FES 12-24 • DOE/EIS-0403

Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States

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Chapters 8 and 9

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Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States (FES 12-24; DOE/EIS-0403)

Responsible Agencies: The U.S. Department of the Interior (DOI) Bureau of Land Management (BLM) and the U.S. Department of Energy (DOE) are co-lead agencies. Nineteen cooperating agencies participated in the preparation of this PEIS: U.S. Department of Defense; U.S. Bureau of Reclamation; U.S. Fish and Wildlife Service; U.S. National Park Service; U.S. Environmental Protection Agency, Region 9; U.S. Army Corps of Engineers, South Pacific Division; Arizona Game and Fish Department; California Energy Commission; California Public Utilities Commission; Nevada Department of Wildlife; N-4 Grazing Board, Nevada; Utah Public Lands Policy Coordination Office; Clark County, Nevada, including Clark County Department of Aviation; Doña Ana County, New Mexico; Esmeralda County, Nevada; Eureka County, Nevada; Lincoln County, Nevada; Nye County, Nevada; and Saguache County, Colorado.

Locations: Arizona, California, Colorado, Nevada, New Mexico, and Utah.

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Abstract: The BLM and DOE have jointly prepared this PEIS to evaluate actions that the agencies are considering taking to further facilitate utility-scale solar energy development in six southwestern states.[1] For the BLM, this includes the evaluation of a new Solar Energy Program applicable to solar development on BLM-administered lands. For DOE, it includes the evaluation of developing new guidance to further facilitate utility-scale solar energy development and maximize the mitigation of associated potential environmental impacts. This Solar PEIS evaluates the potential environmental, social, and economic effects of the agencies' proposed actions and alternatives in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality's regulations for implementing NEPA (Title 40, Parts 1500–1508 of the *Code of Federal Regulations* [40 CFR Parts 1500–1508]), and applicable BLM and DOE authorities.

For the BLM, the Final Solar PEIS analyzes a no action alternative, under which solar energy development would continue on BLM-administered lands in accordance with the terms and conditions of the BLM's existing solar energy policies, and two action alternatives that involve implementing a new BLM Solar Energy Program that would allow the permitting of future solar energy development projects on public lands to proceed in a more efficient, standardized, and environmentally responsible manner. The proposed program would establish right-of-way authorization policies and design features applicable to all utility-scale solar energy development on BLM-administered lands. It would identify categories of lands to be excluded from utility-scale solar energy development and specific locations well suited for utility-scale production of solar energy where the BLM would prioritize development (i.e., solar energy zones or SEZs). The proposed action would also allow for responsible utility-scale solar development on lands outside of priority areas.

1 Utility-scale facilities are defined as projects that generate electricity that is delivered into the electricity transmission grid, generally with capacities greater than 20 megawatts (MW).

For DOE, the Final PEIS analyzes a no action alternative, under which DOE would continue to address environmental concerns for DOE-supported solar projects on a case-by-case basis, and an action alternative, under which DOE would adopt programmatic environmental guidance for use in DOE-supported solar projects.

The BLM and DOE initiated the Solar PEIS process in May 2008. On December 17, 2010, the BLM and DOE published the Draft Solar PEIS. Subsequently, on October 28, 2011, the lead agencies published the Supplement to the Draft Solar PEIS, in which adjustments were made to elements of BLM's proposed Solar Energy Program to better meet BLM's solar energy objectives, and in which DOE's proposed programmatic environmental guidance was presented.

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

UNITS OF MEASURE

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

ENGLISH/METRIC AND METRIC/ENGLISH EQUIVALENTS

The following table lists the appropriate equivalents for English and metric units.

Multiply	By	To Obtain
English/Metric Equivalents		
acres	*0.004047*	square kilometers (km^2)
acre-feet (ac-ft)	*1,234*	cubic meters (m^3)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
degrees Fahrenheit (ºF) –32	0.5555	degrees Celsius (ºC)
feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in.)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
miles per hour (mph)	1.609	kilometers per hour (kph)
pounds (lb)	0.4536	kilograms (kg)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)
Metric/English Equivalents		
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	0.00081	acre-feet (ac-ft)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
degrees Celsius (ºC) +17.78	1.8	degrees Fahrenheit (ºF)
hectares (ha)	2.471	acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
kilometers per hour (kph)	0.6214	miles per hour (mph)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
square kilometers (km^2)	247.1	acres
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)

8 UPDATE TO AFFECTED ENVIRONMENT AND IMPACT ASSESSMENT FOR PROPOSED SOLAR ENERGY ZONES IN ARIZONA

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 Arizona, Brenda and Gillespie, as well as a summary of the Bullard Wash SEZ and why it was 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 under way 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 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 Arizona SEZs presented in the Draft Solar PEIS. As stated previously, the Bullard Wash SEZ was dropped from further consideration through the Supplement to the Draft Solar PEIS. For the remaining two Arizona SEZs, Brenda and Gillespie, the information presented in this chapter supplements and updates, but does not replace, the information provided in the corresponding Chapter 8 on proposed SEZs in Arizona in the Draft Solar PEIS. Corrections to incorrect information in Sections 8.1 and 8.3 of the Draft Solar PEIS and in Sections C.1.1 and C.1.2 of the Supplement to the Draft are provided in Sections 8.1.26 and 8.3.26 of this Final Solar PEIS.

