of the Amargosa Valley SEZ does not alter the potential for these species or other bird species to occur in the affected area.

11.1.11.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Amargosa Valley SEZ could affect potentially suitable bird habitats. The analysis presented in the Draft Solar PES for the Amargosa Valley SEZ indicated that development would result in a small overall impact on most representative bird species and a moderate impact on the black-tailed gnatcatcher (Table 11.1.11.2-1 in the Draft Solar PEIS). The reduction in the developable area of the Amargosa Valley SEZ would result in reduced habitat impacts for all representative bird species; the resultant impact levels for all the representative bird species would be small.

11.1.11.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on bird species are described in Section A.2.2 of Appendix A of this Final Solar PEIS. With the implementation of

required programmatic design features and the applicable SEZ-specific design features, impacts on bird species are anticipated to be small.

Because of the change in boundaries of the SEZ, one of the SEZ-specific design features identified in Section 11.1.11.2.3 of the Draft Solar PEIS (i.e., the Amargosa River should be avoided) is no longer applicable. On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for bird species have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.11.3 Mammals

11.1.11.3.1 Affected Environment

As presented in Section 11.1.11.3.1 of the Draft Solar PEIS, a large number of mammal species were identified that could occur or have potentially suitable habitat within the affected area of the proposed Amargosa Valley SEZ. Representative mammal species identified in the Draft Solar PEIS included (1) big game species: cougar (*Puma concolor*), elk (*Cervis canadensis*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*); (2) furbearers and small game species: the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*, common), desert cottontail (*Sylvilagus audubonii*), gray fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), and red fox (*Vulpes vulpes*); and (3) small nongame species: Botta's pocket gopher (*Thomomys bottae*), cactus mouse (*Peromyscus eremicus*), canyon mouse (*P. crinitis*), deer mouse (*P. maniculatus*), desert kangaroo rat (*Dipodomys deserti*), desert shrew (*Notiosorex crawfordi*), desert woodrat (*Neotoma lepida*), little pocket mouse (*Perognathus longimembris*), long-tailed pocket mouse (*Chaetodipus formosus*), Merriam's pocket mouse (*Dipodomys merriami*), northern grasshopper mouse (*Onychomys leucogaster*), southern grasshopper mouse (*O. torridus*), western harvest mouse (*Reithrodontomys megalotis*), and white-tailed antelope squirrel (*Ammospermophilus leucurus*). Bat species that may occur within the area of the SEZ include the big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), hoary bat (*Lasiurus cinereus*), little brown myotis (*M. lucifugus*), long-legged myotis (*M. volans*), silver-haired bat (*Lasionycteris noctivagans*), and western pipistrelle (*Parastrellus hesperus*). The reduction in the size of the Amargosa Valley SEZ does not alter the potential for these species or any additional mammal species to occur in the affected area.

11.1.11.3.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Amargosa Valley SEZ could affect potentially suitable habitats of mammal species. The analysis presented in the Draft Solar PEIS for the Amargosa Valley SEZ indicated that development would result in

a small overall impact on most representative mammal species analyzed and a moderate impact on the Botta's pocket gopher and the western harvest mouse (Table 11.1.11.3-1 in the Draft Solar PEIS). The reduction in the developable area of the Amargosa Valley SEZ would result in reduced habitat impacts for all representative mammal species; resultant impact levels for all the representative mammal species would be small. On the basis of mapped activity areas, direct potential loss of overall range for the cougar would be reduced from 25,300 acres (102 km^2) to 6,783 acres (27.4 km^2). No mapped activity areas for elk, mule deer, or pronghorn occur within the original configuration or reconfiguration of the SEZ. Direct impact levels for big game activity areas would still be small to none.

11.1.11.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on mammal species are described in Section A.2.2 of Appendix A of this Final Solar PEIS. With the implementation of required programmatic design features, impacts on mammal species will be reduced.

Because of the change in boundaries of the SEZ, one of the SEZ-specific design features identified in Section 11.1.11.3.3 of the Draft Solar PEIS (i.e., the Amargosa River should be avoided) is no longer applicable. On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features have been identified through this Final Solar PEIS. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.11.4 Aquatic Biota

11.1.11.4.1 Affected Environment

There are no surface water bodies, wetlands, or perennial streams within the proposed Amargosa Valley SEZ. The boundaries of the Amargosa Valley SEZ have been reduced compared to the boundaries given in the Draft Solar PEIS. On the basis of these changes, updates to the Draft Solar PEIS include the following:

- The intermittent/ephemeral Amargosa River has been identified as a non-development area.

- There are no surface water bodies, wetlands, or perennial streams located within the area of indirect effects within 5 mi (8 km) of the SEZ. However, 13 mi (21 km) of the Amargosa River and 15 mi (24 km) of an unnamed intermittent stream that drains into the Amargosa River are present in the area of indirect effects.

- Outside of the potential indirect effects area but within 50 mi (80 km) of the SEZ, there are 534 mi (859 km) of intermittent stream located within 50 mi (80 km) of the SEZ and 16 mi (26 km) of an unnamed perennial stream.

- The proposed new road corridor has been moved and is more than 10 mi (16 km) from the perennial White River.

There is no information on aquatic biota in the surface water features in the SEZ. As stated in Appendix C of the Supplement to the Draft Solar PEIS, site surveys can be conducted at the project-specific level to characterize aquatic biota, if present.

11.1.11.4.2 Impacts

The types of impacts from the development of utility-scale solar energy facilities that could affect aquatic habitats and biota are discussed in Section 5.10.3 of the Draft Solar PEIS and this Final Solar PEIS. Aquatic habitats could be affected by solar energy development in a number of ways, including (1) direct disturbance, (2) deposition of sediments, (3) changes in water quantity, and (4) degradation of water quality. The impact assessment provided in the Draft Solar PEIS remains valid with the following update:

- The intermittent/ephemeral Amargosa River has been identified as a non-development area; therefore, streams and wetlands would not be directly affected by construction activities. However, as described in the Draft Solar PEIS, streams and wetlands could be affected indirectly by solar development activities within the SEZ.

11.1.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on aquatic biota are described in Section A.2.2 of Appendix A of this Final Solar PEIS. SEZ-specific resources and conditions will determine how programmatic design features are applied, for example:

- Appropriate engineering controls shall be implemented to minimize the amount of sediment and contaminants entering the Amargosa River.

- Development shall avoid any additional wetlands identified during future site-specific fieldwork.

- If groundwater is used, the amount withdrawn shall not affect aquatic habitat in the Amargosa River ACEC and the Ash Meadows NWR.

It is anticipated that implementation of the programmatic design features will reduce impacts on aquatic biota, and if the utilization of water from groundwater or surface water sources is adequately controlled to maintain sufficient water levels in nearby aquatic habitats,

the potential impacts on aquatic biota from solar energy development at the Amargosa Valley SEZ would be small.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for aquatic biota have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.12 Special Status Species

11.1.12.1 Affected Environment

As presented in the Draft Solar PEIS, 52 special status species were identified that could occur or have potentially suitable habitat within the affected area of the proposed Amargosa Valley SEZ. The reduction in the size of the Amargosa Valley SEZ does not alter the potential for these species to occur in the affected area, but it may reduce the impact magnitude for some species with moderate or large impacts as determined in the Draft Solar PEIS. A total of seven special status species that were determined to have moderate or large impacts in the Draft Solar PEIS are re-evaluated here. These species include (1) plants: Ash Meadows buckwheat (*Eriogonum contiguum*), Death Valley beardtongue (*Penstemon fruticiformis ssp. amargosae*), Panamint Mountains bedstraw (*Galium hilendiae ssp. carneum*), weasel phacelia (*Phacelia mustelina*), and white-margined beardtongue (*Penstemon albomarginatus*); (2) reptiles: desert tortoise (*Gopherus agassizii*); and (3) birds: prairie falcon (*Falco mexicanus*).

Since publication of the Draft Solar PEIS, 14 additional special status species have been identified that could potentially occur in the affected area based on county-level occurrences and the presence of potentially suitable habitat. These 14 special status species are all designated sensitive species by the Nevada BLM office and include (1) birds: crissal thrasher (*Toxostoma crissale*), golden eagle (*Aquila chrysaetos*), gray vireo (*Vireo vicinior*), Le Conte's thrasher (*Toxostoma lecontei*), loggerhead shrike (*Lanius ludovicianus*), long-eared owl (*Asio otus*), and Lucy's warbler (*Vermivora luciae*); and (2) mammals: big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), California myotis (*Myotis californicus*), hoary bat (*Lasiurus cinereus*), long-legged myotis (*Myotis volans*), silver-haired bat (*Lasionycteris noctivagans*), and western pipistrelle (*Pipistrellus Hesperus*). These additional species are discussed below, along with a re-evaluation of those species determined to have moderate or large impacts in the Draft Solar PEIS. Figure 11.1.12.1-1 shows the known or potential occurrences of species in the affected area of the Amargosa Valley SEZ that are listed, proposed, or candidates for listing under the ESA.

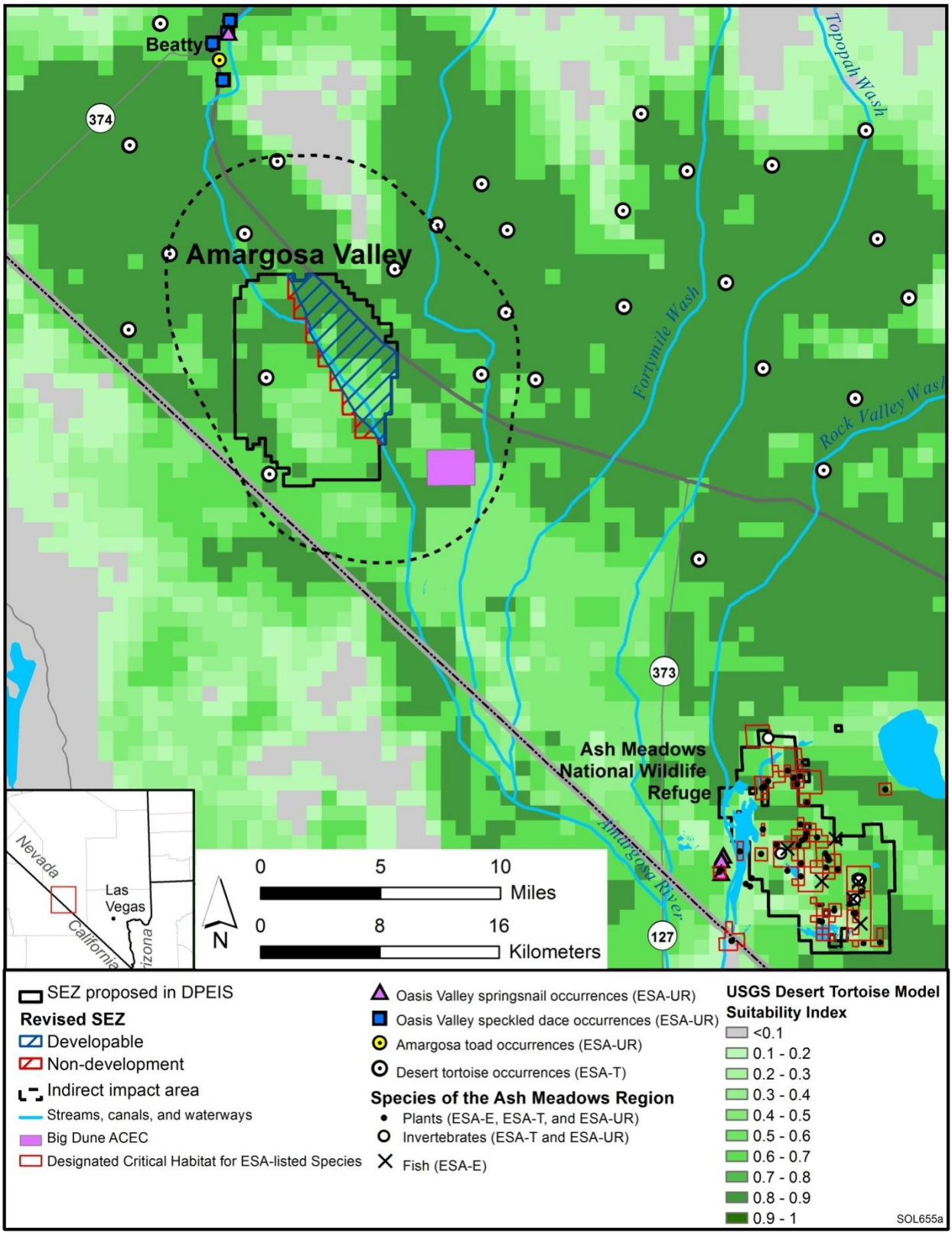

FIGURE 11.1.12.1-1 Proposed Amargosa Valley SEZ as Revised and Distribution of Potentially Suitable Habitat for Species Listed under the Endangered Species Act

11.1.12.1.1 Species Listed under the Endangered Species Act That Could Occur in the Affected Area

The desert tortoise is listed as threatened under the ESA and is known to occur throughout the SEZ affected area. This species was evaluated in the Draft Solar PEIS. According to the SWReGAP habitat suitability model, approximately 8,470 acres (34 km^2) of potentially suitable habitat for the desert tortoise intersects the area of direct effects in the Amargosa Valley SEZ (Figure 11.1.12.1-1; Table 11.1.12.1-1). Approximately 91,900 acres (372 km^2) of potentially suitable habitat occurs outside the SEZ within the area of indirect effects. Designated critical habitat does not occur in the affected area. Additional information provided by the USFWS since the publication of the Draft Solar PEIS indicates that the revised Amargosa Valley SEZ is situated in an area that provides habitat and genetic connectivity between areas with greater habitat suitability (Figure 11.1.12.1-1) (Ashe 2012). The USFWS determined the desert tortoise connectivity areas on the basis of the USGS model for desert tortoise predicted suitable habitat (Nussear et al. 2009).

11.1.12.1.2 BLM-Designated Sensitive Species

There are 18 BLM-designated sensitive species that are discussed in this Final Solar PEIS. Of these species, three were analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. These species were determined to have large or moderate impacts resulting from solar energy development within the SEZ and are thus re-evaluated in this Final Solar PEIS. These species include (1) plants: Death Valley beardtongue and white-margined beardtongue; and (2) birds: prairie falcon. The remaining 15 species were not evaluated for the Amargosa Valley SEZ in the Draft Solar PEIS and are discussed in this Final Solar PEIS because of their potential to occur in the SEZ affected area. These species include (1) birds: crissal thrasher, golden eagle, gray vireo, Le Conte's thrasher, loggerhead shrike, long-eared owl, and Lucy's warbler; and (2) mammals: big brown bat, Brazilian free-tailed bat, California myotis, hoary bat, long-legged myotis, silver-haired bat, and western pipistrelle.

Death Valley Beardtongue

The Death Valley beardtongue is a perennial shrub that is known only from the Death Valley region of California and southern Nevada. This species was analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. It inhabits Mojave desertscrub communities at elevations between 2,800 and 4,600 ft (850 and 1,400 m). The nearest known occurrences are 13 mi (21 km) east of the proposed Amargosa Valley SEZ. Potentially suitable habitat for the species occurs on the SEZ and other portions of the affected area (Table 11.1.12.1-1).

White-Margined Beardtongue

The white-margined beardtongue is a perennial forb that occurs in the deserts of Arizona, California, and Nevada. This species was analyzed for the Amargosa Valley SEZ in the Draft

TABLE 11.1.12.1-1 Habitats, Potential Impacts, and Potential Mitigation for Special Status Species That Could Be Affected by Solar Energy Development on the Proposed Amargosa Valley SEZ as Revised[a]

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]: Within SEZ (Direct Effects)[e]	Maximum Area of Potential Habitat Affected[d]: Outside SEZ (Indirect Effects)[f]	Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
Plants						
Ash Meadows buckwheat[i]	***Eriogonum contiguum***	NV-S1	Known from the Mojave Desert of Inyo County, California, and Clark and Nye Counties, Nevada. Occurs on sandy to gravelly flats and slopes in association with creosote scrub and mesquite communities at elevations below 3,280 ft.[j] Occurs in the area of indirect effects. Nearest recorded occurrence is from the Funeral Mountains, approximately 4 mi[k] southwest of the SEZ. About 1,771,500[l] acres of potentially suitable habitat occurs within the SEZ region.	6,780 acres of potentially suitable habitat lost (0.4% of available potentially suitable habitat)	95,000 acres of potentially suitable habitat (5.4% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys, avoidance or minimization of disturbance to occupied habitats in the areas of direct effects, translocation of individuals from areas of direct effects, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Death Valley beardtongue	*Penstemon fruticiformis* ssp. *amargosae*	BLM-S; FWS-SC; NV-S2	Known only from the Death Valley region of California and southern Nevada. It inhabits Mojave desertscrub communities at elevations between 2,800 and 4,600 ft. Nearest recorded occurrence is approximately 13 mi east of the SEZ. About 2,424,000 acres of potentially suitable habitat occurs within the SEZ region.	6,780 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	95,000 acres of potentially suitable habitat (3.9% of available potentially suitable habitat)	Small overall impact. See Ash Meadows buckwheat for a list of other potential mitigation measures.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Plants (Cont.)						
Panamint Mountains bedstraw	*Galium hilendiae* ssp. *carneum*	NV-S1	Endemic to the Mojave Desert region of Inyo County, California, and Nye County, Nevada. Inhabits creosote scrub and pinyon-juniper woodland communities. Nearest recorded occurrence is from the Death Valley NP, approximately 22 mi northwest of the SEZ. About 1,742,100 acres of potentially suitable habitat occurs within the SEZ region.	6,780 acres of potentially suitable habitat lost (0.4% of available potentially suitable habitat)	92,150 acres of potentially suitable habitat (5.3% of available potentially suitable habitat)	Small overall impact. See Ash Meadows buckwheat for a list of other potential mitigation measures.
Weasel phacelia	*Phacelia mustelina*	NV-S2	Mojave desertscrub, pinyon-juniper woodlands on volcanic or gravelly substrates at elevations between 5,000 and 5,500 ft. Nearest recorded occurrence is from the Death Valley NP, approximately 18 mi northwest of the SEZ. About 2,766,600 acres of potentially suitable habitat occurs within the SEZ region.	6,780 acres of potentially suitable habitat lost (0.2% of available potentially suitable habitat)	96,850 acres of potentially suitable habitat (3.5% of available potentially suitable habitat)	Small overall impact. See Ash Meadows buckwheat for a list of other potential mitigation measures.
White-margined beardtongue	*Penstemon albomarginatus*	BLM-S; FWS-SC; NV-S2	Inhabits desert sand dune habitats and Mojavean desertscrub communities at elevations below 3,600 ft. Nearest recorded occurrence is approximately 17 mi east of the SEZ. About 2,464,200 acres of potentially suitable habitat occurs within the SEZ region.	6,780 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	96,150 acres of potentially suitable habitat (3.9% of available potentially suitable habitat)	Small overall impact. See Ash Meadows buckwheat for a list of other potential mitigations measures.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Reptiles						
Desert tortoise	***Gopherus agassizii***	ESA-T; NV-P; NV-S2	Mojave and Sonoran desert creosotebush communities on firm soils for digging burrows. Often found along riverbanks, washes, canyon bottoms, creosote flats, and desert oases. Known to occur on the SEZ. About 2,717,800 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	92,000 acres of potentially suitable habitat (3.4% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys, avoidance or minimization of disturbance to occupied habitats on the SEZ, translocation of individuals from areas of direct effects, or compensatory mitigation of direct effects on occupied habitats could reduce impacts. The potential for impact and need for mitigation should be determined in consultation with the USFWS and NDOW.
Birds						
Crissal thrasher	*Toxostoma crissale*	BLM-S	A local and uncommon resident in southern Nevada outside of the Colorado River Valley. Occupies dense thickets of shrubs or low trees in riparian habitats. About 4,000 acres of potentially suitable habitat occurs within the SEZ region.	0 acres	85 acres of potentially suitable habitat (2.1% of available potentially suitable habitat)	Small overall impact; no direct effects. No species-specific mitigation is warranted.
Golden eagle	*Aquila chrysaetos*	BLM-S	An uncommon to common permanent resident and migrant in southern Nevada. Habitat includes rolling foothills, mountain areas, and desert shrublands. Nests on cliff faces and in large trees in open areas. About 2,800,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	110,000 acres of potentially suitable habitat (3.9% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Birds (Cont.)						
Gray vireo	*Vireo vicinior*	BLM-S	An uncommon summer resident in arid environments such as pinyon-juniper, chaparral, and desert shrublands. Builds open-cup nests of plant material in forked branches of shrubs or small trees. About 3,600,000 acres of potentially suitable habitat occurs within the SEZ region.	0 acres	6,200 acres of potentially suitable habitat (1.7% of available potentially suitable habitat)	Small overall impact; no direct effects. No species-specific mitigation is warranted.
Le Conte's thrasher	*Toxostoma lecontei*	BLM-S	An uncommon to rare local resident in southwestern deserts. Occurs primarily in open desert wash, desertscrub, alkali desertscrub, and desert succulent scrub habitats. Nests in dense, spiny shrubs or densely branched cactus in desert wash habitat. About 1,500,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.6% of available potentially suitable habitat)	101,350 acres of potentially suitable habitat (6.8% of available potentially suitable habitat)	Small overall impact on foraging and nesting habitat. Pre-disturbance surveys, avoidance or minimization of disturbance to occupied habitats in the areas of direct effects (particularly within desert wash habitats); or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Loggerhead shrike	*Lanius ludovicianus*	BLM-S	A common winter resident in lowlands and foothills in southern Nevada. Prefers open habitats with shrubs, trees, utility lines, or other perches. Highest density occurs in open-canopied foothill forests. About 2,270,000 acres of potentially suitable habitat occurs within the SEZ region.	0 acres	22,900 acres of potentially suitable habitat (1.0% of available potentially suitable habitat)	Small overall impact; no direct effects. No species-specific mitigation is warranted.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Birds (Cont.)						
Long-eared owl	*Asio otus*	BLM-S	An uncommon yearlong resident in southern Nevada. Occurs in desert shrubland environments in proximity to riparian areas such as desert washes. Nests in trees using old nests from other birds or squirrels. About 2,500,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	101,500 acres of potentially suitable habitat (4.1% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.
Lucy's warbler	*Vermivora luciae*	BLM-S	An uncommon summer resident and breeder in desert riparian areas. Occurs in desert wash habitats, especially those dominated by mesquite and saltcedar. Nests in tiny cavities in riparian woodlands. About 4,500 acres of potentially suitable habitat occurs within the SEZ region.	0 acres	85 acres of potentially suitable habitat (1.9% of available potentially suitable habitat)	Small overall impact; no direct effects. No species-specific mitigation is warranted.
Prairie falcon	*Falco mexicanus*	BLM-S	Year-round resident in the SEZ region, primarily in open habitats in mountainous areas, steppe, grasslands, or cultivated areas. Typically nests in well-sheltered ledges of rocky cliffs and outcrops. About 2,338,500 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.4% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (4.5% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Mammals						
Big brown bat	*Eptesicus fuscus*	BLM-S	Occurs throughout the southwestern United States in various habitat types. Uncommon in hot desert environments but may occur in areas in close proximity to water sources such as lakes and washes. Roosts in buildings, caves, mines, and trees. About 1,500,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.6% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (7.0% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.
Brazilian free-tailed bat	*Tadarida brasiliensis*	BLM-S	A fairly common year-round resident in southern Nevada. Occurs in a variety of habitats, including woodlands, shrublands, and grasslands. Roosts in caves, crevices, and buildings. About 1,800,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.5% of available potentially suitable habitat)	106,000 acres of potentially suitable habitat (5.9% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.
California myotis	*Myotis californicus*	BLM-S	A common year-round resident in southern Nevada. Occurs in a variety of habitats, including desert, chaparral, woodlands, and forests. Roosts primarily in crevices, but will also use buildings, mines, and hollow trees. About 2,000,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.4% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (5.3% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Mammals (Cont.)						
Hoary bat	*Lasiurus cinereus*	BLM-S	The most widespread North American bat species, occurs throughout southern Nevada in various habitat types. Occurs in habitats such as woodlands, foothills, desert shrublands, and chaparral. Roosts primarily in trees. About 1,800,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.5% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (5.8% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.
Long-legged myotis	*Myotis volans*	BLM-S	Common to uncommon year-round resident in southern Nevada. Uncommon in desert and arid grassland environments. Most common in woodlands above 4,000 ft elevation. Forages in chaparral, scrub, woodlands, and desert shrublands. Roosts in trees, caves, and crevices. About 1,800,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.5% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (5.8% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.