8.1 BRENDA

8.1.1 Background and Summary of Impacts

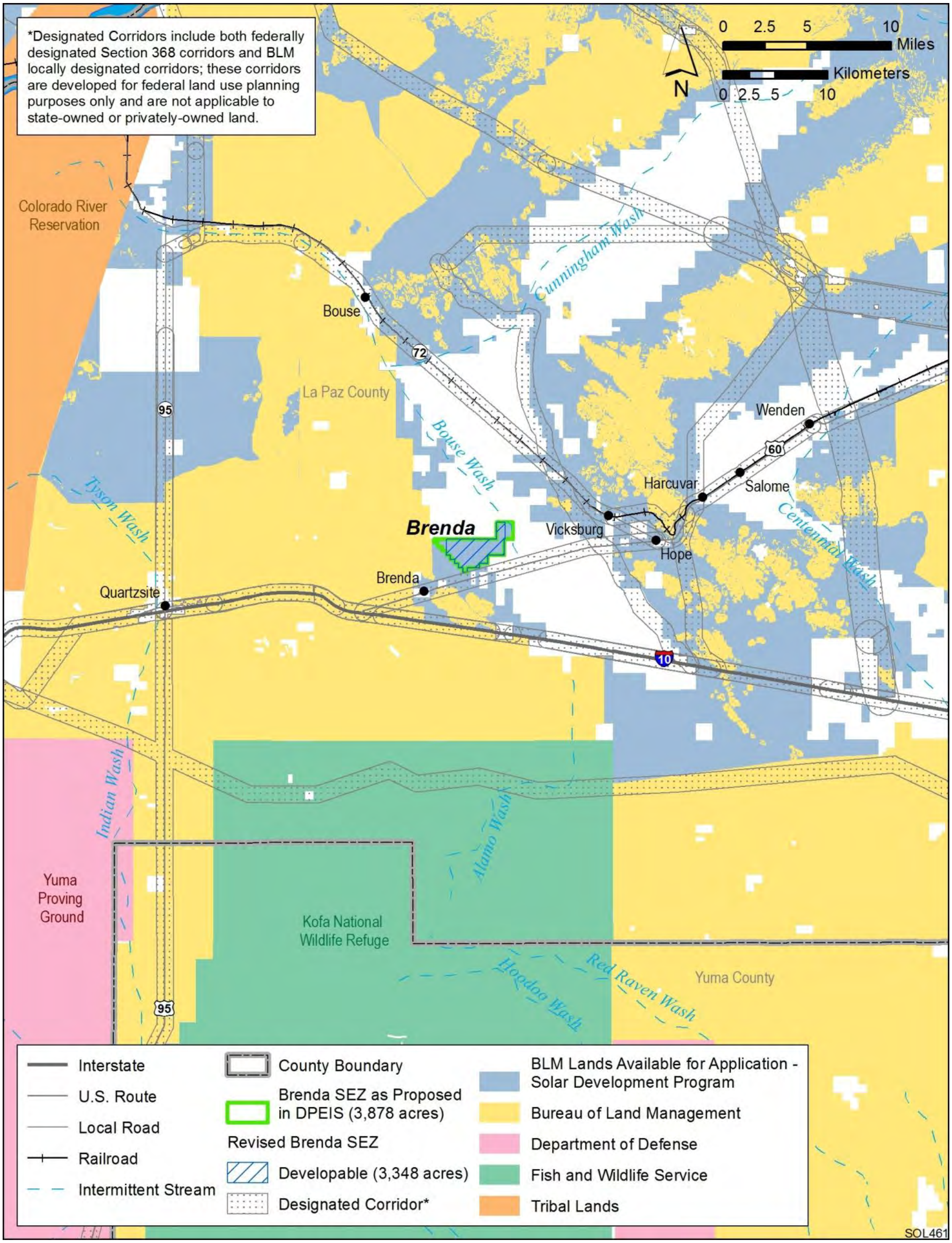
8.1.1.1 General Information

The proposed Brenda SEZ is located in La Paz County in west-central Arizona, 32 mi (52 km) east of the California border. In 2008, the county population was 20,005, while adjacent Riverside County to the west in California had a population of 2,087,917. The towns of Quartzsite and Salome in La Paz County are about 18 mi (29 km) west of and 18 mi (29 km) east of the SEZ, respectively.

The nearest major road access to the SEZ is via U.S. 60, which runs southwest to northeast along the southeast border of the Brenda SEZ. The nearest railroad stop is 11 mi (18 km) away. As of October 28, 2011, there were no pending right-of-way (ROW) applications for solar projects within the SEZ.

As published in the Draft Solar PEIS and the Supplement to the Draft, the proposed Brenda SEZ had a total area of 3,878 acres (16 km^2) (see Figure 8.1.1.1-1). For this Final Solar PEIS, the SEZ boundaries were reduced, thus eliminating the area of Bouse Wash on the east side of the SEZ and eliminating the area on the west side of the SEZ to the west of the county road (a total of 530 acres [2.1 km^2]) (see Figure 8.1.1.1-2). Eliminating the area of Bouse Wash is primarily intended to avoid impacts on habitats and species that utilize the wash. Eliminating the area of the SEZ west of the county road avoids splitting solar development on the SEZ and associated internal access and security issues. In addition, the new boundary limits solar development to a distance of about 0.75 mi (1.2 km) east of the Plomosa Special Resource Management Area (SRMA) and avoids crossing a well-vegetated drainage with wildlife values. The remaining SEZ area is 3,348 acres (13.5 km^2). No additional areas for non-development were identified within the SEZ.

1



2 **FIGURE 8.1.1.1-1 Proposed Brenda SEZ as Revised**

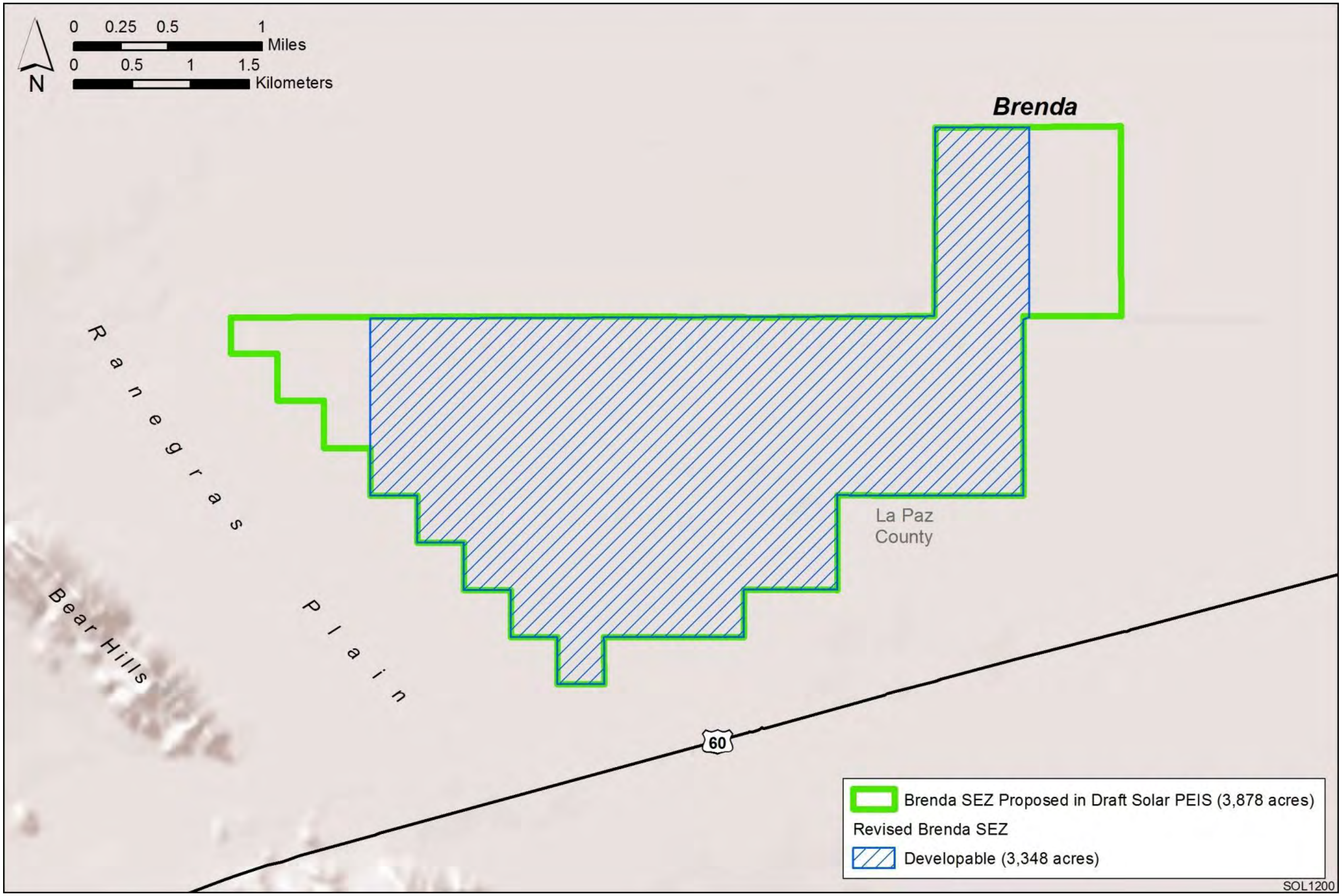


FIGURE 8.1.1.1-2 Developable Area for the Proposed Brenda SEZ as Revised

Because of the extensive potential impacts from solar development in the portion of the proposed Brenda SEZ that has been eliminated, those lands are proposed as solar ROW exclusion areas; that is, applications for solar development on those lands will not be accepted by the 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 proposed Brenda SEZ as described in the Draft Solar PEIS.

8.1.1.2 Development Assumptions for the Impact Analysis

Maximum solar development of the Brenda SEZ is assumed to be 80% of the SEZ area over a period of 20 years, a maximum of 2,678 acres (10.8 km^2). Full development of the Brenda SEZ would allow development of facilities with an estimated total of between 298 MW (power tower, dish engine, or photovoltaic [PV] technologies, 9 acres/MW [0.04 km^2/MW]) and 536 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 Brenda SEZ, updated data indicate that the nearest existing transmission line is a 500-kV east–west line located about 12 mi (19 km) south of the SEZ (the Draft Solar PEIS had indicated that the closest existing line was a 161-kV line 19 mi [31 km] to the west of the SEZ). It is possible that a new transmission line could be constructed from the SEZ to the existing line, but the available capacity on the existing 500-kV could be inadequate for 298 to 536 MW of new capacity. Therefore, at full build-out capacity, new transmission and/or upgrades of existing transmission lines would likely be required to bring electricity from the proposed Brenda SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Brenda SEZ and a general assessment of the impacts of constructing and operating new transmission facilities to those load centers are provided in Section 8.1.23. In addition, the generic impacts of transmission 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.

The transmission assessment for the Brenda SEZ has been updated, and the hypothetical transmission corridor assessed in the Draft Solar PEIS is no longer applicable. For this updated assessment, the 575 acres (2.3 km^2) of land disturbance for a hypothetical transmission corridor to the existing transmission line is no longer assumed (although the impacts of required new transmission overall are addressed in Section 8.1.23).

For the proposed Brenda SEZ, existing road access should be adequate to support construction and operation of solar facilities, because U.S. 60 runs along the southeast border of the SEZ. Thus, no additional road construction outside of the SEZ was assumed to be required to support solar development, as summarized in Table 8.1.1.2-1.

TABLE 8.1.1.2-1 Assumed Development Acreages, Solar MW Output, and Nearest Major Access Road and Transmission Line for the Proposed Brenda 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 Corridor[f]
3,348 acres[a] and 2,678 acres	298 MW[b] 536 MW[c]	U.S. 60 adjacent	12 mi[d,e] and 500 kV	0 acres	Adjacent

[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] In the Draft Solar PEIS, the nearest transmission line identified was a 161-kV line 19 mi (31 km) from the SEZ; this information has been updated.

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

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

8.1.1.3 Programmatic and SEZ-Specific Design Features

The proposed programmatic design features for each resource area to be required under BLM's 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, reduce, and/or mitigate adverse impacts of 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 8.1.2 through 8.1.22) 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 Brenda SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Brenda 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 and Supplement to the Draft Solar PEIS. All applicable SEZ-specific design features identified to date (including those from the Draft Solar PEIS that are still applicable) are presented in Sections 8.1.2 through 8.1.22.

8.1.2 Lands and Realty

8.1.2.1 Affected Environment

The overall size of the proposed SEZ has been reduced to 3,348 acres (13.5 km^2). The area west of the county road containing 211 acres (0.9 km^2) has been dropped from the SEZ, and 284 acres (1.1 km^2) that contain a portion of Bouse Wash in the former northeastern corner of the SEZ have also been dropped from the SEZ. The remainder of the description of the SEZ in the Draft Solar PEIS continues to be valid.

8.1.2.2 Impacts

The description of impacts in the Draft Solar PEIS remains the same with the exception of the lands removed from development because of boundary modification and identification of non-development areas. Full development of the SEZ (80%) now would disturb up to 2,678 acres (10.8 km^2). Solar development within the proposed SEZ would introduce a new and dominant industrial character to the landscape that may conflict with the residential and commercial landowners nearby. It is possible that if the public lands are developed for solar energy production, similar development could be induced on neighboring state and private lands with landowner agreement.

8.1.2.3 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 will 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 induced land use changes if any on state and private lands may not be fully mitigated.

No SEZ-specific design features for lands and realty have been identified through this Final Solar PEIS. Some SEZ-specific design features may be established for parcels within the proposed Brenda SEZ through the process of preparing them for competitive offer and subsequent project-specific analysis.

8.1.3 Specially Designated Areas and Lands with Wilderness Characteristics

8.1.3.1 Affected Environment

As described in the Draft Solar PEIS, there are 8 specially designated areas within 25 mi (40 km) of the proposed Brenda SEZ that potentially could be affected by solar development in the SEZ. These areas include designated wilderness, a Wilderness Study Area (WSA), Areas of Critical Environmental Concern (ACECs), an SRMA, and a National Wildlife Refuge (NWR).

8.1.3.2 Impacts

Impacts are expected to be the same as those described in the Draft Solar PEIS, with the exception that because of the removal of the lands west of the existing county road from the SEZ, the distance to the Plomosa SRMA is increased to about 0.9 mi (1.5 km). This decreases the potential impact on the recreational use of that area. The remaining specially designated areas are far enough from the proposed SEZ that no impacts on these areas are anticipated.

8.1.3.3 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 adequate mitigation for the identified impacts.

No SEZ-specific design features for specially designated areas 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.

8.1.4 Rangeland Resources

8.1.4.1 Livestock Grazing

8.1.4.1.1 Affected Environment

The proposed Brenda SEZ is located within the 234,645-acre (950-km^2) Crowder–Weisser grazing allotment, and the land within the SEZ constitutes less than 2% of the allotment.

8.1.4.1.2 Impacts

The analysis in the Draft Solar PEIS identified the potential for a loss of 315 animal unit months (AUMs) of livestock forage (less than 2% of the total amount of the permitted forage) from the allotment, based on impacts from development within the SEZ. It was recognized that because of the large size of the allotment, it might be possible to accommodate any lost AUMs elsewhere in the allotment; however, should that not be possible, there would be an undetermined adverse economic impact upon the permittee. The overall impact is anticipated to be small.

Economic impacts of the loss of grazing capacity must be determined at the allotment-specific level. For most public land grazing operations, any loss of grazing capacity is an economic concern, but it is not possible to assess the extent of that specific impact at this programmatic level. For that reason, only a general assessment is made based on the projected loss of livestock AUMs; this assessment does not consider potential impacts on management costs, the impacts of reducing the scale of an operation, or the impact on the value of the ranch, including private land values and other grazing associated assets.