TABLE 11.1.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]		Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
				Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	
Mammals (Cont.)						
Silver-haired bat	*Lasionycteris noctivagans*	BLM-S	Uncommon year-round resident in desert habitats of southern Nevada. Forages in coniferous forests, foothill woodlands, and montane riparian habitats. May also forage in desert shrublands. Primarily roosts in hollow trees. About 1,400,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.6% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (7.5% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.
Western pipistrelle	*Pipistrellus Hesperus*	BLM-S	A common year-round resident of deserts, grasslands, and woodlands in southern Nevada. Occurs in various habitats, including mountain foothill woodlands, desert shrublands, desert washes, and pinyon-juniper woodlands. Roosts primarily in rock crevices; occasionally in mines and caves. About 2,500,000 acres of potentially suitable habitat occurs within the SEZ region.	8,470 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	105,000 acres of potentially suitable habitat (4.3% of available potentially suitable habitat)	Small overall impact. Direct impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.

[a] The species presented in this table represent new species identified following publication of the Draft Solar PEIS or a re-evaluation of those species that were determined to have moderate or large impacts in the Draft Solar PEIS. The other special status species for this SEZ are identified in Table 11.1.12.1-1 of the Draft Solar PEIS.

[b] BLM-S = listed as sensitive by the BLM; ESA-T = listed as threatened under the ESA; FWS-SC = USFWS species of concern; NV-P = protected in the state of Nevada under Nevada Revised Statutes (NRS) 501.110 (animals) or NRS 527 (plants); NV-S1 = ranked as S1 in the state of Nevada; NV-S2 = ranked as S2 in the state of Nevada.

[c] Potentially suitable habitat was determined by using SWReGAP habitat suitability models (USGS 2004, 2007). Area of potentially suitable habitat for each species is presented for the SEZ region, which is defined as the area within 50 mi (80 km) of the SEZ center.

Footnotes continued on next page.

TABLE 11.1.12.1-1 (Cont.)

[d] Maximum area of potentially suitable habitat that could be affected relative to availability within the SEZ region. Habitat availability for each species within the region was determined by using SWReGAP habitat suitability models (USGS 2004, 2007). This approach probably overestimates the amount of suitable habitat in the project area.

[e] Direct effects within the SEZ consist of the ground-disturbing activities associated with construction and maintenance of an altered environment associated with operations.

[f] Area of indirect effects was assumed to be the area adjacent to the SEZ within 5 mi (8 km) of the SEZ boundary where ground-disturbing activities would not occur. Indirect effects include effects from surface runoff, dust, noise, lighting, and so on from project developments. The potential degree of indirect effects would decrease with increasing distance away from the SEZ.

[g] Overall impact magnitude categories were based on professional judgment and are as follows: (1) *small*: ≤1% of the population or its habitat would be lost and the activity would not result in a measurable change in carrying capacity or population size in the affected area; (2) *moderate*: >1 but ≤10% of the population or its habitat would be lost and the activity would result in a measurable but moderate (not destabilizing) change in carrying capacity or population size in the affected area; (3) *large*: >10% of a population or its habitat would be lost and the activity would result in a large, measurable, and destabilizing change in carrying capacity or population size in the affected area. Note that much greater weight was given to the magnitude of direct effects because those effects would be difficult to mitigate. Design features would reduce most indirect effects to negligible levels.

[h] Species-specific mitigations are suggested here, but final mitigations should be developed in consultation with state and federal agencies and should be based on pre-disturbance surveys.

[i] Species in bold text have been recorded or have designated critical habitat within 5 mi (8 km) of the SEZ boundary.

[j] To convert ft to m, multiply by 0.3048.

[k] To convert mi to km, multiply by 1.6093.

[l] To convert acres to km^2, multiply by 0.004047.

Solar PEIS. It inhabits desert dunes and desertscrub communities of the Mojave Desert at elevations between 2,000 and 3,600 ft (600 and 1,100 m). The nearest known occurrences are approximately 17 mi (27 km) east of the proposed Amargosa Valley SEZ. Potentially suitable habitat for the species occurs on the SEZ and other portions of the affected area (Table 11.1.12.1-1).

Crissal Thrasher

The crissal thrasher is a local and uncommon resident in southern Nevada outside of the Colorado River Valley, where it is a summer breeding resident. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species occurs in dense thickets of shrubs or low trees in riparian habitats. On the basis of an evaluation of SWReGAP habitat suitability models for this species, potentially suitable habitat does not occur on the SEZ; however, potentially suitable breeding and nonbreeding habitat may occur outside the SEZ in the area of indirect effects (Table 11.1.12.1-1).

Golden Eagle

The golden eagle is an uncommon to common permanent resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits rolling foothills, mountain areas, and desert shrublands. It nests on cliff faces and in large trees in open areas. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable nesting (cliffs and rock outcrops) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Gray Vireo

The gray vireo is an uncommon summer resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species occurs in arid environments such as pinyon-juniper, chaparral, and desert shrublands. It builds open-cup nests of plant material in forked branches of shrubs or small trees. On the basis of an evaluation of SWReGAP habitat suitability models for this species, potentially suitable habitat does not occur on the SEZ; however, potentially suitable breeding and nonbreeding habitat may occur outside the SEZ in the area of indirect effects (Table 11.1.12.1-1).

Le Conte's Thrasher

The Le Conte's thrasher is an uncommon to rare local resident in desert environments of the southwestern United States. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits open desert wash, desertscrub, alkali desertscrub, and desert succulent scrub habitats. It nests in dense, spiny shrubs, or densely branched cactus in

desert wash habitat. Potentially suitable foraging and nesting habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1).

Loggerhead Shrike

The loggerhead shrike is a common winter resident in lowlands and foothills of southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species occurs in open habitats with shrubs, trees, utility lines, or other perches. Highest density occurs in open-canopied foothill forests. On the basis of an evaluation of SWReGAP habitat suitability models for this species, potentially suitable habitat does not occur on the SEZ; however, potentially suitable foraging habitat may occur outside the SEZ in the area of indirect effects (Table 11.1.12.1-1).

Long-Eared Owl

The long-eared owl is an uncommon year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits desert shrubland environments in proximity to riparian areas such as desert washes. It nests in trees using old nests from other birds or squirrels. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable nesting habitat (forests) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Lucy's Warbler

The Lucy's warbler is an uncommon summer resident and breeder in desert riparian areas of southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits desert wash habitats, especially those dominated by mesquite and saltcedar. It nests in tiny cavities in riparian woodlands. On the basis of an evaluation of SWReGAP habitat suitability models for this species, potentially suitable habitat does not occur on the SEZ; however, potentially suitable breeding and nonbreeding habitat may occur outside the SEZ in the area of indirect effects (Table 11.1.12.1-1).

Prairie Falcon

The prairie falcon occurs throughout the western United States. It is a year-round resident within the Amargosa Valley SEZ region. This species was analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species occurs in open habitats in mountainous areas, sagebrush-steppe, grasslands, or cultivated areas. Nests are typically constructed in well-sheltered ledges of rocky cliffs and outcrops. This species occurs in Nye County, Nevada, and potentially suitable foraging habitat occurs on the SEZ and in other portions of the affected area

(Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable nesting habitat (cliffs and rock outcrops) does not occur on the SEZ or within the area of indirect effects.

Big Brown Bat

The big brown bat is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The big brown bat is uncommon in desert habitats but may occur in desert shrublands that are in close proximity to water sources. The species inhabits desert shrubland environments in proximity to riparian areas such as desert washes. It roosts in buildings, caves, mines, and trees. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (forests and rock outcrops) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Brazilian Free-Tailed Bat

The Brazilian free-tailed bat is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits woodlands, shrublands, and grasslands. It roosts in caves and crevices. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (rock outcrops) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

California Myotis

The California myotis is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits desert, chaparral, woodlands, and forests. It roosts primarily in crevices but will also use buildings, mines, and hollow trees. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (forests and rock outcrops) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Hoary Bat

The hoary bat is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits woodlands, foothills, desert shrublands, and chaparral. It roosts primarily in trees. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of

indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (forests) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Long-Legged Myotis

The long-legged myotis is a common to uncommon year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is uncommon in desert and arid grassland environments and most common in woodlands above 4,000-ft (1,219-m) elevation. It forages in chaparral, scrub, woodlands, and desert shrublands and roosts in trees, caves, and crevices. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (forests and rock outcrops) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Silver-Haired Bat

The silver-haired bat is an uncommon year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits coniferous forests, foothill woodlands, and montane riparian habitats. It may also forage in desert shrublands. This species primarily roosts in hollow trees. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (forests) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

Western Pipistrelle

The western pipistrelle is a common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits mountain foothill woodlands, desert shrublands, desert washes, and pinyon-juniper woodlands. It roosts primarily in rock crevices and occasionally in mines and caves. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable roosting habitat (rock outcrops) does not occur on the SEZ or area of indirect effects (Table 11.1.12.1-1).

11.1.12.1.3 Rare Species

There are three rare species (ranked S1 or S2 in Nevada) that have not been discussed as ESA-listed species (Section 11.1.12.1.1) or BLM-designated sensitive (Section 11.1.12.1.2): the

Ash Meadows buckwheat, Panamint Mountains bedstraw, and weasel phacelia. These three species were analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS, and they are re-evaluated in this Final Solar PEIS. Each of these species has the potential to occur in the SEZ and portions of the area of indirect effects. Of these species, however, only the Ash Meadows buckwheat is known to occur within 5 mi (8 km) of the proposed Amargosa Valley SEZ (Table 11.1.12.1-1).

11.1.12.2 Impacts

Overall impact magnitude categories were based on professional judgment and include (1) *small*: a relatively small proportion (≤1%) of the special status species' habitat within the SEZ region would be lost; (2) *moderate*: an intermediate proportion (>1 but ≤10%) of the special status species' habitat would be lost; and (3) *large*: >10% of the special status species' habitat would be lost.

As presented in the Draft Solar PEIS, solar energy development within the Amargosa Valley SEZ could affect potentially suitable habitats of special status species. The analysis presented in the Draft Solar PEIS for the original Amargosa Valley SEZ developable area indicated that development would result in no impact or a small overall impact on most special status species (Table 11.1.12.1-1 in the Draft Solar PEIS). However, development was determined to result in moderate or large impacts on some special status species. In the Draft Solar PEIS, those 25 special status species that could be affected by groundwater withdrawals on the SEZ were determined to have impacts that ranged from small to large depending upon the scale of development and water needs to serve development on the SEZ. Development within the revised Amargosa Valley SEZ could still affect the same 52 species evaluated in the Draft Solar PEIS. However, the reduction in the SEZ boundaries and in the developable area of the Amargosa Valley SEZ would result in reduced impact levels compared to original estimates in the Draft Solar PEIS. Pre-disturbance consultation with the BLM and the necessary state and federal agencies should be conducted to determine the project-specific water needs and the potential for impact on these species (these groundwater-dependent species are listed in Table 11.1.12.1-1 of the Draft Solar PEIS and are listed below in Section 11.1.12.3). Those seven species that were determined to have moderate or large impacts in the Draft Solar PEIS are discussed below. Species for which overall impacts were determined to be small in the Draft Solar PEIS are not discussed because impacts on these species in the revised SEZ footprint are expected to remain small.

In addition, impacts on the 14 BLM-designated sensitive species that were not evaluated for the Amargosa Valley SEZ in the Draft Solar PEIS are discussed below and in Table 11.1.12.1-1. The impact assessment for these additional species was carried out in the same way as for those species analyzed in the Draft Solar PEIS (Section 11.1.12.2 of the Draft Solar PEIS).

11.1.12.2.1 Impacts on Species Listed under the Endangered Species Act

The desert tortoise is listed as threatened under the ESA and is known to occur throughout the SEZ affected area. This species was evaluated in the Draft Solar PEIS. It is widespread in Mojave desertscrub communities where firm soils for digging burrows are present. The desert tortoise has the potential to occur within the revised SEZ on the basis of observed occurrences on and near the SEZ and the presence of apparently suitable habitat in the SEZ (Figure 11.1.12.1-1; Table 11.1.12.1-1). According to habitat suitability models, approximately 8,470 acres (34 km^2) of potentially suitable habitat on the revised SEZ could be directly affected by construction and operations of solar energy development on the revised SEZ (Table 11.1.12.1-1). This direct effects area represents about 0.3% of available suitable habitat of the desert tortoise in the region. Much of this habitat within the SEZ is considered to be highly suitable (modeled suitability value ≥0.8 out of 1.0) according to the USGS desert tortoise habitat suitability model (Nussear et al. 2009). About 92,000 acres (372 km^2) of suitable habitat occurs in the area of potential indirect effects; this area represents about 3.4% of the available suitable habitat in the region (Table 11.1.12.1-1).

Information provided by the USFWS since the publication of the Draft Solar PEIS has identified the revised Amargosa Valley SEZ as being situated in an area that provides habitat and genetic connectivity between areas with greater habitat suitability (Ashe 2012). The USFWS has also determined that some portions of the SEZ are within high-priority connectivity areas, which are necessary to facilitate natural processes of gene exchange between populations in order to maintain population viability. Solar energy development on the Amargosa Valley SEZ, therefore, may isolate and fragment these tortoise populations by creating impediments to natural migration patterns.

In the Draft Solar PEIS, it was determined that the overall impact on the desert tortoise from solar energy development within the Amargosa Valley SEZ would be moderate, because the amount of potentially suitable habitat in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. On the basis of the revised SEZ boundaries, the overall impact on the desert tortoise from construction, operation, and decommissioning of utility-scale solar facilities within the revised Amargosa Valley SEZ is considered to be small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features alone is unlikely to reduce these impacts to negligible levels. Avoidance of potentially suitable habitats for this species is not a feasible means of mitigating impacts, because these habitats (desertscrub) are widespread throughout the area of direct effects. Preconstruction surveys to determine the abundance of desert tortoises on the SEZ and the implementation of a desert tortoise translocation plan and compensation plan could further reduce direct impacts.

Development of actions to reduce impacts (e.g., reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions) for the desert tortoise would require formal consultation with the USFWS under Section 7 of the ESA. This project-level consultation will tier from the programmatic ESA Section 7 consultation that will be completed with the PEIS ROD. Priority should be given to the development of a thorough survey protocol and measures to

avoid impacts on known tortoise populations. If necessary, minimization measures and mitigation measures, which could potentially include translocation actions and compensatory mitigation, may be required. These consultations may be used to authorize incidental take statements per Section 10 of the ESA (if necessary). Consultation with the NDOW should also occur to determine any state mitigation requirements.

Inherent dangers to tortoises are associated with their capture, handling, and translocation from the SEZ. These actions, if conducted improperly, can result in injury or death. To minimize these risks and as stated above, the desert tortoise translocation plan should be developed in consultation with the USFWS and should follow the *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council 1994) and other current translocation guidance provided by the USFWS. Consultation will identify potentially suitable recipient locations, density thresholds for tortoise populations in recipient locations, and procedures for pre-disturbance clearance surveys and tortoise handling, as well as disease-testing and post-translocation monitoring and reporting requirements. Despite some risk of mortality or decreased fitness, translocation is widely accepted as a useful strategy for the conservation of the desert tortoise (Field et al. 2007).

To offset impacts of solar development on the SEZ, compensatory mitigation may be needed to balance the acreage of habitat lost with acquisition of lands that would be improved and protected for desert tortoise populations (USFWS 1994). Compensation can be accomplished by improving the carrying capacity for the desert tortoise on the acquired lands. Other mitigation actions may include funding for the habitat enhancement of the desert tortoise on existing federal lands. Consultation with the USFWS and NDOW would be necessary to determine the appropriate mitigation ratio to acquire, enhance, and preserve desert tortoise compensation lands.

11.1.12.2.2 Impacts on BLM-Designated Sensitive Species

Impacts on the 18 BLM-designated sensitive species that either were re-evaluated for this Final Solar PEIS or are new species determined to potentially occur in the Amargosa Valley SEZ affected area are discussed below.

Death Valley Beardtongue

The Death Valley beardtongue was analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species is not known to occur in the affected area of the revised Amargosa Valley SEZ; however, approximately 6,780 acres (27 km^2) of potentially suitable habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.4% of potentially suitable habitat in the SEZ region. About 95,000 acres (384 km^2) of potentially suitable habitat occurs in the area of indirect effects; this area represents about 3.9% of the available suitable habitat in the SEZ region (Table 11.1.12.1-1).