8.1.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on livestock grazing 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 identified impacts but will not mitigate the loss of livestock AUMs or the loss of value in ranching operations, including private land values.

No SEZ-specific design features to protect livestock grazing 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.

8.1.4.2 Wild Horses and Burros

8.1.4.2.1 Affected Environment

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

8.1.4.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Brenda SEZ would not affect wild horses and burros.

8.1.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

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 wild horses and burros are required for the proposed Brenda SEZ.

8.1.5 Recreation

8.1.5.1 Affected Environment

The description of the area within and around the proposed Brenda SEZ in the Draft Solar PEIS remains valid. The proposed SEZ is located within 15 mi (24 km) of Quartzsite, Arizona, an area that attracts large numbers of winter visitors to the area. The Plomosa SRMA provides a recreational outlet to winter visitors and to others interested in desert and backcountry driving.

8.1.5.2 Impacts

Recreational users would be excluded from areas developed for solar energy production, and they might avoid areas near the SEZ within the Plomosa SRMA. With the removal of the portion of the SEZ west of the county road on the western boundary of the SEZ, impacts on recreational access to the SRMA would no longer be a concern. 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 as a part of the environmental analysis of specific solar energy projects.

8.1.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreational resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide adequate mitigation for the identified impacts but will not mitigate the loss of recreational access to public lands developed for solar energy production.

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 recreation for the proposed Brenda 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.

8.1.6 Military and Civilian Aviation

8.1.6.1 Affected Environment

The description in the Draft Solar PEIS remains valid. The proposed Brenda SEZ is covered by three military training routes (MTRs) with 300-ft (91-m) above-ground-level (AGL) operating limits.

8.1.6.2 Impacts

Through comments on the Draft Solar PEIS, the military has indicated that construction of solar energy and related facilities higher than 250 ft (76 m) could interfere with military training activities and could be a safety concern.

8.1.6.3 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, avoid, minimize, and/or mitigate, if possible, potential impacts on the use of military airspace.

No SEZ-specific design features for 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.

8.1.7 Geologic Setting and Soil Resources

8.1.7.1 Affected Environment

8.1.7.1.1 Geologic Setting

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

- The terrain of the proposed Brenda SEZ slopes gently to the northeast (Figure 8.1.7.1-1). The boundaries of the proposed SEZ have been changed to eliminate a portion of the Bouse Wash floodplain (to the east) and the small area to the west of the county road. Based on these changes, the elevations range from about 1,240 ft (380 m) along its southwest border to about 1,105 ft (340 m) at the northeast corner.

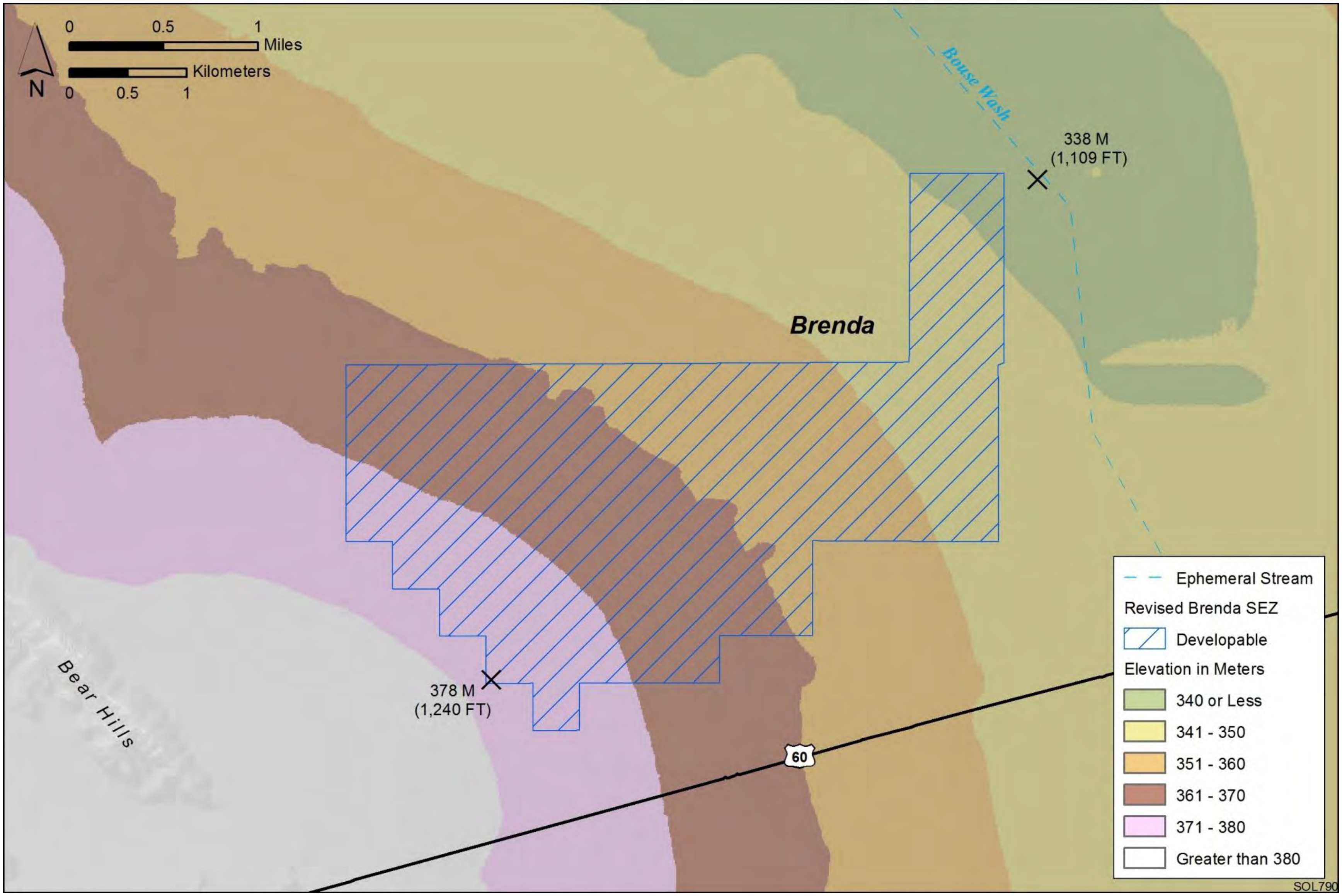


FIGURE 8.1.7.1-1 General Terrain of the Proposed Brenda SEZ as Revised

8.1.7.1.2 Soil Resources

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

- Soils within the proposed Brenda SEZ as revised are predominantly the sandy loams and gravelly sandy loams of the Denure–Pahaka–Growler and Gunsight family–Rillito complexes, which now make up about 19% of the soil coverage at the site (Table 8.1.7.1-1). Most of the map unit composition (about 72%) within the proposed SEZ has not been delineated.

- Soil unit coverage at the proposed Brenda SEZ as revised is shown in Figure 8.1.7.1-2. The new SEZ boundaries eliminate 217 acres (0.88 km^2) of the western portion of the site that has not been mapped for soils; 149 acres (0.60 km^2) of the Gadsden–Glenbar complex; 118 acres (0.48 km^2) of the Mohali–Contine complex, and 48 acres (0.19 km^2) of the Denure–Pahaka–Growler complex.

8.1.7.2 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). The assessment of impacts provided in the Draft Solar PEIS remains valid, with the following updates:

- Impacts related to wind erodibility are somewhat reduced because the change in boundaries eliminates 315 acres (1.3 km^2) of moderately erodible soils from development.

- Impacts related to water erodibility are somewhat reduced because the change in boundaries eliminates 267 acres (1.1 km^2) of moderately erodible soils from development.

8.1.7.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on soils are described in Appendix A of this Final Solar PEIS. Implementing the programmatic design features described in Section A.2.2 of Appendix A, as required under BLM's Solar Energy Program, will reduce the potential for soil impacts during all project phases.

1 **TABLE 8.1.7.1-1 Summary of Soil Map Units within the Proposed Brenda SEZ as Revised**

Map Unit Symbol	Map Unit Name	Erosion Potential: Water[a]	Erosion Potential: Wind[b]	Description	Area in Acres[c] (percentage of SEZ)
NOTCOM	Area not mapped	Not rated	Not rated	Map units not available. Soils belong to the following Soil Series: Pahaka–Estraella–Antho; Pahaka–Mohall–Laveen-Denure; and Hyder-Coolidge–Cipriano-Cherioni.	2,418 (72.3)
205	Denure–Pahaka–Growler complex (0 to 3% slopes)	Slight	Moderate (WEG 3)[d]	Consists of 30% Denure sandy loam, 30% Pahaka fine sandy loam, and 25% Growler fine sandy loam. Level to nearly level soils on alluvial fans. Parent material is fan alluvium from mixed sources. Soils are very deep and well drained, with low surface-runoff potential (high infiltration rate) depending on slope and moderate to moderately rapid permeability. Available water capacity is low to moderate. Soil has features favorable to dust formation; high compaction potential. Used for rangeland, wildlife habitat, and irrigated cropland.	363 (10.9)
330	Gunsight family–Rillito complex (1 to 10% slopes)	Moderate	Moderate (WEG 5)	Consists of 55% Gunsight gravelly sandy loam and 35% Rillito gravelly sandy loam. Nearly level to gently sloping soils on alluvial fan terraces. Parent material is fan alluvium from mixed sources. Soils are very deep and somewhat excessively drained, with low surface-runoff potential (high infiltration rate) and moderate permeability. Available water capacity is very low to low. Resists compaction. Used for rangeland, wildlife habitat, and irrigated cropland.	259 (7.7)
200	Gunsight family–Pinamt complex (1 to 15% slopes)	Moderate	Moderate (WEG 6)	Consists of 50% Gunsight very gravelly loam and 40% Pinamt extremely gravelly loam. Nearly level to gently sloping soils on alluvial fan terraces. Parent material is fan alluvium from mixed sources. Soils are very deep and well drained, with low surface-runoff potential (high infiltration rate) and moderate to high permeability. Available water capacity is very low. High compaction potential. Used mainly for livestock grazing and wildlife habitat; unsuitable for cultivation.	159 (4.8)

2

TABLE 8.1.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Erosion Potential: Water[a]	Erosion Potential: Wind[b]	Description	Area in Acres[c] (percentage of SEZ)
340	Mohall–Contine complex (1 to 5% slopes)	Moderate	Moderate (WEG 3)	Consists of 50% Mohall sandy loam and 40% Contine sandy loam. Level to nearly level soils on basin floors. Parent material is mixed stream alluvium. Soils are very deep and well drained, with slow to moderate surface runoff potential and moderately slow to slow permeability. Available water capacity is low. Soil has moderate resistance to dust propagation. Used for rangeland, wildlife habitat, and irrigated cropland.	146 (4.4)

[a] Water erosion potential rates the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K (whole soil; does not account for the presence of rock fragments) and represent soil loss caused by sheet or rill erosion where 50 to 75% of the surface has been exposed by ground disturbance. A rating of “slight” indicates that erosion is unlikely under ordinary climatic conditions. A rating of “moderate” indicates that erosion could be expected under ordinary climatic conditions.

[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 (4,000 m^2) per year, for each of the wind erodibility groups: WEG 1, 220 tons (200 metric tons) per acre (4,000 m^2) per year (average); WEG 2, 134 tons (122 metric tons) per acre (4,000 m^2) per year; WEGs 3 and 4 (and 4L), 86 tons (78 metric tons) per acre (4,000 m^2) per year; WEG 5, 56 tons (51 metric tons) per acre (4,000 m^2) per year; WEG 6, 48 tons (44 metric tons) per acre (4,000 m^2) per year; WEG 7, 38 tons (34 metric tons) per acre (4,000 m^2) per year; and WEG 8, 0 tons (0 metric tons) per acre (4,000 m^2) per year.

Source: NRCS (2010).