In the Draft Solar PEIS, it was determined that the overall impact on the Death Valley beardtongue from solar energy development within the proposed Amargosa Valley SEZ was moderate, because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. On the basis of the revised SEZ boundaries, the overall impact on the Death Valley beardtongue from construction, operation, and decommissioning of utility-scale solar facilities within the revised Amargosa Valley SEZ is considered to be small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region.

Avoidance of all potentially suitable habitats is not a feasible means to mitigate impacts on the Death Valley beardtongue, because potentially suitable desertscrub habitat is widespread throughout the area of direct effects. Impacts could be reduced by conducting pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ. If avoidance or minimization is not a feasible option, plants could be translocated from areas of direct effects to protected areas that would not be affected directly or indirectly by future development. Alternatively, or in combination with translocation, a compensatory mitigation plan could be developed and implemented to offset direct effects on occupied habitats. Compensation could involve the protection and enhancement of existing occupied or suitable habitats to compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or more of these options could be designed to completely offset the impacts of development.

White-Margined Beardtongue

The white-margined beardtongue was analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species is not known to occur in the affected area of the revised Amargosa Valley SEZ; however, approximately 6,780 acres (27 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.3% of potentially suitable habitat in the SEZ region. About 96,150 acres (389 km^2) of potentially suitable habitat occurs in the area of indirect effects; this area represents about 3.9% of the potentially suitable habitat in the SEZ region (Table 11.1.12.1-1).

In the Draft Solar PEIS, it was determined that the overall impact on the white-margined beardtongue from solar energy development within the proposed Amargosa Valley SEZ was moderate, because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. On the basis of the revised SEZ boundaries, the overall impact on the white-margined beardtongue from construction, operation, and decommissioning of utility-scale solar facilities within the revised Amargosa Valley SEZ is considered to be small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region.

Avoidance of all potentially suitable habitats is not a feasible way to mitigate impacts on the white-margined beardtongue, because potentially suitable desertscrub habitat is widespread

throughout the area of direct effects. However, impacts could be reduced to negligible levels with the implementation of programmatic design features and the mitigation options described previously for the Death Valley beardtongue. The need for mitigation, other than programmatic design features, should be determined by conducting preconstruction surveys for the species and its habitat on the SEZ.

Crissal Thrasher

The crissal thrasher was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is a local and uncommon resident in southern Nevada outside of the Colorado River Valley, where it is a summer breeding resident. The crissal thrasher is not known to occur on the revised Amargosa Valley SEZ, and suitable habitat is not expected to occur on the SEZ; however, on the basis of an evaluation of the SWReGAP habitat suitability model for this species, approximately 85 acres (0.3 km^2) of potentially suitable breeding and nonbreeding habitat may occur outside the SEZ in the area of indirect effects. This area represents about 2.1% of the potentially suitable foraging habitat in the SEZ region (Table 11.1.12.1-1).

The overall impact on the crissal thrasher from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because no potentially suitable habitat for this species occurs in the area of direct effects and only indirect effects are possible. The implementation of programmatic design features may be sufficient to reduce indirect impacts on this species to negligible levels.

Golden Eagle

The golden eagle was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is an uncommon to common permanent resident in southern Nevada, and potentially suitable foraging habitat is expected to occur in the affected area. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents 0.3% of potentially suitable habitat in the SEZ region. About 110,000 acres (445 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 3.9% of the available suitable foraging habitat in the SEZ region (Table 11.1.12.1-1). Most of this area could serve as foraging habitat (open shrublands). On the basis of an evaluation of SWReGAP land cover types, potentially suitable nesting habitat (cliffs and rock outcrops) does not occur on the SEZ or within the area of indirect effects.

The overall impact on the golden eagle from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable foraging habitat for this species in the area of direct effects represents less than 1% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of direct impacts on all potentially suitable foraging habitat is not a feasible way to mitigate impacts on the golden eagle,

because potentially suitable shrubland is widespread throughout the area of direct effects and readily available in other portions of the affected area.

Gray Vireo

The gray vireo was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is an uncommon summer resident in southern Nevada. The gray vireo is not known to occur on the revised Amargosa Valley SEZ, and suitable habitat is not expected to occur on the SEZ; however, on the basis of an evaluation of the SWReGAP habitat suitability model for this species, approximately 6,200 acres (25 km^2) of potentially suitable breeding and nonbreeding habitat may occur outside the SEZ in the area of indirect effects. This area represents about 1.7% of the potentially suitable foraging habitat in the SEZ region (Table 11.1.12.1-1).

The overall impact on the gray vireo from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because no potentially suitable habitat for this species occurs in the area of direct effects and only indirect effects are possible. The implementation of programmatic design features may be sufficient to reduce indirect impacts on this species to negligible levels.

Le Conte's Thrasher

The Le Conte's thrasher is an uncommon to rare local resident in desert environments of the southwestern United States. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits open desert wash, desert scrub, alkali desertscrub, and desert succulent scrub habitats. Approximately 8,470 acres (34 km^2) of potentially suitable foraging or nesting habitat on the SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents 0.6% of potentially suitable habitat in the SEZ region. About 101,350 acres (410 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 6.8% of the available suitable foraging habitat in the SEZ region (Table 11.1.12.1-1).

The overall impact on the Le Conte's thrasher from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts to negligible levels.

Avoidance of all potentially suitable habitats is not a feasible way to mitigate impacts on the Le Conte's thrasher, because potentially suitable shrubland habitat is widespread throughout the area of direct effects and readily available in other portions of the SEZ region. Impacts on the Le Conte's thrasher could be reduced by conducting pre-disturbance surveys and avoiding or minimizing disturbance to occupied nests in the area of direct effects. If avoidance or

minimization is not a feasible option, a compensatory mitigation plan could be developed and implemented to offset direct effects on occupied habitats. Compensation could involve the protection and enhancement of existing occupied or suitable habitats to make up for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than design features, should be determined by conducting pre-disturbance surveys for the species and its habitat in the area of direct effects.

Loggerhead Shrike

The loggerhead shrike was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is a common winter resident in lowlands and foothills of southern Nevada. The loggerhead shrike is not known to occur on the revised Amargosa Valley SEZ, and suitable habitat is not expected to occur on the SEZ; however, on the basis of an evaluation of the SWReGAP habitat suitability model for this species, approximately 22,900 acres (93 km^2) of potentially suitable foraging habitat may occur outside the SEZ in the area of indirect effects. This area represents about 1.0% of the potentially suitable foraging habitat in the SEZ region (Table 11.1.12.1-1).

The overall impact on the loggerhead shrike from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because no potentially suitable habitat for this species occurs in the area of direct effects and only indirect effects are possible. The implementation of programmatic design features may be sufficient to reduce indirect impacts on this species to negligible levels.

Long-Eared Owl

The long-eared owl is an uncommon year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species inhabits desert shrubland environments in proximity to riparian areas such as desert washes. It nests in trees using old nests from other birds or squirrels. Potentially suitable foraging habitat for this species may occur on the SEZ and throughout the area of indirect effects (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, potentially suitable nesting habitat (forests) does not occur on the SEZ or within the area of indirect effects (Table 11.1.12.1-1).

The long-eared owl was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is an uncommon to common permanent resident in southern Nevada, and potentially suitable foraging habitat is expected to occur in the affected area. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents 0.3% of potentially suitable habitat in the SEZ region. About 101,500 acres (411 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 4.1% of the available suitable foraging habitat in the SEZ region (Table 11.1.12.1-1).

The overall impact on the long-eared owl from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable foraging habitat for this species in the area of direct effects represents less than 1% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of direct impacts on all potentially suitable foraging habitat is not a feasible way to mitigate impacts on the long-eared owl, because potentially suitable shrubland is widespread throughout the area of direct effects and readily available in other portions of the affected area.

Lucy's Warbler

The Lucy's warbler was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. This species is an uncommon summer resident and breeder in desert riparian areas of southern Nevada. The Lucy's warbler is not known to occur on the revised Amargosa Valley SEZ, and suitable habitat is not expected to occur on the SEZ; however, on the basis of an evaluation of the SWReGAP habitat suitability model for this species, approximately 85 acres (0.3 km^2) of potentially suitable foraging or nesting habitat may occur outside the SEZ in the area of indirect effects. This area represents about 1.9% of the potentially suitable foraging habitat in the SEZ region (Table 11.1.12.1-1).

The overall impact on the Lucy's warbler from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because no potentially suitable habitat for this species occurs in the area of direct effects and only indirect effects are possible. The implementation of programmatic design features may be sufficient to reduce indirect impacts on this species to negligible levels.

Prairie Falcon

The prairie falcon occurs throughout the western United States. It is a year-round resident within the Amargosa Valley SEZ region. This species was analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. The species occurs in open habitats in mountainous areas, sagebrush-steppe, grasslands, or cultivated areas. Nests are typically constructed in well-sheltered ledges of rocky cliffs and outcrops. Approximately 8,470 acres (34 km^2) of potentially suitable habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents 0.4% of potentially suitable habitat in the SEZ region. About 105,000 acres (425 km^2) of potentially suitable habitat occurs in the area of indirect effects; this area represents about 4.5% of the potentially suitable habitat in the SEZ region (Table 11.1.12.1-1). Most of this area could serve as foraging habitat (open shrublands). On the basis of an evaluation of SWReGAP land cover types, potentially suitable nesting habitat (cliffs and rock outcrops) does not occur on the SEZ or within the area of indirect effects.

In the Draft Solar PEIS, it was determined that the overall impact on the prairie falcon from solar energy development within the proposed Amargosa Valley SEZ was moderate,

because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. On the basis of the revised SEZ boundaries, the overall impact on the prairie falcon from construction, operation, and decommissioning of utility-scale solar facilities within the revised Amargosa Valley SEZ is considered to be small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region.

The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitats to mitigate impacts on the prairie falcon is not feasible, because potentially suitable foraging habitats are widespread throughout the area of direct effects and readily available in other portions of the affected area.

Big Brown Bat

The big brown bat is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (caves, forests, and buildings) are not expected to occur on the SEZ, but the availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.6% of potentially suitable foraging habitat in the region. About 105,000 acres (425 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 7.0% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests and rock outcrops) exists within the SEZ or within the area of indirect effects.

The overall impact on the big brown bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

Brazilian Free-Tailed Bat

The Brazilian free-tailed bat is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (caves, forests, and buildings) are not expected to occur on the SEZ, but the

availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.5% of potentially suitable foraging habitat in the region. About 106,000 acres (429 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 5.9% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests and rock outcrops) exists within the SEZ or within the area of indirect effects.

The overall impact on the Brazilian free-tailed bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

California Myotis

The California myotis is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (forests and rock outcrops) are not expected to occur on the SEZ, but the availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.4% of potentially suitable foraging habitat in the region. About 105,000 acres (425 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 5.3% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests and rock outcrops) exists within the SEZ or within the area of indirect effects.

The overall impact on the California myotis from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

Hoary Bat

The hoary bat is a fairly common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (forests) are not expected to occur on the SEZ, but the availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.5% of potentially suitable foraging habitat in the region. About 105,000 acres (425 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 5.8% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests) exists within the SEZ or within the area of indirect effects.

The overall impact on the hoary bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

Long-Legged Myotis

The long-legged myotis is a common to uncommon year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (forests and rock outcrops) are not expected to occur on the SEZ, but the availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.5% of potentially suitable foraging habitat in the region. About 105,000 acres (425 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 5.8% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests and rock outcrops) exists within the SEZ or within the area of indirect effects.

The overall impact on the long-legged myotis from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is

widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

Silver-Haired Bat

The silver-haired bat is an uncommon year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (forests) are not expected to occur on the SEZ, but the availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.6% of potentially suitable foraging habitat in the region. About 105,000 acres (425 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 7.5% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests) exists within the SEZ or within the area of indirect effects.

The overall impact on the silver-haired bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

Western Pipistrelle

The western pipistrelle is a common year-round resident in southern Nevada. This species was not analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS. Suitable roosting habitats (forests and rock outcrops) are not expected to occur on the SEZ, but the availability of suitable roosting sites in the area of indirect effects has not been determined. Approximately 8,470 acres (34 km^2) of potentially suitable foraging habitat on the revised SEZ could be directly affected by construction and operations (Table 11.1.12.1-1). This direct effects area represents about 0.3% of potentially suitable foraging habitat in the region. About 105,000 acres (425 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 4.3% of the available suitable foraging habitat in the region (Table 11.1.12.1-1). On the basis of an evaluation of SWReGAP land cover types, no suitable roosting habitat (forests and rock outcrops) exists within the SEZ or within the area of indirect effects.

The overall impact on the western pipistrelle from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Amargosa Valley SEZ

is considered small, because the amount of potentially suitable habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging habitat is not a feasible way to mitigate impacts, because potentially suitable foraging habitat is widespread throughout the area of direct effects and is readily available in other portions of the SEZ region.

11.1.12.2.3 Impacts on Rare Species

There are three rare species (ranked S1 or S2 in Nevada) that have not been discussed as ESA-listed species (Section 11.1.12.1.1) or BLM-designated sensitive (Section 11.1.12.1.2): the Ash Meadows buckwheat, Panamint Mountains bedstraw, and weasel phacelia. These three species were analyzed for the Amargosa Valley SEZ in the Draft Solar PEIS and they are re-evaluated in this Final Solar PEIS. Each of these species has the potential to occur in the revised SEZ and portions of the area of indirect effects. Of these species, however, only the Ash Meadows buckwheat is known to occur within 5 mi (8 km) of the revised Amargosa Valley SEZ (Table 11.1.12.1-1). Impacts on these species are presented in Table 11.1.12.1-1.

11.1.12.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on special status and rare species are described in Section A.2.2 of Appendix A of this Final Solar PEIS. SEZ-specific resources and conditions will determine how programmatic design features are applied, for example:

- Pre-disturbance surveys shall be conducted within the SEZ to determine the presence and abundance of special status species, including those identified in Table 11.1.12.1-1 of the Draft Solar PEIS, as well as those additional species presented in Table 11.1.12.1-1 of this Final Solar PEIS. Disturbance to occupied habitats for these species shall be avoided or minimized to the extent practicable. If avoiding or minimizing impacts on occupied habitats is not possible, translocation of individuals from areas of direct effects or compensatory mitigation of direct effects on occupied habitats may be used to reduce impacts. A comprehensive mitigation strategy for special status species that uses one or more of these options to offset the impacts of development shall be developed in coordination with the appropriate federal and state agencies.

- Disturbance to desert wash or riparian habitats on the SEZ shall be avoided or minimized to reduce impacts on the Bullfrog Hills sweetpea, Holmgren lupine, phainopepla, and Le Conte's thrasher.

- Groundwater withdrawals from the Amargosa Desert Basin to serve solar energy development on the SEZ shall be avoided or limited to reduce or prevent impacts on the following 25 groundwater-dependent special status species that may occur more than 5 mi (8 km) from the SEZ boundary: Amargosa niterwort, Ash Meadows blazingstar, Ash Meadows gumplant, Ash Meadows ivesia, Ash Meadows sunray, spring-loving centaury, Amargosa tryonia, Ash Meadows pebblesnail, crystal springsnail, distal gland springsnail, elongate gland springsnail, Fairbanks springsnail, median gland springsnail, minute tryonia, Oasis Valley springsnail, Point of Rocks tryonia, sporting goods tryonia, Amargosa naucorid, Ash Meadows naucorid, Ash Meadows Amargosa pupfish, Ash Meadows speckled dace, Devils Hole pupfish, Oasis Valley speckled dace, Warm Springs Amargosa pupfish, and Amargosa toad.

- Consultation with the USFWS and NDOW shall be conducted to address the potential for impacts on the following 12 species listed as threatened or endangered under the ESA that may be affected by solar energy development on the SEZ: Amargosa niterwort, Ash Meadows blazingstar, Ash Meadows gumplant, Ash Meadows ivesia, Ash Meadows sunray, spring-loving centaury, Ash Meadows naucorid, Ash Meadows Amargosa pupfish, Ash Meadows speckled dace, Devils Hole pupfish, Warm Springs Amargosa pupfish, and desert tortoise. Consultation would 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.

- Coordination with the USFWS and NDOW shall be conducted for the following 16 species under review for listing under the ESA that may be affected by solar energy development on the SEZ: Amargosa tryonia, Ash Meadows pebblesnail, crystal springsnail, distal gland springsnail, elongate gland springsnail, Fairbanks springsnail, median gland springsnail, minute tryonia, Oasis Valley springsnail, Point of Rocks tryonia, sporting goods tryonia, Amargosa naucorid, Oasis Valley speckled dace, and Amargosa toad. Coordination would identify an appropriate survey protocol, and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.

- Coordination with the USFWS and NDOW shall be conducted to address potential indirect impacts (e.g., site runoff and erosion) and the effectiveness of design features for the following special status species that are endemic to the Big Dune system: Big Dune meloderes weevil, Giuliani's dune scarab beetle, and large aegialian scarab beetle.

It is anticipated that implementation of these programmatic design features will reduce the majority of impacts on the special status species from habitat disturbance and groundwater use.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for special status species have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis. Projects will comply with terms and conditions set forth by the USFWS Biological Opinion resulting from the programmatic consultation and any necessary project-specific ESA Section 7 consultations.

11.1.13 Air Quality and Climate

11.1.13.1 Affected Environment

Except as noted below, the information for air quality and climate presented in the affected environment section of the Draft Solar PEIS remains essentially unchanged.

11.1.13.1.1 Existing Air Emissions

The Draft Solar PEIS presented Nye County emissions data for 2002. More recent data for 2008 (EPA 2011a) were reviewed. The two emissions inventories are from different sources and assumptions; for example, the 2008 data did not include biogenic volatile organic compound (VOC) emissions. All emissions except particulate matter with a diameter of 10 µm or less (PM_{10}) were lower in the more recent data. PM_{10} emissions were about 54% higher in the 2008 data, and emissions of particulate matter with a diameter of 2.5 µm or less ($PM_{2.5}$) were about 73% of those in the 2002 data. However, these changes would not affect modeled air quality impacts presented in this update.

11.1.13.1.2 Air Quality

The calendar quarterly average National Ambient Air Quality Standard (NAAQS) of 1.5 µg/m^3 for lead (Pb) presented in Table 11.1.13.1-2 of the Draft Solar PEIS has been replaced by the rolling 3-month standard (0.15 µg/m^3). The federal 24-hour and annual sulfur dioxide ($SO_{2)}$ and 1-hour ozone ($O_{3)}$ have been revoked as well (EPA 2011b). These changes will not affect the modeled air quality impacts presented in this Final Solar PEIS. Nevada State Ambient Air Quality Standards (SAAQS) have not been changed.

Given the reduced size of the proposed Amargosa Valley SEZ, the distances to nearby Class I areas are larger by a few miles than those in the Draft Solar PEIS. The conclusion in the Draft Solar PEIS that no Class I areas are within the 100-km (62-mi) distance within which the EPA recommends notification of Federal Land Managers remains valid.

11.1.13.2 Impacts

11.1.13.2.1 Construction

Methods and Assumptions

Except for the area disturbed at any one time during construction, the methods and modeling assumptions have not changed from those presented in the Draft Solar PEIS. On the basis of the reduced size of the proposed Amargosa Valley SEZ, for this Final Solar PEIS air quality was remodeled by assuming that a maximum of 3,000 acres (12.14 km^2) in the southern portion of the proposed SEZ (the area closest to nearby residences) would be disturbed at any one time; the Draft Solar PEIS assumed disturbance of an area three times larger.[1]

Results

Potential particulate impacts on air quality from construction were remodeled based on the revised boundaries of the proposed Amargosa Valley SEZ. Changes in magnitude to predicted impacts at the boundary would be expected to be larger than changes at greater distances from the SEZ. Table 11.1.13.2-1 presents the updated maximum modeled concentrations from construction fugitive dust.

The updated maximums are lower by about 30% than those in the Draft Solar PEIS (as would be expected given the reduction in the area assumed disturbed), but totals, except for annual $PM_{2.5}$, could still exceed the NAAQS/SAAQS levels. These updated predictions are still consistent with the conclusion in the Draft Solar PEIS that maximum particulate levels in the vicinity of the SEZ could exceed the standard levels used for comparison. These high PM_{10} concentrations would be limited to the immediate areas surrounding the SEZ boundaries and would decrease quickly with distance.