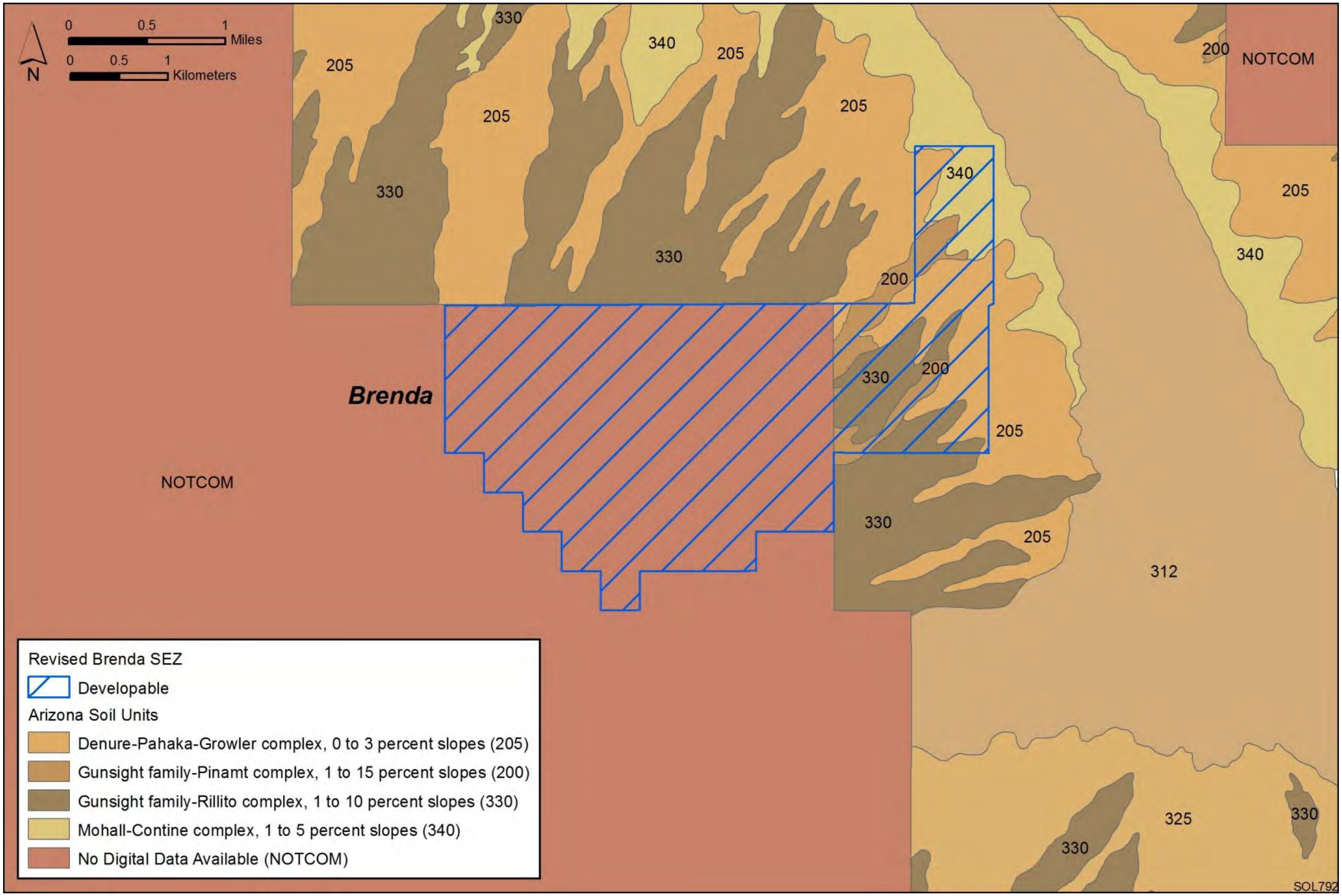


FIGURE 8.1.7.1-2 Soil Map for the Proposed Brenda SEZ as Revised (NRCS 2008)

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 were identified for soil resources at the proposed Brenda SEZ as revised. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.1.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Brenda SEZ has been prepared and reviewed by BLM mineral specialists knowledgeable about the region where the SEZ is located (BLM 2012). 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 8.1.24.

8.1.8.1 Affected Environment

There are no oil and gas leases, mining claims, or geothermal leases located within the proposed Brenda SEZ. The description in the Draft Solar PEIS remains valid.

8.1.8.2 Impacts

There are no anticipated impacts on mineral resources from the development of solar energy facilities in the proposed SEZ. The analysis of impacts on mineral resources in the Draft Solar PEIS remains valid.

8.1.8.3 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 for 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.

8.1.9 Water Resources

8.1.9.1 Affected Environment

The overall size of the Brenda SEZ has been reduced by 15% from the area described in the Draft Solar PEIS, resulting in a total area of 3,348 acres (13.5 km^2). The description of the affected environment given in the Draft Solar PEIS relevant to water resources at the Brenda SEZ remains valid and is summarized in the following paragraphs.

The proposed Brenda SEZ is located within the Lower Colorado hydrologic subregion of the Lower Colorado hydrologic region. The valley region is known as the Ranegras Plain, a desert valley nestled between mountain ranges to the east and west–southwest. Precipitation in the valley is between 4 in./yr (10 cm/yr) and 8 in./yr (20 cm/yr), and evaporation is estimated to be 115 in./yr (292 cm/yr). No perennial surface water features, flood hazards, or wetlands have been identified within the Brenda SEZ. Bouse Wash and an unnamed intermittent/ephemeral stream flow through portions of the eastern and western sides of the Brenda SEZ, and these braided stream channel areas have been classified as non-development areas. The proposed SEZ is located in the Ranegras Plain groundwater basin where available groundwater occurs primarily in basin-fill deposits, with a general southeast to northwest flow pattern. Reported groundwater recharge estimates range from 1,000 to 6,000 ac-ft/yr (1.2 million to 7.4 million m^3/yr), which primarily occurs through focused recharge in intermittent/ephemeral stream channels. Groundwater surface elevations have declined over several decades resulting from agricultural use, which has also resulted in land subsidence. Levels of total dissolved solids (TDS) and fluoride in the basin are considered high, and both contaminants are often found present above the secondary maximum contaminant level (MCL). In addition, concentrations of hexavalent chromium, selenium, arsenic, and nitrate have all been recorded above the MCL.

The Arizona Department of Water Resources (ADWR) is responsible for water conservation and distribution throughout the state and created guidelines in 2010 to manage water for solar-generating facilities. While there are no surface water rights available in the Ranegras Plains Basin, it is legal to pump groundwater without a permit; however, current groundwater withdrawals exceed the estimated recharge of the basin. Between 2000 and 2005, groundwater withdrawals from the Ranegras Plain Basin for agriculture averaged 28,800 ac-ft/yr (35 million m^3/yr) and for municipal water use averaged 400 ac-ft/yr (490,000 m^3/yr).

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 Brenda SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 8.1.9.1-1 through 8.1.9.1-7 and in Figures 8.1.9.1-1 and 8.1.9.1-2. Fieldwork and hydrologic analyses needed to determine 100-year floodplains and jurisdictional water bodies would need to be coordinated with appropriate federal, state, and local agencies. Areas within the Brenda SEZ that are found to be within a 100-year floodplain will be identified as non-development areas. Any water features within the Brenda SEZ determined to be jurisdictional will be subject to the permitting process described in the Clean Water Act (CWA).

TABLE 8.1.9.1-1 Watershed and Water Management Basin Information Relevant to the Proposed Brenda SEZ as Revised

Basin	Name	Area (acres)[b]
Subregion (HUC4)[a]	Lower Colorado (1503)	12,016,053
Cataloging unit (HUC8)	Bouse Wash (15030105)	1,048,871
Groundwater basin	Rangegras Plain	583,680
SEZ	Brenda	3,348

[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.

TABLE 8.1.9.1-2 Climate Station Information Relevant to the Proposed Brenda 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.)
Bouse, Arizona (020949)	925	17	1932–2011	5.50	0.10
Quartzsite, Arizona (026865)	875	20	1908–2011	4.99	0.10
Salome 17 SE (027462)	1,599	23	1987–1998	6.31	0.00

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

[b] Surface elevations for the proposed Brenda SEZ range from 1,110 to 1,235 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 8.1.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ Scale Relevant to the Proposed Brenda SEZ as Revised

Water Feature	Subregion, HUC4 (ft)[a]	Cataloging Unit, HUC8 (ft)	SEZ (ft)
Unclassified streams	11,539	0	0
Perennial streams	1,433,435	79	0
Intermittent/ephemeral streams	213,542,849	14,746,951	19,469
Canals	8,079,744	744,695	2,398

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

Source: USGS (2012a).

TABLE 8.1.9.1-4 Stream Discharge Information Relevant to the Proposed Brenda SEZ as Revised

	Station (USGS ID)	
Parameter	Bouse Wash Tributary near Bouse, Arizona (09428550)	Cunningham Wash Tributary near Wenden, Arizona (09428545)
Period of record	1963–1976	1964–1976
No. of observations	13	14
Discharge, median (ft^3/s)	319	48
Discharge, range (ft^3/s)	20–2,920	0.4–173
Discharge, most recent observation (ft^3/s)	1,500	48
Distance to SEZ (mi)	14	27

[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).