Other locations modeled include Big Dune, the nearest residences, nearby schools, the truck stop at the intersection of U.S. 95 and State Route 373, and Ash Meadows NWR. The updated analysis conducted for this Final Solar PEIS predicted concentrations at all modeled locations lower than those in the Draft Solar PEIS and showed no locations with predicted concentrations above the NAAQS levels.

[1] At this programmatic level, detailed information on construction activities, such as facility size, type of solar technology, heavy equipment fleet, activity level, work schedule, and so on, is not known; thus air quality modeling cannot be conducted. It has been assumed that an area of 3,000 acres (12.14 km^2) would be disturbed continuously, so the modeling results and discussion here should be interpreted in that context. During the site-specific project phase, more detailed information would be available and more realistic air quality modeling analysis could be conducted. It is likely that impacts on ambient air quality predicted for specific projects would be much lower than those in this Final Solar PEIS.

TABLE 11.1.13.2-1 Maximum Air Quality Impacts from Emissions Associated with Construction Activities for the Proposed Amargosa Valley SEZ as Revised

Pollutant[a]	Averaging Time	Rank[b]	Concentration (μg/m^3) Maximum Increment[b]	Background[c]	Total	NAAQS/ SAAQS	Percentage of NAAQS/SAAQS Increment	Total
PM_{10}	24 hour	H6H	340	66	406	150	227	271
	Annual	–[d]	67.5	17	84.5	50	135	169
$PM_{2.5}$	24 hour	H8H	27.1	12.9	40.0	35	77	114
	Annual	–	6.7	4.9	11.7	15	45	78

[a] $PM_{2.5}$ = particulate matter with a diameter of ≤2.5 μm; PM_{10} = particulate matter with a diameter of ≤10 μm.

[b] Concentrations for attainment demonstration are presented. H6H = highest of the sixth-highest concentrations at each receptor over the 5-year period. H8H = highest of the multiyear average of the eighth-highest concentrations at each receptor over the 5-year period. For the annual average, multiyear averages of annual means over the 5-year period are presented. Maximum concentrations are predicted to occur at the site boundaries.

[c] See Table 11.1.13.1-2 of the Draft Solar PEIS.

[d] A dash indicates not applicable.

Updated 24-hour and annual PM_{10} concentration increments at the surrogate receptors[2] for the nearest Class I area—John Muir WA in California—would be lower than those in the Draft Solar PEIS, but the Class I PSD increment for 24-hour PM_{10} could still be exceeded. However, the predicted 24-hour PM_{10} increment in the John Muir WA has been updated from a value exceeding the Class I PSD increment for 24-hour PM_{10} in the Draft Solar PEIS to a value of about 50% of the increment in this Final Solar PEIS, considering the same decay ratio with distance.

The conclusions in the Draft Solar PEIS remain valid. The predicted 24-hour and annual PM_{10} and 24-hour $PM_{2.5}$ concentration levels could exceed the standard levels used for comparison at the SEZ boundaries and in the immediately surrounding areas during the construction of solar facilities. To reduce potential impacts on ambient air quality and in compliance with programmatic design features, aggressive dust control measures would be used. Potential air quality impacts on nearby communities would be much lower. Modeling indicates that air quality impacts from construction activities are anticipated to be less than the Class I PSD PM_{10} increments at the nearest federal Class I area. Construction activities are not subject to the PSD program, and the comparison provides only a screen for gauging the size of the

[2] Because the nearest Class I area is more than 31 mi (50 km) from the SEZ (which exceeds the maximum modeling distance), several regularly spaced receptors in the directions of the nearest Class I area were selected as surrogates for the Prevention of Significant Deterioration (PSD) analysis.

impact. Accordingly, it is anticipated that impacts of construction activities on ambient air quality would be moderate and temporary.

Considering the reduced size of the SEZ, emissions from construction equipment and vehicles would be less than those mentioned in the Draft Solar PEIS. Any potential impacts on air quality-related values (AQRVs) at nearby federal Class I areas would be less; thus the conclusions in the Draft Solar PEIS remain valid. Emissions from construction-related equipment and vehicles are temporary and could cause some unavoidable but short-term impacts.

11.1.13.2.2 Operations

The reduction in the developable area of the proposed Amargosa Valley SEZ by about 73% from 31,625 acres (128.0 km^2) to 8,479 acres (34.3 km^2) reduces the generating capacity and annual power generation by a similar percentage and thus reduces the potentially avoided emissions presented in the Draft Solar PEIS. Total revised power generation capacity ranging from 754 to 1,357 MW is estimated for the revised Amargosa Valley SEZ for various solar technologies (see Section 11.1.1.2). As explained in the Draft Solar PEIS, the estimated amount of emissions avoided for the solar technologies evaluated depends only on the megawatts of conventional fossil fuel–generated power avoided.

Table 11.1.13.2-2 in the Draft Solar PEIS provided estimates for emissions potentially avoided by a solar facility. These estimates were updated by reducing the tabulated estimates by about 27%, as shown in the revised Table 11.1.13.2-2. For example, for the technologies estimated to require 9 acres/MW (power tower, dish engine, and PV), up to 1,598 tons of NO_x per year (= 26.81% × the low-end value of 5,960 tons per year tabulated in the Draft Solar PEIS) could be avoided by full solar development of the revised area of the proposed Amargosa Valley SEZ. Although the total emissions avoided by full solar development of the proposed SEZ are considerably reduced from those presented in the Draft Solar PEIS, the conclusions of the Draft Solar PEIS remain valid; that is, if the proposed Amargosa Valley SEZ were fully developed, it is expected that the emissions avoided could be substantial. Power generation from fossil fuel–fired power plants accounts for about 93% of the total electric power generated in Nevada, for which the contributions of natural gas and coal combustion are comparable. Thus, solar facilities to be built in the Amargosa Valley SEZ could be more important than those built in other states in terms of avoiding fuel combustion–related emissions.

11.1.13.2.3 Decommissioning and Reclamation

The discussion in the Draft Solar PEIS remains valid. Decommissioning and reclamation activities would be of short duration, and their potential impacts on air quality would be minor and temporary.

TABLE 11.1.13.2-2 Annual Emissions from Combustion-Related Power Generation Displaced by Full Solar Development of the Proposed Amargosa Valley SEZ as Revised

Area Size (acres)[a]	Capacity (MW)[b]	Power Generation (GWh/yr)[c]	Emissions Avoided (tons/yr; 10^3 tons/yr for CO_2)[d]			
			SO_2	NO_x	Hg	CO_2
8,479	754–1,357	1,320–2,377	1,863–3,353	1,598–2,876	0.011–0.019	1,026–1,846
Percentage of total emissions from electric power systems in the state of Nevada[e]			3.5–6.3%	3.5–6.3%	3.5–6.3%	3.5–6.3%
Percentage of total emissions from all source categories in the state of Nevada[f]			2.8–5.1%	1.1–1.9%	–[g]	1.9–3.4%
Percentage of total emissions from electric power systems in the six-state study area[e]			0.74–1.3%	0.43–0.78%	0.36–0.65%	0.39–0.70%
Percentage of total emissions from all source categories in the six-state study area[e]			0.40–0.71%	0.06–0.11%	–	0.12–0.22%

[a] To convert acres to km^2, multiply by 0.004047.

[b] It is assumed that the SEZ would eventually have development on 80% of the lands and that a range of 5 acres (0.020 km^2) per MW (for parabolic trough technology) to 9 acres (0.04 km^2) per MW (power tower, dish engine, and PV technologies) would be required.

[c] Assumed a capacity factor of 20%.

[d] Composite combustion-related emission factors for SO_2, NO_x, Hg, and CO_2 of 2.82, 2.42, 1.6×10^{-5}, and 1,553 lb/MWh, respectively, were used for the state of Nevada.

[e] Emission data for all air pollutants are for 2005.

[f] Emission data for SO_2 and NO_x are for 2002, while those for CO_2 are for 2005.

[g] A dash indicates not estimated.

Sources: EPA (2009a,b); WRAP (2009).

11.1.13.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce air quality impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Limiting dust generation during construction and operations is a required programmatic design feature under the BLM Solar Energy Program. These extensive fugitive dust control measures would keep off-site PM levels as low as possible during construction.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features to address air quality impacts in the proposed

Amargosa Valley SEZ have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.14 Visual Resources

11.1.14.1 Affected Environment

The proposed Amargosa Valley SEZ, as revised, extends approximately 3.1 mi (4.8 km) east to west and approximately 7.0 mi (11.3 km) north to south. The SEZ boundaries have been revised to eliminate the area south and west of the Amargosa River floodplain and the area northeast of U.S. 95; U.S. 95 no longer passes through the northeast portion of the SEZ and instead now serves as the northeastern boundary. Areas of the SEZ that were labeled to meet Visual Resource Management (VRM) Class II-consistent management objectives in the Draft Solar PEIS also have been eliminated from the SEZ.

The boundary changes resulted in the elimination of 21,888 acres (88.6 km^2). In addition, 1,258 acres (5.1 km^2) within the SEZ boundaries have been identified as non-development areas. These areas consist of lands within the Amargosa River floodplain, which were included in the SEZ to facilitate the definition of the SEZ boundaries. As a result, the developable area within the SEZ now includes an area of 8,479 acres (34.3 km^2). Because of the reduction in size of the SEZ, the total acreage of the lands visible within the 25-mi (40 km) viewshed of the SEZ has decreased.

An updated Visual Resources Inventory (VRI) map for the SEZ and surrounding lands is shown in Figure 11.1.14.1-1; it provides information from the BLM 2007 VRI, which was finalized in October 2011 (BLM 2011a). As shown, the updated VRI value for the SEZ is VRI Class III, indicating moderate relative visual values. The updated inventory indicates low scenic quality for the SEZ and its immediate surroundings. Positive scenic quality attributes included moderately rated adjacent scenery. The updated inventory also indicates high sensitivity for the SEZ and its immediate surroundings, based on a moderate level of use and a high level of public interest.

The 25-mi (40-km), 650-ft (198-m) viewshed contains lands located in the Barstow Field Office, the Battle Mountain District Office, and the Southern Nevada District Office. Lands within this viewshed have the following VRI Class designations:

- Barstow Field Office
  - 3,160 acres (12.8 km^2) of VRI Class I areas, and
  - 14,822 acres (60.0 km^2) of VRI Class IV areas.

- Battle Mountain District Office
  - 3,067 acres (12.4 km^2) of VRI Class II areas,
  - 15,923 acres (64.4 km^2) of VRI Class III areas, and
  - 14,588 acres (59.0 km^2) of VRI Class IV areas.

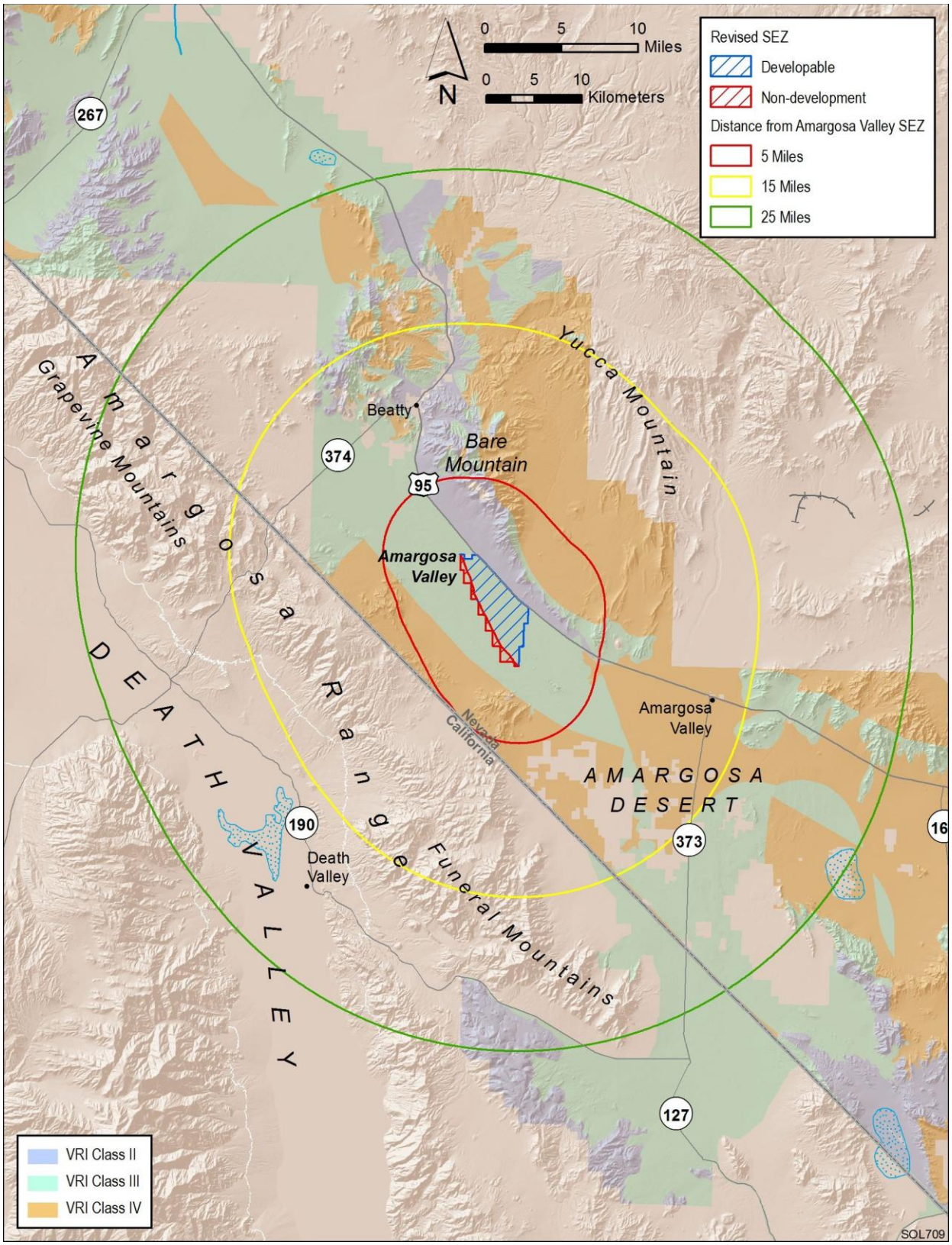

FIGURE 11.1.14.1-1 Visual Resource Inventory Values for the Proposed Amargosa Valley SEZ as Revised

- Southern Nevada District Office
  - 17,067 acres (69.1 km^2) of VRI Class II areas,
  - 108,955 acres (440.9 km^2) of VRI Class III areas, and
  - 133,410 acres (539.9 km^2) of VRI Class IV areas.

As indicated in the Draft Solar PEIS, the proposed SEZ is managed as VRM Classes III and IV. However, because of the elimination of acreage, the revised Amargosa Valley SEZ now is primarily managed as VRM Class III, with only a small portion in the southwest (near the non-developable lands) as VRM Class IV.

11.1.14.2 Impacts

The reduction in SEZ size would substantially decrease the total visual impacts associated with solar energy development in the SEZ. It would limit the total amount of solar facility infrastructure that would be visible and the geographic extent of the visible infrastructure.

The reduction in size of the proposed Amargosa Valley SEZ in the Supplement to the Draft Solar PEIS eliminates approximately 73% of the original SEZ. The resulting visual contrast reduction for any given point within view of the SEZ would vary greatly depending on the viewpoint's distance and direction from the SEZ. Contrast reduction generally would be greatest for viewpoints closest to the portions of the SEZ that were eliminated and especially for those that had wide-angle views of these areas. In general, contrast reductions also would be larger for elevated viewpoints relative to non-elevated viewpoints, because the reduction in area of the solar facilities would be more apparent when looking down at the SEZ than when looking across it.

11.1.14.2.1 Impacts on the Proposed Amargosa Valley SEZ

Although the reduction in size of the SEZ discussed in Section 11.1.14.2 would substantially reduce visual contrasts associated with solar development, solar development still would involve major modification of the existing character of the landscape; it likely would dominate the views from most locations within the SEZ. Additional impacts would occur as a result of the construction, operation, and decommissioning of related facilities, such as access roads and electric transmission lines. In general, strong visual contrasts from solar development still would be expected to be observed from viewing locations within the SEZ.

11.1.14.2.2 Impacts on Lands Surrounding the Proposed Amargosa Valley SEZ

For the Draft Solar PEIS, preliminary viewshed analyses were conducted to identify which lands surrounding the proposed SEZ could have views of solar facilities in at least some portion of the SEZ (see Appendixes M and N of the Draft Solar PEIS for important information on assumptions and limitations of the methods used). Four viewshed analyses were conducted, assuming four different heights representative of project elements associated with potential solar

energy technologies: PV and parabolic trough arrays, 24.6 ft (7.5 m); solar dishes and power blocks for concentrating solar power (CSP) technologies, 38 ft (11.6 m); transmission towers and short solar power towers, 150 ft (45.7 m); and tall solar power towers, 650 ft (198.1 m).

These same viewsheds were recalculated in order to account for the boundary changes described in the Supplement to the Draft Solar PEIS. Figure 11.1.14.2-1 shows the combined results of the viewshed analyses for the four viewshed heights. The colored segments indicate areas with clear lines of sight to one or more areas within the SEZ and from which solar facilities within these areas of the SEZ would be expected to be visible, assuming adequate lighting and other atmospheric conditions, and the absence of screening vegetation or structures. The light brown areas are locations from which PV and parabolic trough arrays located in the SEZ could be visible. Solar dishes and power blocks for CSP technologies would be visible from the areas shaded in light brown and the additional areas shaded in light purple. Transmission towers and short solar power towers would be visible from the areas shaded light brown, light purple, and the additional areas shaded in dark purple. Power tower facilities located in the SEZ could be visible from areas shaded light brown, light purple, dark purple, and at least the upper portions of power tower receivers from the additional areas shaded in medium brown.

11.1.14.2.3 Impacts on Selected Federal-, State-, and BLM-Designated Sensitive Visual Resource Areas and Other Lands and Resources

Figure 11.1.14.2-2 shows the results of a geographical information system (GIS) analysis that overlays selected federal, state, and BLM-designated sensitive visual resource areas onto the combined tall solar power tower (650 ft [198.1 m]) and PV and parabolic trough array (24.6 ft [7.5 m]) viewsheds in order to illustrate which of these sensitive visual resource areas would have views of solar facilities within the SEZ and therefore potentially would be subject to visual impacts from those facilities. Distance zones that correspond to BLM's VRM system-specified foreground-middleground distance (5 mi [8 km]), background distance (15 mi [24.1 km]), and a 25-mi (40.2-km) distance zone are shown as well in order to indicate the effect of distance from the SEZ on impact levels, which are highly dependent on distance. A similar analysis was conducted for the Draft Solar PEIS.

The scenic resources included in the analysis were as follows:

- National Parks, National Monuments, National Recreation Areas, National Preserves, National Wildlife Refuges, National Reserves, National Conservation Areas, National Historic Sites;

- Congressionally authorized Wilderness Areas;

- Wilderness Study Areas;

- National Wild and Scenic Rivers;

- Congressionally authorized Wild and Scenic Study Rivers;

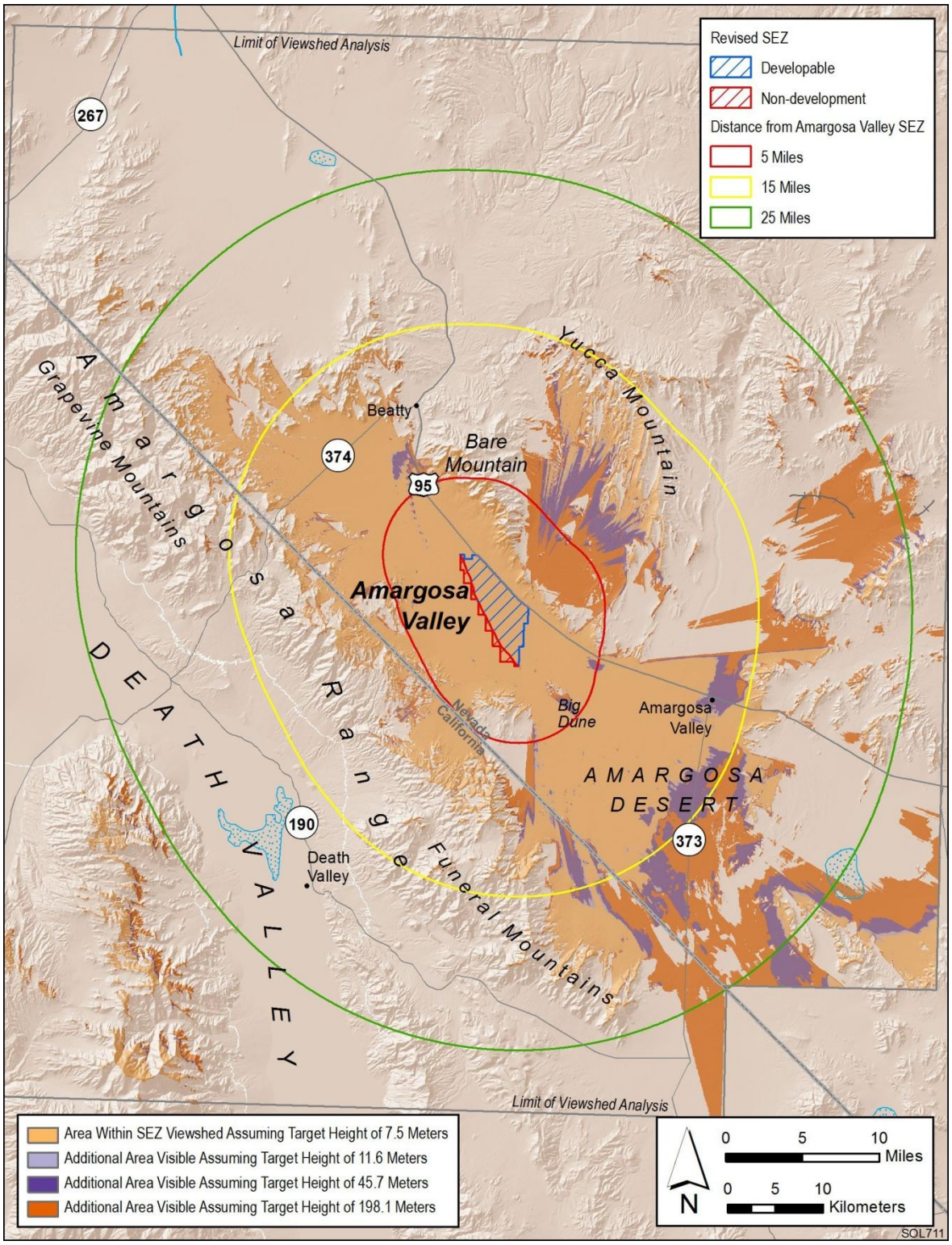

FIGURE 11.1.14.2-1 Viewshed Analyses for the Proposed Amargosa Valley SEZ as Revised and Surrounding Lands, Assuming Viewshed Heights of 24.6 ft (7.5 m), 38 ft (11.6 m), 150 ft (45.7 m), and 650 ft (198.1 m) (shaded areas indicate lands from which solar development and/or associated structures within the SEZ could be visible)

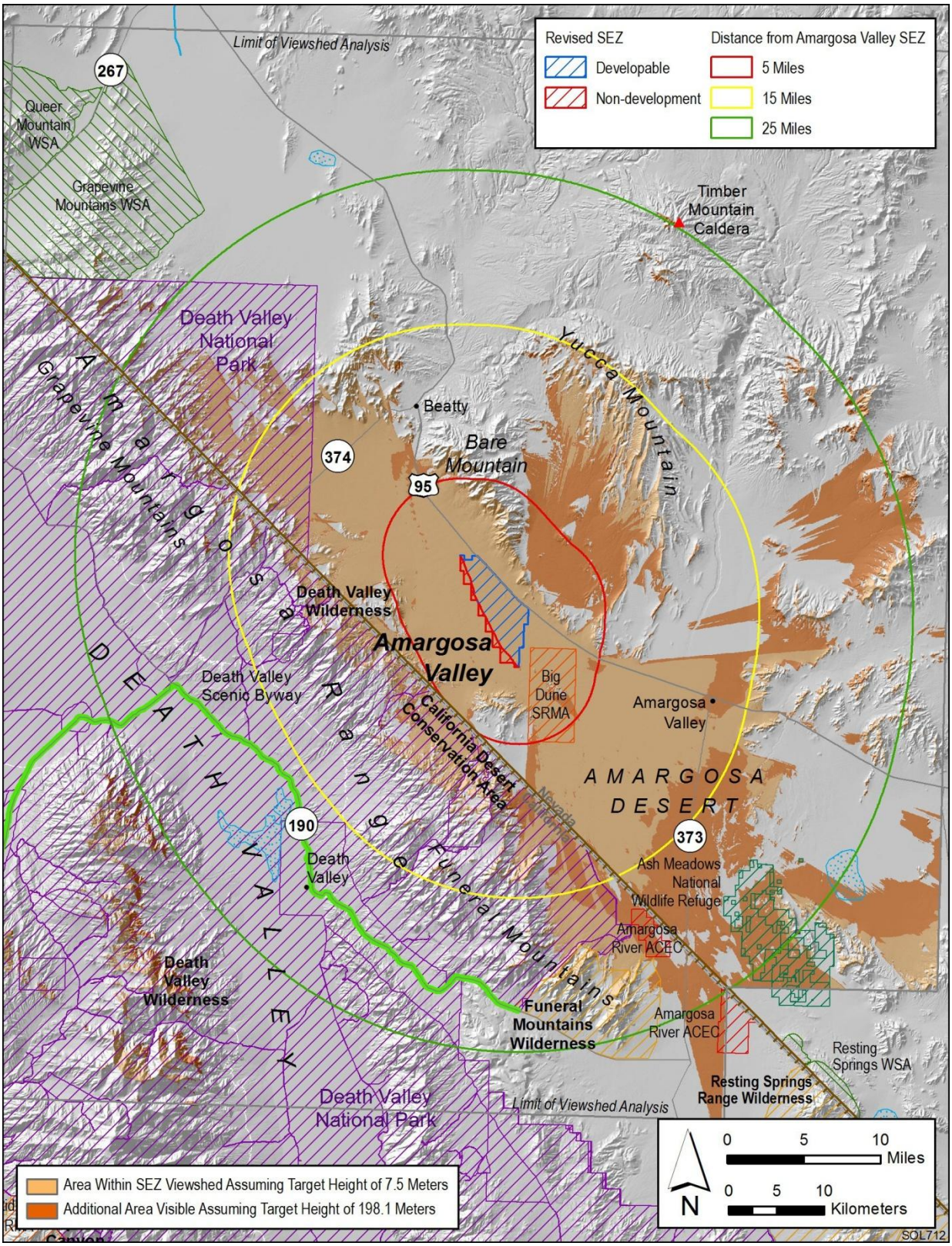

FIGURE 11.1.14.2-2 Overlay of Selected Sensitive Visual Resource Areas onto Combined 650-ft (198.1-m) and 24.6-ft (7.5-m) Viewsheds for the Proposed Amargosa Valley SEZ as Revised

- National Scenic Trails and National Historic Trails;
- National Historic Landmarks and National Natural Landmarks;
- All-American Roads, National Scenic Byways, State Scenic Highways, and BLM- and USFS-designated scenic highways/byways;
- BLM-designated Special Recreation Management Areas; and
- ACECs designated because of outstanding scenic qualities.

The results of the GIS analyses are summarized in Table 11.1.14.2-1. The change in size of the SEZ alters the viewshed of the SEZ, such that the visibility of the SEZ and solar facilities within the SEZ from the surrounding lands would be reduced.

TABLE 11.1.14.2-1 Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Proposed Amargosa Valley SEZ as Revised, Assuming a Target Height of 650 ft (198.1 m)

		Feature Area or Linear Distance[b]		
			Visible Between	
Feature Type	Feature Name/ Linear Distance (Total Acreage[a])	Visible within 5 mi	5 and 15 mi	15 and 25 mi
National Park	Death Valley (3,397,062 acres)	0 acres (0%)	58,953 acres (2%)	29,504 acres (1%)
WAs	Death Valley (3,074,256 acres)	0 acres (0%)	40,892 acres (1%)	13,900 acres (0%)
	Funeral Mountains (27,567 acres)	0 acres (0%)	0 acres (0%)	3,675 acres (13%)
Wildlife Refuge	Ash Meadows (24,193 acres)	0 acres (0%)	0 acres (0%)	8,896 acres (37%)
SRMA	Big Dune (11,572 acres)	10,230 acres (88%)	858 acres (7%)	0 acres (0%)
ACEC	Amargosa River (27,797 acres)	0 acres (0%)	0 acres (0%)	2,254 acres (8%)
National Conservation Area	California Desert (25,919,319 acres)	0 acres (0%)	44,903 acres (0%)	31,191 acres (0%)

[a] To convert acres to km^2, multiply by 0.004047.

[b] Percentage of total feature acreage or road length viewable.

With the reduction in size of the SEZ, solar energy development within the SEZ would be expected to create minimal or weak visual contrasts for viewers within three of the seven surrounding scenic resource areas and other resources listed in Table 11.1.14.2-1. Moderate or strong visual contrasts still would occur in the Death Valley NP and WA, Big Dune SRMA, and the California Desert National Conservation Area (CDNCA).

In addition to these areas, impacts on other lands and resource areas also were evaluated. These areas include U.S. 95, State Route 374, and State Route 373.

11.1.14.2.4 Summary of Visual Resource Impacts for the Proposed Amargosa Valley SEZ

The visual contrast analysis in the Draft Solar PEIS determined that because there could be multiple solar facilities within the Amargosa Valley SEZ and a range of supporting facilities required, solar development within the SEZ would make it essentially industrial in appearance and would contrast strongly with the surrounding mostly natural-appearing landscape.

The reduction in size of the SEZ would decrease the visual contrast associated with solar facilities as seen both within the SEZ and from surrounding lands in both daytime and nighttime views. The reductions in visual contrast can be summarized as follows:

- Within the Amargosa Valley SEZ: Contrasts experienced by viewers in the area south and west of the Amargosa River floodplain and the area northeast of U.S. 95 would be reduced because of the elimination of 21,888 acres (88.6 km^2) of land within these areas of the SEZ. A small reduction in contrasts also would occur within 1,258 acres (5.1 km^2) that were identified within the Amargosa River floodplain due to their designation as non-development lands. Strong contrasts, however, still would result in the remaining developable areas of the SEZ.

- Death Valley NP: A reduction in contrasts would be anticipated due to the revision of the SEZ. The SEZ, as it was originally proposed in the Draft Solar PEIS, was located within 1 mi (1.6 km) of the National Park. Viewers within the National Park would have open views of the SEZ, especially from elevated viewpoints. At the point of closest approach, Death Valley NP now is just more than 5 mi (8 km) from the southwest border of the SEZ. Because of the proximity of the National Park to the SEZ and the potential for views from elevated viewpoints, solar development within the SEZ still would cause weak to strong contrasts, depending on viewer location within the National Park.

- Death Valley WA: See above for Death Valley NP.

- Funeral Mountains WA: A reduction in contrasts would be anticipated due to the elimination of acreage within the southern portion of the SEZ. Expected contrast levels would be lowered from “weak” to “minimal to weak.”

- Ash Meadows NWR: A reduction in contrasts would be anticipated due to the revision of the SEZ; expected contrast levels would be lowered from "weak" to "minimal to weak."

- Big Dune SRMA: A reduction in contrasts would be anticipated due to the elimination of approximately 73% of the SEZ. However, because of the proximity of the SEZ and the presence of some relatively open views, solar development within the SEZ still would cause strong contrasts. Contrast would be slightly weaker from viewpoints in the southeastern portion of the SRMA.

- Amargosa River ACEC: A reduction in contrasts would be anticipated due to the revision of the SEZ. The amount of acreage within the 25-mi (40-km) viewshed decreased by 665 acres (2.7 km^2); however, solar development within the SEZ still would cause minimal contrasts.

- CDNCA: A reduction in contrasts would be anticipated, especially in those areas that were located within 5 mi (8 km) of the SEZ, as it was originally proposed in the Draft Solar PEIS. The CDNCA now is located slightly more than 5 mi (8 km) from the SEZ at the point of closest approach. Solar development within the SEZ, however, still would cause weak to strong contrasts, depending on viewer location within the CDNCA.

- U.S. 95: A reduction in contrasts would be anticipated due to the elimination of acreage on the northeast side of U.S. 95. The highway now serves as the boundary of the SEZ, rather than passing through it. The strongest contrast would be seen by viewers traveling along the highway in those portions that serve as the SEZ boundary. Because of the close proximity, solar development within the SEZ still would cause strong contrasts.

- State Route 374: A reduction in contrasts would be anticipated because of the revision of the SEZ, which eliminated some of the northwest portions of the SEZ. Solar development, however, within the SEZ still would cause weak to moderate contrasts, depending on viewer location on State Route 374.

- State Route 373: A reduction in contrasts would be anticipated because of the elimination of acreage in the southeast portion of the SEZ; expected contrast levels would be lowered from "minimal to weak" to "minimal."

11.1.14.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on visual resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. While application of the programmatic design features will reduce potential visual impacts somewhat, the degree of effectiveness of these design features could be assessed only at the site- and project-specific

level. Given the large scale, reflective surfaces, and strong regular geometry of utility-scale solar energy facilities and the lack of screening vegetation and landforms within the SEZ viewshed, siting the facilities away from sensitive visual resource areas and other sensitive viewing areas would be the primary means of mitigating visual impacts. The effectiveness of other visual impact mitigation measures generally would be limited.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for visual resources have been identified in this Final Solar PEIS. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.15 Acoustic Environment

11.1.15.1 Affected Environment

The developable area of the proposed Amargosa Valley SEZ was reduced by about 73% from 31,625 acres (128.0 km^2) to 8,479 acres (34.3 km^2); the southern and western boundaries were moved inward about 1.5 mi (2.4 km) and 1.2 to 5.0 mi (1.9 to 8.0 km), respectively; and the area north of U.S. 95 was removed. These reductions increased the distances to some of the sensitive receptors at which noise was modeled for the Draft Solar PEIS. In particular, the nearest residences to the south and Death Valley NP to the southwest are now farther from the proposed SEZ boundary than was assumed in the Draft Solar PEIS. Consequently, noise levels at these receptors will be lower than those predicted in the Draft Solar PEIS.

Comments provided by the DoD on the Supplement to the Draft Solar PEIS noted that several approved, highly utilized MTRs exist in airspace directly above the SEZ. Existing noise levels at the SEZ include periodic loud routine military flight operations occurring in MTRs located directly above and proximate to the SEZ.

11.1.15.2 Impacts

11.1.15.2.1 Construction

Except for the area disturbed at any one time during construction, the methods and modeling assumptions have not changed from those presented in the Draft Solar PEIS. On the basis of the boundary changes and reduced size of the proposed Amargosa Valley SEZ, noise impacts for this Final Solar PEIS were remodeled assuming that 3,000 acres (12.14 km^2) in the southern portion of the proposed SEZ (the area closest to the nearest residences) would be disturbed at any one time. The updated noise predictions are less than those in the Draft Solar PEIS, and, except as noted below for wildlife impact in specially designated areas, the conclusions presented in the Draft Solar PEIS remain valid.

With the revised SEZ boundaries, estimated construction noise levels at the nearest residence (about 5.9 mi [9.5 km] south of the SEZ) would be about 22 dBA, which is well below a typical daytime mean rural background level of 40 dBA. In addition, an estimated 40 dBA L_{dn} at this residence (i.e., no contribution from construction activities) is well below the EPA guidance of 55 dBA L_{dn} for residential areas.

On the basis of comments received and recent references as applicable, this Final Solar PEIS used an approximate significance threshold of 55 dBA corresponding to the onset of adverse physiological impacts (Barber et al. 2010) to update the analysis of potential noise impacts on terrestrial wildlife in areas of special concern. Noise levels were updated for two of three specially designated areas within 5 mi (8.0 km) of the proposed Amargosa Valley SEZ. The updated distance between the revised SEZ boundaries and Death Valley NP is greater than that in the Draft Solar PEIS, and predicted noise levels at the National Park's boundary are lower (25 dBA). The distance to Big Dune ACEC is unchanged by the revised boundaries; thus the predicted noise level will be the same as in the Draft Solar PEIS (36 dBA). Both these levels are below the 55 dBA approximate significance threshold and the typical daytime mean rural background level of 40 dBA. The third specially designated area, Big Dune SRMA, which includes Big Dune ACEC, was established to provide a management framework primarily for OHV use, and noise is not likely to be a concern at the Big Dune SRMA. As concluded in the Draft Solar PEIS, construction noise in the proposed SEZ is not likely to be a significant concern for the three nearby specially designated areas. However, as discussed in Section 5.10.2 of the Draft Solar PEIS and this Final Solar PEIS, there is the potential for other effects on terrestrial wildlife (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). Considering the approximate significance threshold of 55 dBA and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from construction noise would have to be considered on a site-specific basis. However, even considering potential impacts at lower noise levels, construction noise from the SEZ would not be anticipated to affect wildlife in the nearby specially designated areas.

Construction noise and vibration impacts would be the same or less than those presented in the Draft Solar PEIS, and the conclusions of the Draft Solar PEIS remain valid. Construction would cause minimal, unavoidable, but localized, short-term noise impacts on neighboring communities, even when construction activities occur close to the nearest residence. No adverse vibration impacts are anticipated from construction activities, including pile driving for dish engines.

11.1.15.2.2 Operations

Due to boundary changes and identification of non-development areas for the proposed Amargosa Valley SEZ, noise impacts for this Final Solar PEIS were remodeled.

Parabolic Trough and Power Tower

If thermal energy storage (TES) were not used (12 hours of daytime operations only), the predicted noise level at the nearest residence about 5.9 mi (9.5 km) away would be well below the typical daytime mean rural background of 40 dBA and the EPA guideline level of 55 dBA L_{dn} for residential areas. However, if TES were used, on a calm, clear night, typical of the proposed Amargosa Valley SEZ, strong temperature inversions could focus sound downward, and the nighttime noise level would be higher than the typical nighttime mean rural background level of 30 dBA. The 55-dBA EPA guideline would still not be exceeded. The conclusion in the Draft Solar PEIS that operating parabolic trough or power tower facilities using TES and located near the southern SEZ boundary could result in minor adverse noise impacts on the nearest residence, depending on background noise levels and meteorological conditions, remains valid.

As stated above under construction impacts, for this Final Solar PEIS, an approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. With TES, estimated daytime/nighttime noise levels from operation of a parabolic trough or power tower solar facility near the southern boundary of the proposed Amargosa Valley SEZ could produce noise levels of 29/39 dBA and 37/47 dBA at the boundaries of Death Valley NP and Big Dune ACEC, respectively. These levels are below the significance threshold; thus the conclusion in the Draft Solar PEIS that adverse impacts on wildlife in the specially designated areas are unlikely remains valid. However, as discussed in Section 5.10.2, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). Because of these impacts and the potential for impacts at lower noise levels, consideration of impacts on terrestrial wildlife from construction noise would have to be conducted on a site-specific basis. For potential impacts at lower noise levels, noise from a parabolic trough or power tower facility with TES could cause minor impacts on wildlife in the nearby specially designated areas. These noise levels could be audible and affect soundscapes in Death Valley NP.

Dish Engines

The reduced size of the proposed Amargosa Valley SEZ would decrease the maximum potential number of 25-kW dish engines to 30,148. The estimated noise level at the nearest residence about 5.9 mi (9.5 km) away would be about 35 dBA, lower than the typical daytime mean rural background level of 40 dBA and, for 12 hours of operation, about 41 dBA L_{dn}, well below the EPA guideline of 55 dBA L_{dn} for residential areas. The conclusion of the Draft Solar PEIS that noise from dish engines could cause minor adverse impacts on the nearest residence, depending on background noise levels and meteorological conditions, remains valid.

As stated above under construction impacts, for this Final Solar PEIS an approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. Estimated noise levels from operation of a dish engine solar facility, for which dish engines are placed all over the SEZ, could produce noise levels of 38 and 44 dBA at the boundaries of Death Valley NP and Big Dune ACEC, respectively. These levels are below the significance threshold; thus the conclusion in the Draft Solar PEIS that adverse

impacts on wildlife in the specially designated areas are unlikely remains valid. However, as discussed in Section 5.10.2, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). Because of these impacts and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from construction noise would have to be considered on a site-specific basis. For potential impacts at lower noise levels, noise from a dish engine facility could cause minor impacts on wildlife in the nearby specially designated areas. These noise levels could be audible and affect soundscapes in Death Valley NP.