TABLE 8.1.9.1-5 Surface Water Quality Data Relevant to the Proposed Brenda SEZ as Revised

Station (USGS ID)	Period of Record	No of Records
No water quality data are available for surface water stations in the SEZ's HUC8.	NA[a]	NA

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

Source: USGS (2012b).

8.1.9.2 Impacts

8.1.9.2.1 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 proposed Brenda SEZ could potentially affect drainage patterns, along with groundwater recharge and discharge properties. 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 alteration of the SEZ boundaries to exclude Bouse Wash and another intermittent/ephemeral stream on the west side of the SEZ reduces the potential for adverse impacts associated with land disturbance activities.

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 Brenda SEZ is a subset of the Bouse Wash watershed (HUC8), for which information regarding stream channels is presented in Tables 8.1.9.1-3 and 8.1.9.1-4 of this Final Solar PEIS. The results of the intermittent/ephemeral stream evaluation are shown in Figure 8.1.9.2-1, which depicts flow lines from the National Hydrography Dataset (USGS 2012a) labeled as low, moderate, and high sensitivity to land disturbance. Within the study area, 69% of the intermittent/ephemeral stream channels had low sensitivity, and 31% had moderate sensitivity to land disturbance. One intermittent/ephemeral channel reach within the Brenda SEZ was classified with moderate sensitivity to land disturbance (Figure 8.1.9.2-1).

TABLE 8.1.9.1-6 Water Quality Data from Groundwater Samples Relevant to the Proposed Brenda SEZ as Revised

	Station (USGS ID)[a]							
Parameter	334040113572101	334147113460301	334320113420601	334722113562001	334826113513801	335028113532101	335234113585601	335517114003101
Period of record	1948–1999	1986–1999	1974–1999	1946–1989	1990–2000	1967–1985	1974–1980	1958–1965
No. of records	12	4	5	7	10	4	4	4
Temperature (°C)[b]	30.5 (21.5–32)	31.75 (31–32)	32 (28–33)	29 (28.7–29.5)	27 (26.5–28)	27 (26–30)	25.5 (25–26)	26.7 (26.5–26.7)
Total dissolved solids (mg/L)	396 (380–443)	1,224.5 (978–2,110)	279 (277–280)	825.5 (758–847)	2,730 (1,630–5,130)	2,780 (1,020–4,260)	424.5 (373–477)	914
Dissolved oxygen (mg/L)	6.15 (5.4–7.3)	4 (3.9–4.2)	5 (4.6–5.2)	5.1	2.05 (0.8–3.3)	4.9	NA	NA
pH	7.95 (7.8–8.0)	8.2 (7.8–8.3)	8.55 (8.5–8.6)	7.65 (7.4–8)	7.7 (7.6–8)	7.7 (6.7–8)	7.2 (7–7.4)	6.85 (6.5–7.2)
Nitrate + nitrite (mg/L as N)	5.2 (3.4–7.07)	8.4 (5.8–13.1)	2 (1.9–2.08)	4.9 (4.4–5)	6.85 (5.67–24)	14 (4.5–19)	6.5 (4.8–8.2)	NA
Phosphate (mg/L)	0.043 (<0.031–0.123)	<0.031	<0.031 (0–<0.031)	<0.031 (0–<0.031)	<0.031 (<0.031–0.037)	0.03 (<0.031–0.03)	0.015 (0–0.03)	NA
Organic carbon (mg/L)	NA[c]	NA	NA	NA	NA	NA	NA	NA
Calcium (mg/L)	15 (13–16.4)	81.5 (48–176)	4.34 (3.9–4.7)	44.5 (42–47)	140.5 (71–344)	112.5 (50–340)	57 (52–62)	59 (58–60)
Magnesium (mg/L)	13 (12–15)	2.94 (1.8–7.75)	0.42 (0.3–0.51)	6.55 (6.4–8.6)	30.4 (14–72)	27 (12–80)	8.3 (7.8–8.8)	7.9 (3.8–186)
Sodium (mg/L)	110 (100–123)	330 (280–507)	96.6 (92–97)	230 (220–230)	712 (470–1,210)	610 (270–950)	75 (65–85)	NA
Chloride (mg/L)	24 (17–34)	355.5 (240–508)	31.7 (30–33)	230 (206–240)	510 (340–1,200)	425 (220–800)	49.5 (18–81)	193 (179–200)
Sulfate (mg/L)	13.5 (8.17–27)	347.5 (290–777)	43 (40.8–47)	227 (200–230)	1,175 (580–2,100)	765 (320–1,900)	5.15 (3.5–6.8)	340 (328–380)
Arsenic (µg/L)	6 (5–7)	34 (30–36)	15 (13–16)	32 (28–36)	0.5 (<1–1)	12	8	NA
Fluoride (mg/L)	0.4 (0.2–0.5)	7.22 (< 0.10–8.6)	0.84 (0.5–0.9)	4.7 (4.3–5.2)	4.46 (2.8–7)	4.7 (4–4.9)	0.95 (0.8–1.1)	4.85 (4.5–5)
Hexavalent chromium (µg/L)	19.5 (7–23)	14.5 (< 1–28)	20 (16–24)	28.5 (12–45)	<1	23.5 (5–42)	0	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).

TABLE 8.1.9.1-7 Groundwater Surface Elevations Relevant to the Proposed Brenda SEZ as Revised

	Station (USGS ID)					
Parameter	332848113425101	333121113413001	334144113510601	334422113524001	335555114000901	335622114005601
Period of record	1963–1998	1965–2006	1948–1993	1967–2006	1983–1993	1945–1991
No. of observations	6	26	5	22	13	49
Surface elevation (ft)[a]	1,438	1,350	1,129	1,123	955	925
Well depth (ft)	350	455	1,005	1,459	130	176
Depth to water, median (ft)	241.2	337.5	130.9	154.5	71.3	36.6
Depth to water, range (ft)	228–333	330–343.7	128–132.1	146.05–158.7	67.5–71.6	26.92–51.95
Depth to water, most recent observation (ft)	238.5	343.6	132.1	158.7	71.6	49.5
Distance to SEZ (mi)[b]	19	17	3	2	16	17

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

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

Source: USGS (2012b).