Changes in the boundaries of the proposed Amargosa Valley SEZ would not affect the discussions of vibration, transformer and switchyard noise, and transmission line corona discharge presented in the Draft Solar PEIS. Noise impacts from these sources would be minimal to negligible.

11.1.15.2.3 Decommissioning and Reclamation

The discussion in the Draft Solar PEIS remains valid. Decommissioning and reclamation activities would be of short duration, and their potential noise impacts would be minor and temporary. Potential noise and vibration impacts on surrounding communities would be correspondingly less than those for construction activities.

11.1.15.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce noise impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some protection from noise impacts.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes in the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for noise impacts in the proposed Amargosa Valley SEZ have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.16 Paleontological Resources

11.1.16.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid, with the following updates:

- The residual deposits located on the southern edge and southwest corner of the SEZ are no longer in the SEZ.

- The BLM Regional Paleontologist may have additional information regarding the paleontological potential of the SEZ and be able to update the temporary assignment of Potential Fossil Yield Classification (PFYC) Class 2 as used in the Draft Solar PEIS.

11.1.16.2 Impacts

The assessment provided in the Draft Solar PEIS remains valid. Few, if any, impacts on significant paleontological resources are likely to occur in the proposed Amargosa Valley SEZ. However, a more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted.

11.1.16.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on paleontological resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Impacts would be minimized through the implementation of required programmatic design features, including a stop-work stipulation in the event that paleontological resources are encountered during construction, as described in Section A.2.2 of Appendix A.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses based on changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for paleontological resources have been identified. If the geologic deposits in the proposed Amargosa Valley SEZ are determined to be thick alluvial deposits as described in Section 11.1.16.1 of the Draft Solar PEIS and are classified as PFYC Class 2, mitigation of paleontological resources within the SEZ is not likely to be necessary. The need for and nature of any SEZ-specific design features for the remaining portion of the SEZ would depend on the results of future paleontological investigations. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

As additional information on paleontological resources (e.g., from regional paleontologists or from new surveys) becomes available, the BLM will post the data to the project Web site (http://solareis.anl.gov) for use by applicants, the BLM, and other stakeholders.

11.1.17 Cultural Resources

11.1.17.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid, with the following updates:

- The percentage of area that has been surveyed (142 acres [0.6 km^2]) in the proposed Amargosa Valley SEZ has been reduced from 3% to 1.6%.

- The number of archaeological sites located in the SEZ has been reduced from four to one. The one remaining site, a railroad siding, has been determined to be not eligible for listing in the *National Register of Historic Places* (NRHP).

- The distance from the SEZ boundary to the Keane Wonder Mine has increased from 8 mi (13 km) to 12 mi (19 km).

- The distance from the SEZ boundary to Death Valley NP has been increased from 1 mi (1.6 km) to 5 mi (8 km).

- A tribally approved ethnographic study of the proposed Amargosa Valley SEZ study area was conducted (SWCA and University of Arizona 2011), and a summary of that study was presented in the Supplement to the Draft Solar PEIS. Several areas of flaked stone were noted, and a number of new cultural landscapes, important water sources, geological features, and traditional plants and animals were identified. (See Section 11.1.18 for a description of the latter.) The completed ethnographic study is available in its entirety on the Solar PEIS Web site (http://solareis.anl.gov).

- Big Dune and Eagle Mountain are important geologic features that figure into the traditional stories and songs of the Pahrump Paiute and Timbisha Shoshone Tribes.

- For the Southern Paiute, the Salt Song Trail and associated ceremonial areas pass through or are in the vicinity of the SEZ.

- The Amargosa River is one of the most culturally important features in or near the proposed Amargosa Valley SEZ, and Black Mountain, north of the SEZ, is the source of the river and a powerful ceremonial volcanic mountain.

- Naturally shaped volcanic stones with circular depressions were identified by Tribal members on the valley floor. These stones are believed to have once been used as prayer shrines for individuals travelling through the area.

- Tribal members believe that the prehistoric artifacts in the SEZ were left there intentionally as part of prayer rituals and should be left alone.

- Additional information may be available to characterize the area surrounding the proposed SEZ in the future (after the Final Solar PEIS is completed), as follows:
  - Results of a Class I literature file search to better understand (1) the site distribution pattern in the vicinity of the SEZ, (2) trail networks through

existing ethnographic reports, and (3) overall cultural sensitivity of the landscape.

- Results of a Class II stratified random sample survey of 424 acres (1.7 km^2) or roughly 5% of the SEZ. The Class II survey is being conducted by the BLM to meet its ongoing Section 110 responsibilities under the National Historic Preservation Act (NHPA). The objectives of the Class II surveys currently under contract are to reliably predict the density, diversity, and distribution of archaeological sites within each SEZ in Arizona, California, and Nevada and to create sensitivity zones based on projected site density, complexity, likely presence of human burials, and/or other tribal concerns. The BLM will continue to request funding to support additional Class II sample inventories in the SEZ areas. Areas of interest, such as dune areas and along washes, as determined through a Class I review, and, if appropriate, some subsurface testing of dune and/or colluvium areas should be considered in sampling strategies of future surveys.
- Continuation of government-to-government consultation as described in Section 2.4.3 of the Supplement to the Draft Solar PEIS and Instruction Memorandum (IM) 2012-032 (BLM 2011b), including follow-up to recent ethnographic studies covering some SEZs in Nevada and Utah with tribes not included in the original studies to determine whether those tribes have similar concerns.

11.1.17.2 Impacts

As stated in the Draft Solar PEIS, direct impacts on significant cultural resources could occur in the proposed Amargosa Valley SEZ; however, further investigation is needed. The following updates are based on the revised boundaries of the SEZ:

- One known non-NRHP eligible site would potentially be affected within the reduced footprint of the SEZ, as well as the flaked stone sites identified by Tribal members.

- Impacts on the Salt Song and Southern Fox Trails are possible.

- Volcanic stone prayer shrines on the valley floor could be affected by solar energy development.

11.1.17.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on cultural resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Programmatic design features assume that the necessary surveys, evaluations, and consultations will occur.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses based on changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for cultural resources have been identified. SEZ-specific design features would be determined in consultation with the Nevada State Historic Preservation Office (SHPO) and affected tribes and would depend on the results of future investigations. Information in the ethnographic reports would suggest that impacts on the Amargosa River, the Salt Song and Southern Fox Trails, and culturally sensitive plant and animal species would need to be avoided, minimized, or otherwise mitigated if solar energy development were to be initiated in the proposed Amargosa Valley SEZ. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.18 Native American Concerns

11.1.18.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid, with the following updates:

- A tribally approved ethnographic study of the proposed Amargosa Valley SEZ study area was conducted (SWCA and University of Arizona 2011), and a summary of that study was presented in the Supplement to the Draft Solar PEIS. Several areas of flaked stone were noted, and a number of new cultural landscapes, important water sources, geological features, and traditional plants and animals were identified. The completed ethnographic study is available in its entirety on the Solar PEIS Web site (http://solareis.anl.gov).

- The tribal representatives from both the Pahrump Paiute Tribe and the Timbisha Shoshone Tribe believe that all the cultural resources and landscapes within the Amargosa SEZ are important in helping both tribes to understand their past, present, and future.

- The Paiute are concerned with the effects on their cultural and spiritual lifeways of harnessing and distributing the sun's energy.

- The tribal representatives of both the Pahrump Paiute Tribe and the Timbisha Shoshone Tribe believe that the Amargosa Valley is a sacred space that should be managed as a spiritual cultural landscape and would like to see the areas significant to each tribe (e.g., Big Dune, Eagle Mountain, and Mount Charleston) nominated as traditional cultural properties.

- Big Dune has been identified by both tribes as an important landscape feature, a geologic anomaly known as a "singing dune." To the Paiute, it acts as a geographic marker to travelers and as a boundary and guide for spirits travelling to the afterlife along the Salt Song Trail.

- Eagle Mountain, located southeast of the SEZ, is important in both tribes' spiritual beliefs. It is the origin place of the Western Shoshone and a stop along the Salt Song Trail for the Southern Paiute.

- Mount Charleston, located southeast of the proposed SEZ in the Spring Mountains, has been identified as a creation place for the Southern Paiute.

- The Amargosa River and its origin point, Black Mountain, have been identified by tribal representatives of both groups as extremely important features. The mountain possesses *Puha* (power). As the river flows from the mountain, it carries *Puha* over the landscape, connecting other landscapes, elements, and people. Black Mountain is linked to ceremonial pilgrimages by both Shoshone and Paiute medicine people. In order to get to Black Mountain, a system of trails was followed, passing important ritual areas. In addition, Black Mountain contains a series of spiritual trails traveled by supernatural beings.

- The proposed Amargosa Valley SEZ is located on the path of the annual Shoshone spiritual run, *Mavaa Mia.* During these runs, the Shoshone communicate with the landscape, and it is important that they have unobstructed views to do so.

- Geological features identified by tribal representatives as possessing importance in stories, songs, ceremonies, and Native American lifeways include Devils Hole, Fortymile Canyon, Bare Mountain, Spring Mountains, and Ash Meadows.

- Two "Regions of Refuge" were identified during the ethnographic study: the Black Mountain area and the Spring Mountains. As Europeans encroached on Shoshone and Paiute traditional lands, the tribes retreated to these resource-rich areas.

- Both tribes have identified a number of historical events that occurred in the valley that contribute to the history of their tribes. These include the disruption of irrigation agriculture during European contact and the further disruption of lifeways from the California Gold Rush and the influx of "Forty-niners," other mining activities, the establishment of mining and ranching communities, and the development of railroads and highways. Native Americans continued to live in the area surrounding the Amargosa Valley during these activities and eventually assimilated into European communities, working in mining camps and on the railroad.

- The Pahrump Paiute representatives maintain that all geological features, artifacts, and archaeological sites have been purposely placed in their present locations and purposely revealed for present and future generations.

- The following traditional plants have been identified in addition to those listed in Table 11.1.18.1-2 of the Draft Solar PEIS: big sagebrush (*Artemisia tridentate*), blackbrush (*Coleogyne ramosissima*), brittlebush (*Encelia farinose*), desert prince's plume/Indian spinach (*Stanleya pinnata*), desert saltbush (*Atriplex polycarpa*), desert trumpet (*Eriogonum inflatum*), spiny chorizanthe (*Chorizanthe rigida*), shadscale (*Atriplex confertifolia*), and white bursage (*Ambrosia dumosa*).

- The following traditional animals have been identified in addition to those listed in Table 11.1.18.1-3 of the Draft Solar PEIS: jackrabbit (*Lepus* sp.), mountain lion (*Puma concolor*), American kestral (*Falco sparverius*), horned lark (*Eremophilia alpestris*), killdeer (*Charadrius vociferous*), loggerhead strike (*Lanius ludovicianus*), red-tailed hawk (*Buteo jamaicensis*), rock wren (*Salpinctes obsoletus*), Say's pheobe (*Sayornis saya*), turkey vulture (*Cathartes aura*), and western kingbird (*Tyrannus verticalis*).

11.1.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. During past project-related consultation, the Western Shoshone, Southern Paiute, and Owens Valley Paiute have expressed concerns over project impacts on a variety of resources. While no comments specific to the Amargosa Valley SEZ have been received from Native American tribes to date, the Big Pine Valley Tribe of the Owens Valley has commented on the scope of this PEIS. The tribe recommends that the BLM preserve undisturbed lands intact and that recently disturbed lands, such as abandoned farm fields, railyards, mines, and airfields, be given primary consideration for solar energy development. Potential impacts on existing water supplies were also a primary concern (Moose 2009). The construction of utility-scale solar energy facilities within the proposed SEZ would result in the destruction of some plants important to Native Americans and the habitat of some traditionally important animals.

In addition to the impacts discussed in the Draft Solar PEIS, the ethnographic study conducted for the proposed Amargosa Valley SEZ identified the following impacts:

- Development within the proposed Amargosa Valley SEZ could result in visual impacts on Big Dune, Eagle Mountain, Black Mountain, Devils Hole, Fortymile Canyon, Bare Mountain, the Spring Mountains, Ash Meadows, and other culturally important and prominent geological features.

- Development within the proposed Amargosa Valley SEZ will have a direct impact on *Mavaa Mia*, the annual Shoshone spiritual run.

- Development within the proposed Amargosa Valley SEZ may affect the spiritual connection that both tribes have to water, as the disturbance of the Amargosa River may cause a disturbance in the *Puha* that flows through it. Both tribes are concerned that energy development within the area will greatly

reduce the amount of water that is available to the Tribe and to plants and animals in the valley.

- Development of a project area within the SEZ will directly affect culturally important plant and animal resources, as it will likely require the grading of the project area and removal of vegetation.

- OHV use and nonvehicular recreational activities, such as hiking, and vehicle traffic, have been identified by the tribal representatives as current impacts on cultural resources, cultural landscapes, traditionally important plants and animals, and water sources (SWCA and University of Arizona 2011).

11.1.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

Tribal representatives believe that solar energy development within the Amargosa Valley SEZ will adversely affect identified and unidentified archaeological resources, water sources, culturally important geological features, naturally occurring prayer rocks, and traditional plant, mineral, and animal resources (SWCA and University of Arizona 2011). Required programmatic design features that would reduce impacts on Native American concerns are described in Appendix A of this Final Solar PEIS. For example, impacts would be minimized through the avoidance of sacred sites, water sources, and tribally important plant and animal species. Programmatic design features require that the necessary surveys, evaluations, and consultations would occur. The tribes would be notified regarding the results of archaeological surveys, and they would be contacted immediately upon any discovery of Native American human remains and associated cultural items.

On the basis of the impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes in SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features to address Native American concerns have been identified. The need for and nature of SEZ-specific design features would be determined during government-to-government consultation with the affected tribes as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis. Potential culturally significant sites and landscapes in the vicinity of the SEZ associated with the Fortymile Canyon, Bare Mountain, Eagle Mountain, Big Dune, Amargosa River, Ash Meadows, and Salt Song and Southern Fox Trails, as well as rock art sites, clay, salt, and pigment sources, water resources, and plant and animal resources, should be considered and discussed during consultation.

11.1.19 Socioeconomics

11.1.19.1 Affected Environment

Although the boundaries of the Amargosa Valley SEZ have been changed, the socioeconomic region of influence (ROI), the area in which site employees would live and spend

their wages and salaries and into which any in-migration would occur, includes the same counties and communities as described in the Draft Solar PEIS, meaning that no changes in the affected environment information given in the Draft Solar PEIS are required.

11.1.19.2 Impacts

Socioeconomic resources in the ROI around the SEZ could be affected by solar energy development through the creation of direct and indirect employment and income, the generation of direct sales and income taxes, SEZ acreage rental and capacity payments to BLM, the in-migration of solar facility workers and their families, and impacts on local housing markets and on local community service employment. The impact assessment provided in the Draft Solar PEIS remains valid, with the following updates.

11.1.19.2.1 Solar Trough

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of solar trough technologies would be up to 2,922 jobs (Table 11.1.19.2-1). Construction activities would constitute 0.2% of total ROI employment. A solar facility would also produce $180.6 million in income; direct sales taxes would be $1.2 million.

Given the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available within the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 743 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units would not be expected to be large, with up to 257 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.5% of the vacant rental units expected to be available in the ROI.

In addition to the potential impact on housing markets, in-migration would affect community service employment (education, health, and public safety). An increase in such employment would be required to meet existing levels of service in the ROI. Accordingly, up to six new teachers, two physicians, and two public safety employees (career firefighters and uniformed police officers) would be required in the ROI. These increases would represent less than 0.1% of total ROI employment expected in these occupations.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using solar trough technologies would be up to 444 jobs (Table 11.1.19.2-1). Such a solar facility would also produce $16.8 million in income; direct sales taxes would be $0.2 million. On the basis of fees established by the BLM (BLM 2010), acreage–related fees would be $0.5 million, and solar generating capacity fees, at least $8.9 million.

Operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 38 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units would not be expected to be large, with up to 23 owner-occupied units expected to be occupied in the ROI.

No new community service employment would be required to meet existing levels of service in the ROI.

11.1.19.2.2 Power Tower

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of power tower technologies would be up to 1,164 jobs (Table 11.1.19.2-2). Construction activities would constitute 0.1% of total ROI employment. Such a solar facility would also produce $71.9 million in income; direct sales taxes would be $0.5 million.

Given the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 296 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units would not be expected to be large, with up to 102 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.2% of the vacant rental units expected to be available in the ROI.

In addition to the potential impact on housing markets, in-migration would affect community service (education, health, and public safety) employment. An increase in such employment would be required to meet existing levels of service in the ROI. Accordingly, up to three new teachers, one physician, and one public safety employee would be required in the ROI.

TABLE 11.1.19.2-1 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Amargosa Valley SEZ as Revised with Trough Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	1,744	296
Total	2,922	444
Income[c]		
Total	180.6	16.8
Direct state taxes[c,d]		
Sales	1.2	0.2
BLM payments[c]		
Acreage-related fee	NA[e]	0.5
Capacity fee[f]	NA	8.9
In-migrants (no.)	743	38
Vacant housing[g] (no.)	257	23
Local community service employment		
Teachers (no.)	6	0
Physicians (no.)	2	0
Public safety (no.)	2	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 600 MW (corresponding to 3,000 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 1,357 MW.

[c] Values are reported in $ million 2008.

[d] There is currently no individual income tax in Nevada.

[e] NA = not applicable.

[f] The BLM annual capacity payment was based on a fee of $6,570/MW, established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010), assuming a solar facility with no storage capability, and full build-out of the site. Projects with three or more hours of storage would generate higher payments, based on a fee of $7,884/MW.

[g] Construction activities would affect vacant rental housing; operations activities would affect vacant owner-occupied housing.

TABLE 11.1.19.2-2 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Amargosa Valley SEZ as Revised with Power Tower Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	695	153
Total	1,164	202
Income[c]		
Total	71.9	7.0
Direct state taxes[c]		
Sales	0.5	<0.1
BLM payments[c,d]		
Acreage-related fee	NA[e]	0.5
Capacity fee[f]	NA	5.0
In-migrants (no.)	296	19
Vacant housing[g] (no.)	102	12
Local community service employment		
Teachers (no.)	3	0
Physicians (no.)	1	0
Public safety (no.)	1	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 333 MW (corresponding to 3,000 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 754 MW.

[c] Values are reported in $ million 2008.

[d] There is currently no individual income tax in Nevada.

[e] NA = not applicable.

[f] The BLM annual capacity payment was based on a fee of $6,570/MW, established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010), assuming a solar facility with no storage capability, and full build-out of the site. Projects with three or more hours of storage would generate higher payments, based on a fee of $7,884/MW.

[g] Construction activities would affect vacant rental housing; operations activities would affect vacant owner-occupied housing.

These increases would represent less than 0.1% of total ROI employment expected in these occupations.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using power tower technologies would be 202 jobs (Table 11.1.19.2-2). Such a solar facility would also produce $7.0 million in income; direct sales taxes would be less than $0.1 million. On the basis of fees established by the BLM (BLM 2010), acreage–related fees would be $0.5 million, and solar generating capacity fees, at least $5.0 million.

Operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with 19 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units would not be expected to be large, with 12 owner-occupied units expected to be required in the ROI.

No new community service employment would be required to meet existing levels of service in the ROI.

11.1.19.2.3 Dish Engine

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of dish engine technologies would be up to 473 jobs (Table 11.1.19.2-3). Construction activities would constitute less than 0.1% of total ROI employment. Such a solar facility would also produce $29.2 million in income; direct sales taxes would be $0.2 million.

Given the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 120 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units would not be expected to be large, with up to 42 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.1 % of the vacant rental units expected to be available in the ROI.

TABLE 11.1.19.2-3 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Amargosa Valley SEZ as Revised with Dish Engine Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	282	148
Total	473	196
Income[c]		
Total	29.2	6.8
Direct state taxes[c]		
Sales	0.2	<0.1
BLM payments[c,d]		
Acreage-related fee	NA[e]	0.5
Capacity fee[f]	NA	5.0
In-migrants (no.)	120	19
Vacant housing[g] (no.)	42	12
Local community service employment		
Teachers (no.)	1	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 333 MW (corresponding to 3,000 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 754 MW.

[c] Values are reported in $ million 2008.

[d] There is currently no individual income tax in Nevada.

[e] NA = not applicable.

[f] The BLM annual capacity payment was based on a fee of $6,570/MW, established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010), assuming a solar facility with no storage capability, and full build-out of the site. Projects with three or more hours of storage would generate higher payments, based on a fee of $7,884/MW.

[g] Construction activities would affect vacant rental housing; operations activities would affect vacant owner-occupied housing.

In addition to the potential impact on housing markets, in-migration would affect community service (education, health, and public safety) employment. An increase in such employment would be required to meet existing levels of service in the ROI. Accordingly, up to one new teacher would be required in the ROI. These increases would represent less than 0.1% of total ROI employment expected in these occupations.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using dish engine technologies would be 196 jobs (Table 11.1.19.2-3). Such a solar facility would also produce $6.8 million in income; direct sales taxes would be less than $0.1 million. On the basis of fees established by the BLM (BLM 2010), acreage–related fees would be $0.5 million, and solar generating capacity fees, at least $5.0 million.

Operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 19 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units would not be expected to be large, with up to 12 owner-occupied units expected to be required in the ROI.

No new community service employment would be required to meet existing levels of service in the ROI.

11.1.19.2.4 Photovoltaic

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of PV technologies would be up to 221 jobs (Table 11.1.19.2-4). Construction activities would constitute less than 0.1% of total ROI employment. Such a solar development would also produce $13.7 million in income; direct sales taxes would be $0.1 million.

Given the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 56 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units would not be expected to be large, with 19 rental units expected to be occupied in

TABLE 11.1.19.2-4 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Amargosa Valley SEZ as Revised with PV Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	132	15
Total	221	20
Income[c]		
Total	13.7	0.7
Direct state taxes[c]		
Sales	0.1	<0.1
BLM payments[c,d]		
Acreage-related fee	NA[e]	0.5
Capacity fee[f]	NA	4.0
In-migrants (no.)	56	2
Vacant housing[g] (no.)	19	1
Local community service employment		
Teachers (no.)	0	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 333 MW (corresponding to 3,000 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 754 MW.

[c] Values are reported in $ million 2008.

[d] There is currently no individual income tax in Nevada.

[e] NA = data not applicable.

[f] The BLM annual capacity payment was based on a fee of $5,256/MW, established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010), assuming full build-out of the site.

[g] Construction activities would affect vacant rental housing; operations activities would affect owner-occupied housing.

the ROI. This occupancy rate would represent less than 0.1% of the vacant rental units expected to be available in the ROI.

No new community service employment would be required to meet existing levels of service in the ROI.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using PV technologies would be 20 jobs (Table 11.1.19.2-4). Such a solar facility would also produce $0.7 million in income; direct sales taxes would be less than $0.1 million. On the basis of fees established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010), acreage–related fees would be $0.5 million, and solar generating capacity fees, at least $4.0 million.

Operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with two persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units would not be expected to be large, with one owner-occupied unit expected to be required in the ROI.

No new community service employment would be required to meet existing levels of service in the ROI.

11.1.19.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce socioeconomic impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will reduce the potential for socioeconomic impacts during all project phases.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features to address socioeconomic impacts in the proposed Amargosa Valley SEZ have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.20 Environmental Justice

11.1.20.1 Affected Environment

The data presented in the Draft Solar PEIS have not substantially changed due to the change in boundaries of the proposed Amargosa Valley SEZ. There are no minority or low-income populations in the Nevada or California portions of the 50-mi (80-km) radius of the SEZ taken as a whole. However, because of the changes to the SEZ boundaries, revised data on minority and low-income populations within a 50-mi (80-km) radius of the SEZ are presented in Table 11.1.20.1-1 and are discussed below.

The data in Table 11.1.20.1-1 show the minority and low-income composition of the total population located in the proposed Amargosa Valley SEZ based on 2000 Census data

TABLE 11.1.20.1-1 Minority and Low-Income Populations within the 50-mi (80-km) Radius Surrounding the Proposed Amargosa Valley SEZ as Revised

Parameter	California	Nevada
Total population	2,034	31,656
White, non-Hispanic	1,570	26,283
Hispanic or Latino	245	2,751
Non-Hispanic or Latino minorities	219	2,622
One race	162	1,858
Black or African American	2	1,001
American Indian or Alaskan Native	132	406
Asian	17	280
Native Hawaiian or Other Pacific Islander	9	95
Some other race	2	76
Two or more races	57	764
Total minority	464	5,373
Low-income	212	3,293
Percentage minority	22.8	17.0
State percentage minority	53.3	34.8
Percentage low-income	10.5	11.2
State percentage low-income	14.2	10.5

Source: U.S Bureau of the Census (2009a,b).

(U.S. Bureau of the Census 2009a,b) and Council on Environmental Quality (CEQ) guidelines (CEQ 1997). Individuals identifying themselves as Hispanic or Latino are included in the table as a separate entry. However, because Hispanics can be of any race, this number also includes individuals identifying themselves as being part of one or more of the population groups listed in the table.

A large number of minority and low-income individuals are located in the 50-mi (80-km) area around the boundary of the SEZ. Within the 50-mi (80-km) radius in California, 22.8% of the population is classified as minority, while 10.5% is classified as low-income. However, the number of minority individuals does not exceed 50% of the total population in the area, and the number of minority individuals does not exceed the state average by 20 percentage points or more; thus, in aggregate, there is no minority population in the SEZ area based on 2000 Census data and CEQ guidelines. The number of low-income individuals does not exceed the state average by 20 percentage points or more and does not exceed 50% of the total population in the area; thus, in aggregate, there are no low-income populations in the SEZ.

In the Nevada portion of the 50-mi (80-km) radius, 17.0% of the population is classified as minority, while 11.2% is classified as low-income. The number of minority individuals does not exceed 50% of the total population in the area and the number of minority individuals does not exceed the state average by 20 percentage points or more; thus, in aggregate, there is no minority population in the SEZ area based on 2000 Census data and CEQ guidelines. The number of low-income individuals does not exceed the state average by 20 percentage points or more and does not exceed 50% of the total population in the area; thus, in aggregate, there are no low-income populations in the SEZ.

11.1.20.2 Impacts

Environmental justice concerns common to all utility-scale solar energy facilities are described in detail in Section 5.18 of the Draft Solar PEIS. The potentially relevant environmental impacts associated with solar facilities within the proposed Amargosa Valley SEZ include noise and dust during construction; noise and electromagnetic field (EMF) effects associated with operations; visual impacts of solar generation and auxiliary facilities, including transmission lines; access to land used for economic, cultural, or religious purposes; and effects on property values as areas of concern that might potentially affect minority and low-income populations.

Potential impacts on low-income and minority populations could be incurred as a result of the construction and operation of solar facilities involving each of the four technologies. Impacts are likely to be small, and there are no minority populations defined by CEQ guidelines (Section 11.1.20.1-1) within the 50-mi (80-km) radius around the boundary of the SEZ; this means that any adverse impacts of solar projects would not disproportionately affect minority populations. Because there are also no low-income populations within the 50-mi (80-km) radius, there would be no impacts on low-income populations.

11.1.20.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce potential environmental justice impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will reduce the potential for environmental justice impacts.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for environmental justice have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.21 Transportation

11.1.21.1 Affected Environment

The reduction in developable area of the SEZ does not change the information on affected environment provided in the Draft Solar PEIS.

11.1.21.2 Impacts

As stated in the Draft Solar PEIS, the primary transportation impacts are anticipated to be from commuting worker traffic. Single projects could involve up to 1,000 workers each day, with an additional 2,000 vehicle trips per day (maximum). This additional traffic on U.S. 95 would represent a two-thirds increase in traffic volume in the area of the SEZ. Because higher traffic volumes would be experienced during shift changes, traffic on U.S. 95 could experience moderate slowdowns during these time periods in the general area of the SEZ. Local road improvements would be necessary on any portion of U.S. 95 that might be developed to avoid overwhelming the local access roads near any site access point(s). Potential existing site access roads would require improvements, including asphalt pavement.

Solar development within the SEZ would affect public access along OHV routes that are designated open and available for public use. Although open routes crossing areas granted ROWs for solar facilities could be redesignated as closed (see Section 5.5.1 of the Draft Solar PEIS), a programmatic design feature has been included under Recreation (Section A.2.2.6.1 of Appendix A) that requires consideration of replacement of lost OHV route acreage and of access across and to public lands.

11.1.21.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce transportation impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. The programmatic design

features, including 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 SEZ. Depending on the location of solar facilities within the SEZ, more specific access locations and local road improvements could be implemented.

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features to address transportation impacts in the proposed Amargosa Valley SEZ have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

11.1.22 Cumulative Impacts

The analysis of potential impacts in the vicinity of the proposed Amargosa Valley SEZ presented in the Draft Solar PEIS is still generally applicable for this Final Solar PEIS, although the impacts would be decreased because the size of the developable area of the proposed SEZ has been reduced to 8,479 acres (34.3 km^2). Also, several previously pending projects now have been dropped (there are now only six pending projects). The following sections include an update to the information presented in the Draft Solar PEIS regarding cumulative effects for the proposed Amargosa Valley SEZ.

11.1.22.1 Geographic Extent of the Cumulative Impacts Analysis

The geographic extent of the cumulative impact analysis has not changed. The extent varies on the basis of the nature of the resource being evaluated and the distance at which the impact may occur (e.g., air quality impacts may have a greater geographic extent than visual resources impacts). Most of the lands around the Amargosa Valley SEZ are administered by the BLM, the USFWS, the NPS, the U.S. Department of Energy (DOE), and the DoD. The BLM administers approximately 28% of the lands within a 50-mi (80-km) radius of the SEZ.

11.1.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The Draft Solar PEIS included six other proposed SEZs in Nevada. Two of these, Delamar Valley and East Mormon Mountain, have been removed from consideration.

One project (the Amargosa Farm Road project) has been authorized within a 50-mi (80-km) radius of the proposed Amargosa Valley SEZ. Although the Amargosa Farm Road project has an authorized ROW application, additional case processing and environmental review will be required to consider a post-authorization request to change technology to PV.

There are also six pending ROW applications for solar facilities within 50 mi (80 km) of the Amargosa Valley SEZ that could generate up to 2,610 MW on public lands in Nevada

(see list in Appendix B of this Final Solar PEIS). However, these applications are in various stages of approval, and for many, environmental assessments have not been completed. Only the Amargosa North Solar Project adjacent to the southern boundary of the SEZ and the Lathrop Wells project, about 10 mi (16 km) southeast of the SEZ, have advanced to consideration as reasonably foreseeable actions (because there are firm near-term plans and environmental documentation has been completed). As of the end of October 2011, the other pending solar applications were not considered reasonably foreseeable future actions.

The list of reasonably foreseeable future actions related to energy production and distribution, including potential solar energy projects under the proposed action near the proposed Amargosa Valley SEZ, has been updated and is presented in Table 11.1.22.2-1. Projects listed in the table are shown in Figure 11.1.22.2-1. One project not previously described in the Draft Solar PEIS is described in the following section.

11.1.22.2.1 Lathrop Wells Solar Facility

Abengoa Solar, Inc., proposes to construct and operate a 250-MW parabolic trough solar generating facility, with an option to add a second 250-MW unit. The project may also include a 20-MW PV solar unit. The site is located on 5,336 acres (21.6 km^2) of BLM land in Amargosa Valley, 10 mi (16 km) southeast of the SEZ. The project would utilize a dry-cooling system to minimize water requirements (BLM 2012b).

11.1.22.2.2 Other Actions

The list of other major ongoing and foreseeable actions within 50 mi (80 km) of the proposed Amargosa Valley SEZ has been updated and is presented in Table 11.1.22.2-2.

11.1.22.3 General Trends

The information on general trends presented in the Draft Solar PEIS remains valid.

11.1.22.4 Cumulative Impacts on Resources

Total disturbance over 20 years in the proposed Amargosa Valley SEZ is assumed to be about 6,783 acres (27.5 km^2) (80% of the entire proposed SEZ). This development would contribute incrementally to the impacts from other past, present, and reasonably foreseeable future actions in the region as described in the Draft Solar PEIS. Primary impacts from development in the Amargosa Valley SEZ may include impacts on water quantity and quality, air quality, ecological resources such as habitat and species, cultural and visual resources, and on specially designated lands.

TABLE 11.1.22.2-1 Ongoing and Reasonably Foreseeable Future Actions Related to Energy Development and Distribution near the Proposed Amargosa Valley SEZ as Revised[a]

Description	Status	Resources Affected	Primary Impact Location
Approved and Priority Solar Energy Projects on BLM-Administered Land			
Amargosa Farm Road Solar Energy Project (Solar Millennium) (NVN-84359), **484-MW, originally planned as parabolic trough; converting to PV**, **6,320 total acres[b,c]**	**ROD November 15, 2010**	Terrestrial habitats, wildlife	6 mi[d] southeast of the SEZ
Amargosa North Solar Project (NVN-84465), 150-MW PV, 7,500 acres	NOI December 14, 2009	Terrestrial habitats, wildlife	Adjacent to the SEZ
Lathrop Wells Solar Project (Abengoa Solar) (NVN-86571), up to 500-MW parabolic trough, possibly 20-MW PV, 5,336 acres	NOI July 15, 2010	Terrestrial habitats, Wildlife	10 mi southeast of the SEZ
Transmission and Distribution Systems			
138-kV transmission line	Operating		Corridor passes adjacent to the SEZ

[a] Projects with status changed from that given in the Draft Solar PEIS are shown in bold text.

[b] See SEIA (2011) for details.

[c] To convert acres to km^2, multiply by 0.004047.

[d] To convert mi to km, multiply by 1.6093.

Activities in the region that will contribute to cumulative impacts include one additional solar project that that was not considered foreseeable at the time the Draft Solar PEIS was prepared: the Lathrop Wells Solar Facility. This will be a 250- to 500-MW dry-cooled parabolic trough facility.

Overall, the incremental cumulative impacts associated with the development of the proposed Amargosa Valley SEZ during construction, operation, and decommissioning are expected to be the same or less than those described in the Draft Solar PEIS. This is because the size of the Amargosa Valley SEZ has decreased by approximately 73%. Also, as a result of the change in technology from parabolic trough to PV in the nearby Amargosa Farm Road Solar

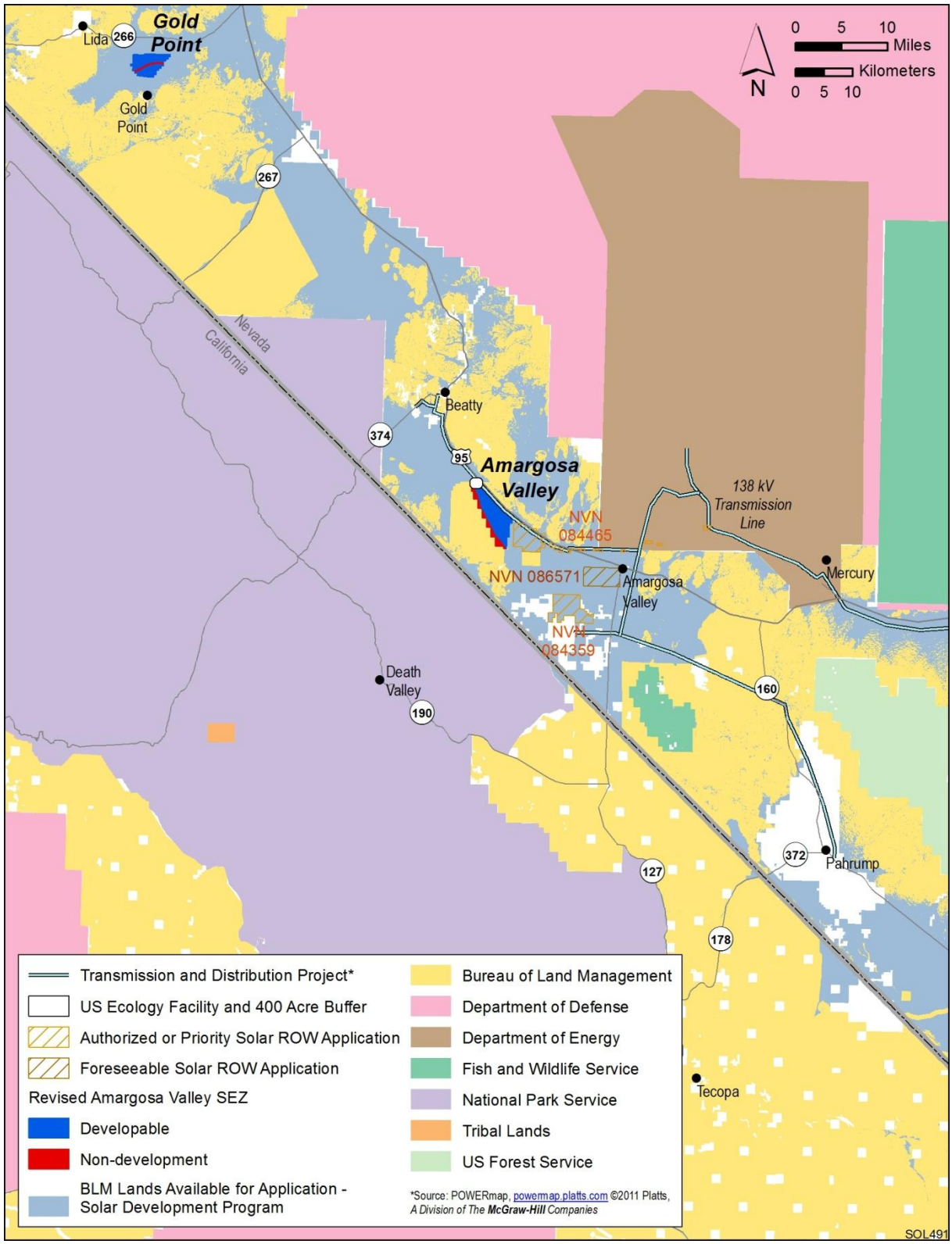

FIGURE 11.1.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Amargosa Valley SEZ as Revised (Source: Platts 2011)

TABLE 11.1.22.2-2 Other Major Actions near the Proposed Amargosa Valley SEZ as Revised[a]

Description	Status	Resources Affected	Primary Impact Location
Beatty Water and Sanitation District Water Treatment Plant	EA November 2009 **Operation began March 16, 2011[b]**	Soils, minor other impacts	10 mi[c] north of SEZ
Caliente Rail Realignment	FEIS June 2008	Terrestrial habitats, wildlife cultural resources	8 mi northeast of the SEZ
Hazardous Waste Management Facility	In operation since 1962	Soils, terrestrial habitats, noise, air quality	Adjacent to the SEZ

[a] Projects with status changed from that given in the Draft Solar PEIS are shown in bold text.

[b] See Stephens (2011) for details.

[c] To convert mi to km, multiply by 1.6093.

Energy Project, the projected water use impacts in the region are expected to be lower than projected in the Draft Solar PEIS.

11.1.23 Transmission Analysis

The methodology for this transmission analysis is described in Appendix G of this Final Solar PEIS. This section presents the results of the transmission analysis for the Amargosa Valley SEZ, including the identification of potential load areas to be served by power generated at the SEZ and the results of the dedicated-line transmission (DLT) analysis. Unlike Sections 11.1.2 through 11.1.22, this section is not an update of previous analysis for the Amargosa Valley SEZ; this analysis was not presented in the Draft Solar PEIS. However, the methodology and a test case analysis were presented in the Supplement to the Draft Solar PEIS. Comments received on the material presented in the Supplement were used to improve the methodology for the assessment presented in this Final Solar PEIS.

On the basis of its size, the assumption of a minimum of 5 acres (0.02 km^2) of land required per MW, and the assumption of a maximum of 80% of the land area developed, the Amargosa Valley SEZ is estimated to have the potential to generate 1,357 MW of marketable solar power at full build-out.

11.1.23.1 Identification and Characterization of Load Areas

The primary candidates for Amargosa Valley SEZ load areas are the major surrounding cities. Figure 11.1.23.1-1 shows the possible load areas for the Amargosa Valley SEZ and the estimated portion of their market that could be served by solar generation. Possible load areas for the Amargosa Valley SEZ include Phoenix, Arizona; Salt Lake City, Utah; Las Vegas and Reno, Nevada; and Los Angeles, San Jose, San Francisco, Oakland, and Sacramento, California.

The two load area groups examined for the Amargosa Valley SEZ are as follows:

1. Las Vegas, Nevada; and Los Angeles, California; and

2. Las Vegas, Nevada; and Phoenix, Arizona.

Figures 11.1.23.1-2 shows the most economically viable transmission scheme for the Amargosa Valley SEZ (transmission scheme 1), and Figure 11.1.23.1-3 shows an alternative transmission scheme (transmission scheme 2) that represents a logical choice should transmission scheme 1 be infeasible. As described in Appendix G, the alternative shown in transmission scheme 2 represents the optimum choice if one or more of the primary linkages in transmission scheme 1 are excluded from consideration. The groups provide for linking loads along alternative routes so that the SEZ's output of 1,357 MW could be fully allocated.

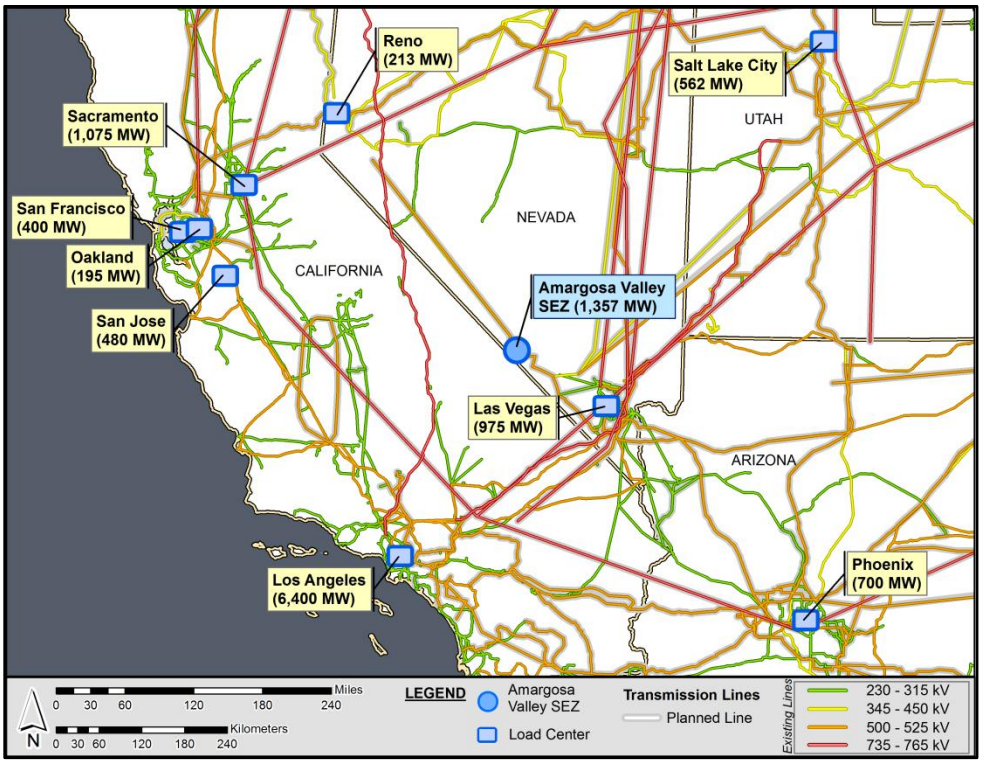

FIGURE 11.1.23.1-1 Location of the Proposed Amargosa Valley SEZ and Possible Load Areas (Source for background map: Platts 2011)

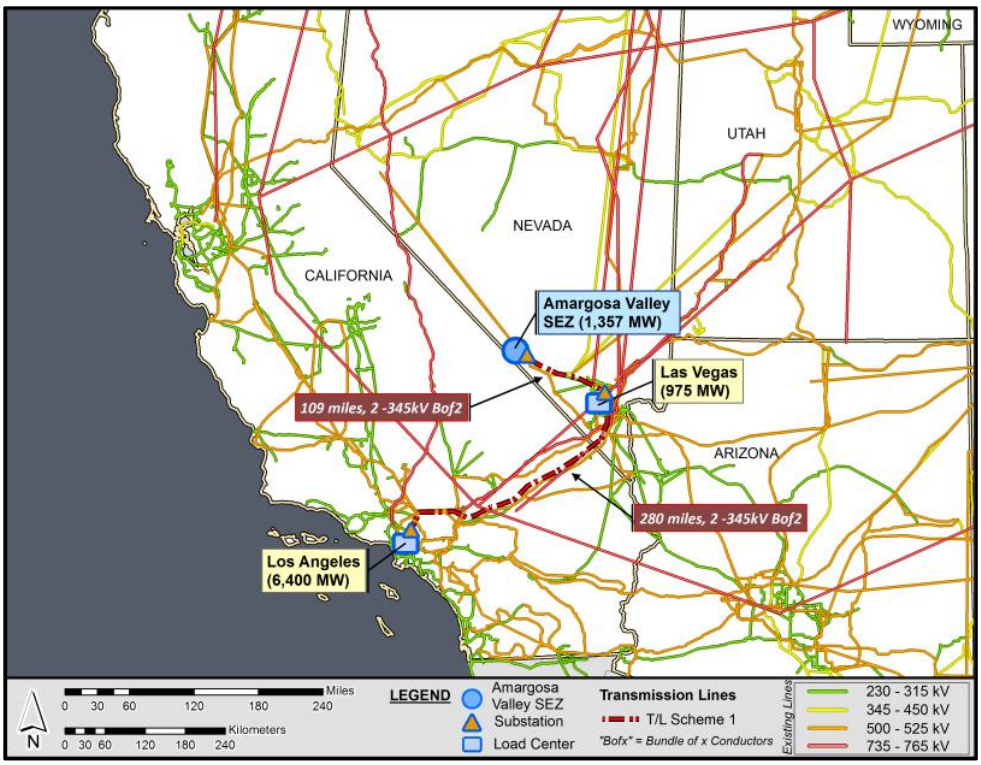

FIGURE 11.1.23.1-2 Transmission Scheme 1 for the Proposed Amargosa Valley SEZ (Source for background map: Platts 2011)

Table 11.1.23.1-1 summarizes and groups the load areas according to their associated transmission scheme and provides details on how the megawatt load for each area was estimated.

11.1.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the Amargosa Valley SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The new transmission lines(s) would directly convey the 1,357-MW output of the Amargosa Valley SEZ to the prospective load areas for each possible transmission scheme. The approach also assumes that all existing transmission lines in the Western Electricity Coordinating Council (WECC) region are saturated and have little or no available capacity to accommodate the SEZ's output throughout the entire 10-year study horizon.

Figures 11.1.23.1-2 and 11.1.23.1-3 display the pathways that new dedicated lines might follow to distribute solar power generated at the Amargosa Valley SEZ via the two identified transmission schemes described in Table 11.1.23.1-1. These pathways parallel existing 500-, 345-, 230-kV, and/or lower voltage lines. The intent of following existing lines is to avoid pathways that may be infeasible due to topographical limitations or other concerns.

FIGURE 11.1.23.1-3 Transmission Scheme 2 for the Proposed Amargosa Valley SEZ (Source for background map: Platts 2011)

For transmission scheme 1, a new line would be constructed to connect with Las Vegas (975 MW) and Los Angeles (6,400 MW), so that the 1,357-MW output of the Amargosa Valley SEZ could be fully utilized by these two load centers (Figure 11.1.23.1-2). This particular scheme requires two segments. One segment extends to the southeast from the SEZ to Las Vegas (975 MW) over a distance of about 109 mi (175 km). This segment would require a double-circuit 345-kV (2-345 kV) bundle of two conductors (Bof2) transmission line design based on engineering and operational considerations. The second segment extends to the southwest from Las Vegas (975 MW) to Los Angeles (6,400 MW) over a distance of about 280 mi (451 km). This segment would require a double-circuit 345-kV bundle of two conductors (Bof2) transmission line design. In general, the transmission configuration options were determined using the line "loadability" curve provided in American Electric Power's *Transmission Facts* (AEP 2010). Appendix G documents the line options used for this analysis and describes how the load area groupings were determined.

For transmission scheme 2 serving load centers to the southeast, Figure 11.1.23.1-3 shows that new lines would be constructed to connect with Las Vegas (975 MW) and Phoenix (700 MW), so that the 1,357-MW output of the Amargosa Valley SEZ could be fully utilized by these two load centers. This scheme requires two segments. The first segment extends to the southeast from the SEZ to Las Vegas (975 MW) over a distance of about 109 mi (175 km). This segment would require a double-circuit 345-kV bundle of two (Bof2) transmission line design.

TABLE 11.1.23.1-1 Candidate Load Area Characteristics for the Proposed Amargosa Valley SEZ

Transmission Scheme	City/Load Area Name	Position Relative to SEZ	2010 Population[c]	Estimated Total Peak Load (MW)	Estimated Peak Solar Market (MW)
1	Las Vegas, Nevada[a]	Southeast	1,950,000	4,875	975
	Los Angeles, California[a]	Southwest	12,800,000	32,000	6,400
2	Las Vegas, Nevada[a]	Southeast	1,950,000	4,875	975
	Phoenix, Arizona[b]	Southeast	1,400,000	3,500	700

[a] The load area represents the metropolitan area (i.e., the identified city plus adjacent communities).

[b] The load area represents the city named.

[c] City and metropolitan area population data are from 2010 Census data (U.S. Bureau of the Census 2010).

The second segment runs about 294 mi (473 km) southeast from Las Vegas to Phoenix (700 MW). The second segment requires a double-circuit 345-kV bundle of two transmission line design.

Table 11.1.23.2-1 summarizes the distances to the various load areas over which new transmission lines would need to be constructed, as well as the assumed number of substations that would be required. One substation is assumed to be installed at each load area and an additional one at the SEZ. Thus, in general, the total number of substations per scheme is simply equal to the number of load areas associated with the scheme plus one. Substations at the load areas would consist of one or more step-down transformers, while the originating substation at the SEZ would consist of several step-up transformers. The originating substation would have a rating of at least 1,357 MW (to match the plant's output), while the combined-load substations would have a similar total rating of 1,357 MW. For schemes that require the branching of the lines, a switching substation is assumed to be constructed at the appropriate junction. In general, switching stations carry no local load but are assumed to be equipped with switching gears (e.g., circuit breakers and connecting switches) to reroute power as well as, in some cases, with additional equipment to regulate voltage.

Table 11.1.23.2-2 provides an estimate of the total land area disturbed for construction of new transmission facilities under each of the schemes evaluated. The most favorable transmission scheme with respect to minimizing costs and the area disturbed would be scheme 1, which would serve Las Vegas and Los Angeles. This scheme is estimated to potentially disturb about 8,284 acres (33.5 km^2) of land. The less favorable transmission scheme with respect to minimizing costs and the area disturbed would be scheme 2, which serves Las Vegas and Phoenix loads. For this scheme, the construction of new transmission lines and substations is estimated to disturb a land area on the order of 8,581 acres (34.7 km^2).

TABLE 11.1.23.2-1 Potential Transmission Schemes, Estimated Solar Markets, and Distances to Load Areas for the Proposed Amargosa Valley SEZ

Transmission Scheme	City/Load Area Name	Estimated Peak Solar Market (MW)[c]	Total Solar Market (MW)	Sequential Distance (mi)[c]	Total Distance (mi)[d]	Line Voltage (kV)	No. of Substations
1	Las Vegas, Nevada[a]	975	7,375	109	389	345	3
	Los Angeles, California[a]	6,400		280			
2	Las Vegas, Nevada[a]	975	1,675	109	403	345	3
	Phoenix, Arizona[b]	700		294			

[a] The load area represents the metropolitan area (i.e., the identified city plus adjacent communities).

[b] The load area represents the city named.

[c] From Table 11.1.23.1-1.

[d] To convert mi to km, multiply by 1.6093.

TABLE 11.1.23.2-2 Comparison of the Various Transmission Line Configurations with Respect to Land Use Requirements for the Proposed Amargosa Valley SEZ

Transmission Scheme	City/Load Area Name	Total Distance (mi)[c]	No. of Substations	Land Use (acres)[d]		
				Transmission Line	Substation	Total
1	Las Vegas, Nevada[a]	389	3	8,251.5	32.6	8,284.1
	Los Angeles, California[a]					
2	Las Vegas, Nevada[a]	403	3	8,548.5	32.6	8,581.1
	Phoenix, Arizona[b]					

[a] The load area represents the metropolitan area (i.e., the identified city plus adjacent communities).

[b] The load area represents the city named.

[c] To convert mi to km, multiply by 1.6093.

[d] To convert acres to km^2, multiply by 0.004047.

Table 11.1.23.2-3 shows the estimated net present value (NPV) of both transmission schemes and takes into account the cost of constructing the lines, the substations, and the projected revenue stream over the 10-year horizon. A positive NPV indicates that revenue more than offsets investments. This calculation does not include the cost of producing electricity.

The most economically attractive configuration (transmission scheme 1) has the highest positive NPV and serves Las Vegas and Los Angeles. The secondary case (transmission scheme 2), which excludes one or more of the primary pathways used in scheme 1, is less economically attractive and focuses on delivering power to the Las Vegas and Phoenix markets. For the assumed utilization factor of 20%, both options exhibit positive NPVs of similar magnitude, implying similar degrees of economic viability under the current assumptions.

Table 11.1.23.2-4 shows the effect of varying the value of the utilization factor on the NPV of the transmission schemes. It also shows that as the utilization factor is increased, the economic viability of the lines also increases. Utilization factors can be raised by allowing the new dedicated lines to market other power generation outputs in the region in addition to that of its associated SEZ.

The findings of the DLT analysis for the proposed Amargosa Valley SEZ are as follows:

- Transmission scheme 1, which identifies Las Vegas and Los Angeles as the primary markets, represents the most favorable option based on NPV and land use requirements. This configuration would result in new land disturbance of about 8,284 acres (33.5 km^2).

- Transmission scheme 2, which represents an alternative configuration, serves Las Vegas and Phoenix. This configuration would result in new land disturbance of about 8,581 acres (34.7 km^2).

TABLE 11.1.23.2-3 Comparison of Potential Transmission Lines with Respect to NPV (Base Case) for the Proposed Amargosa Valley SEZ

Transmission Scheme	City/Load Area Name	Present Value Transmission Line Cost ($ million)	Present Value Substation Cost ($ million)	Annual Sales Revenue ($ million)	Present Worth of Revenue Stream ($ million)	NPV ($ million)
1	Las Vegas, Nevada[a] Los Angeles, California[a]	972.5	89.6	237.7	1,835.8	773.8
2	Las Vegas, Nevada[a] Phoenix, Arizona[b]	1,007.5	89.6	237.7	1,835.8	738.8

[a] The load area represents the metropolitan area (i.e., the identified city plus adjacent communities).

[b] The load area represents the city named.

TABLE 11.1.23.2-4 Effects of Varying the Utilization Factor on the NPV of the Transmission Schemes for the Proposed Amargosa Valley SEZ

Transmission Scheme	City/Load Area Name	NPV ($ million) at Different Utilization Factors					
		20%	30%	40%	50%	60%	70%
1	Las Vegas, Nevada[a] Los Angeles, California[a]	774	1,692	2,610	3,527	4,445	5,363
2	Las Vegas, Nevada[a] Phoenix, Arizona[b]	739	1,657	2,272	3,492	4,410	5,328

[a] The load area represents the metropolitan area (i.e., the identified city plus adjacent communities).

[b] The load area represents the city named.

- Other load area configurations are possible but would be less favorable than scheme 1 in terms of NPV and, in most cases, also in terms of land use requirements. If new electricity generation at the proposed Amargosa SEZ is not sent to either of the two markets identified above, the potential upper-bound impacts in terms of cost would be greater.

- The analysis of transmission requirements for the Amargosa Valley SEZ would be expected to show lower costs and less land disturbance if solar-eligible load assumptions were increased, although the magnitude of those changes would vary due to a number of factors. In general, for cases such as the Amargosa Valley SEZ that show multiple load areas being served to accommodate the specified capacity, the estimated costs and land disturbance would be affected by increasing the solar-eligible load assumption. By increasing the eligible loads at all load areas, the transmission routing and configuration solutions can take advantage of shorter line distances and deliveries to fewer load areas, thus reducing costs and land disturbed. In general, SEZs that show the greatest number of load areas served and greatest distances required for new transmission lines (e.g., Riverside East) would show the greatest decrease in impacts as a result of increasing the solar-eligible load assumption from 20% to a higher percentage.

11.1.24 Impacts of the Withdrawal

The BLM is proposing to withdraw 9,737 acres (39 km^2) of public land comprising the proposed Amargosa Valley SEZ from settlement, sale, location, or entry under the general land laws, including the mining laws, for a period of 20 years (see Section 2.2.2.2.4 of the Final Solar PEIS). The public lands would be withdrawn, subject to valid existing rights, from settlement, sale, location, or entry under the general land laws, including the mining laws. This means that

the lands could not be appropriated, sold, or exchanged during the term of the withdrawal, and new mining claims could not be filed on the withdrawn lands. Mining claims filed prior to the segregation or withdrawal of the identified lands would take precedence over future solar energy development. The withdrawn lands would remain open to the mineral leasing, geothermal leasing, and mineral material laws, and the BLM could elect to lease the oil, gas, coal, or geothermal steam resources, or to sell common-variety mineral materials, such as sand and gravel, contained in the withdrawn lands. In addition, the BLM would retain the discretion to authorize linear and renewable energy ROWs on the withdrawn lands.

The purpose of the proposed land withdrawal is to minimize the potential for conflicts between mineral development and solar energy development for the proposed 20-year withdrawal period. Under the land withdrawal, there would be no mining-related surface development, such as the establishment of open pit mining, construction of roads for hauling materials, extraction of ores from tunnels or adits, or construction of facilities to process the material mined, that could preclude use of the SEZ for solar energy development. For the Amargosa Valley SEZ, the impacts of the proposed withdrawal on mineral resources and related economic activity and employment are expected to be negligible because the mineral potential of the lands within the SEZ is low (BLM 2012a). There has been no documented mining within the SEZ, and there are no known locatable mineral deposits within the land withdrawal area. According to the Legacy Rehost 2000 System (LR2000) (accessed in May 2012), there are no recorded mining claims within the land withdrawal area.

Although the mineral potential of the lands within the Amargosa Valley SEZ is low, the proposed withdrawal of lands within the SEZ would preclude many types of mining activity over a 20-year period, resulting in the avoidance of potential mining-related adverse impacts. Impacts commonly related to mining development include increased soil erosion and sedimentation, water use, generation of contaminated water in need of treatment, creation of lagoons and ponds (hazardous to wildlife), toxic runoff, air pollution, establishment of noxious weeds and invasive species, habitat destruction or fragmentation, disturbance of wildlife, blockage of migration corridors, increased visual contrast, noise, destruction of cultural artifacts and fossils and/or their context, disruption of landscapes and sacred places of interest to tribes, increased traffic and related emissions, and conflicts with other land uses (e.g., recreational).

11.1.25 References

Note to Reader: This list of references identifies Web pages and associated URLs where reference data were obtained for the analyses presented in this Final Solar PEIS. It is likely that at the time of publication of this Final Solar PEIS, some of these Web pages may no longer be available or their URL addresses may have changed. The original information has been retained and is available through the Public Information Docket for this Final Solar PEIS.

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11.1.26 Errata for the Proposed Amargosa Valley SEZ

This section presents corrections to material presented in the Draft Solar PEIS and the Supplement to the Draft. The need for these corrections was identified in several ways: through comments received on the Draft Solar PEIS and the Supplement to the Draft (and verified by the authors), through new information obtained by the authors subsequent to publication of the Draft Solar PEIS and the Supplement to the Draft, or through additional review of the original material by the authors. Table 11.1.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

TABLE 11.1.26-1 Errata for the Proposed Amargosa Valley SEZ (Section 11.1 of the Draft Solar PEIS and Section C.4.1 of the Supplement to the Draft Solar PEIS)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
11.1.11.2					All uses of the term "neotropical migrants" in the text and tables of this section should be replaced with the term "passerines."
11.1.15.2.1	11.1-262	21			"For the parabolic trough and power tower technologies..." should read "For construction activities associated with solar power technologies..."
C.4.1.5.11	C-159 through C-161				The California Desert National Conservation Area (CDNCA) was omitted from the discussion of sensitive visual resource areas that would be subject to moderate or strong visual contrast from solar development within the Amargosa Valley SEZ in Section C.4.1.5.11 of the Supplement. Because of the proximity of this resource area to the SEZ, the potential for open views of the SEZ, and the presence of elevated viewpoints, weak to strong visual contrasts could be observed by visitors to this area. This resource area consists of 25,919,319 acres (104,892 km^2). Portions of the CDNCA within the 650-ft (198.1-m) viewshed for the Amargosa Valley SEZ, as presented in the Draft Solar PEIS, include approximately 94,485 acres (382.37 km^2), or 0.4% of the total CDNCA acreage.