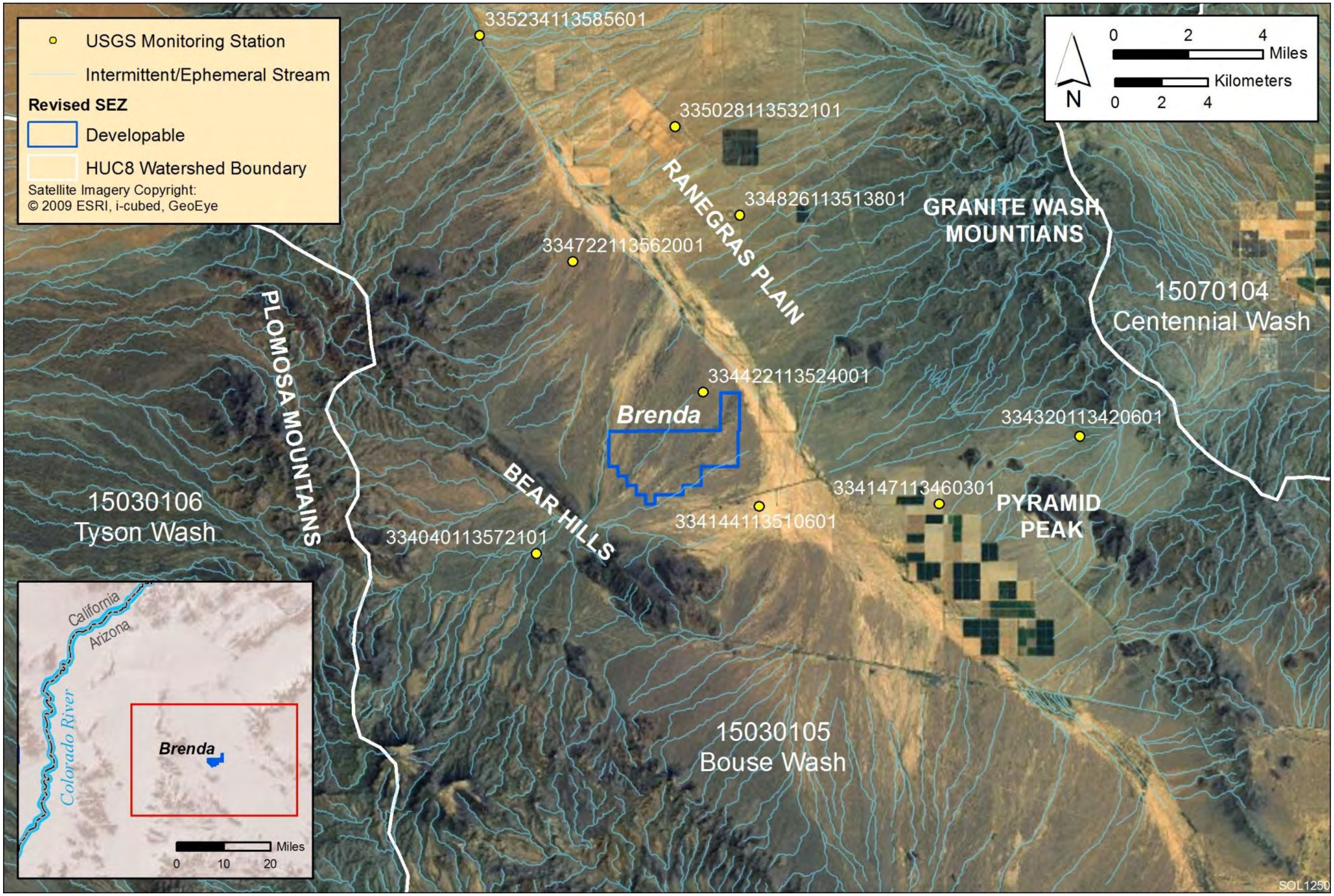


FIGURE 8.1.9.1-1 Water Features near the Proposed Brenda SEZ as Revised

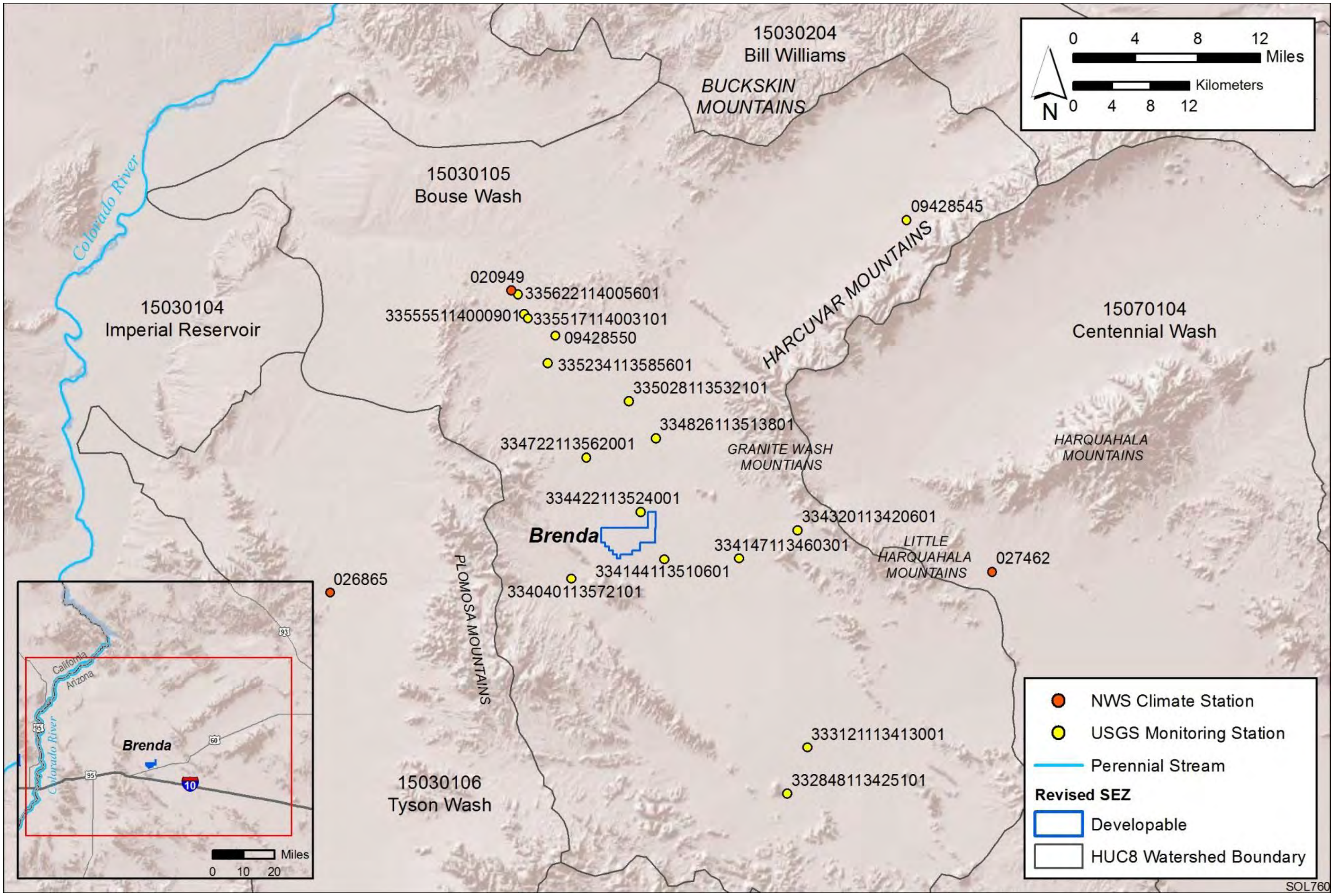


FIGURE 8.1.9.1-2 Water Features within the Bouse Wash Watershed, Which Includes the Proposed Brenda SEZ as Revised

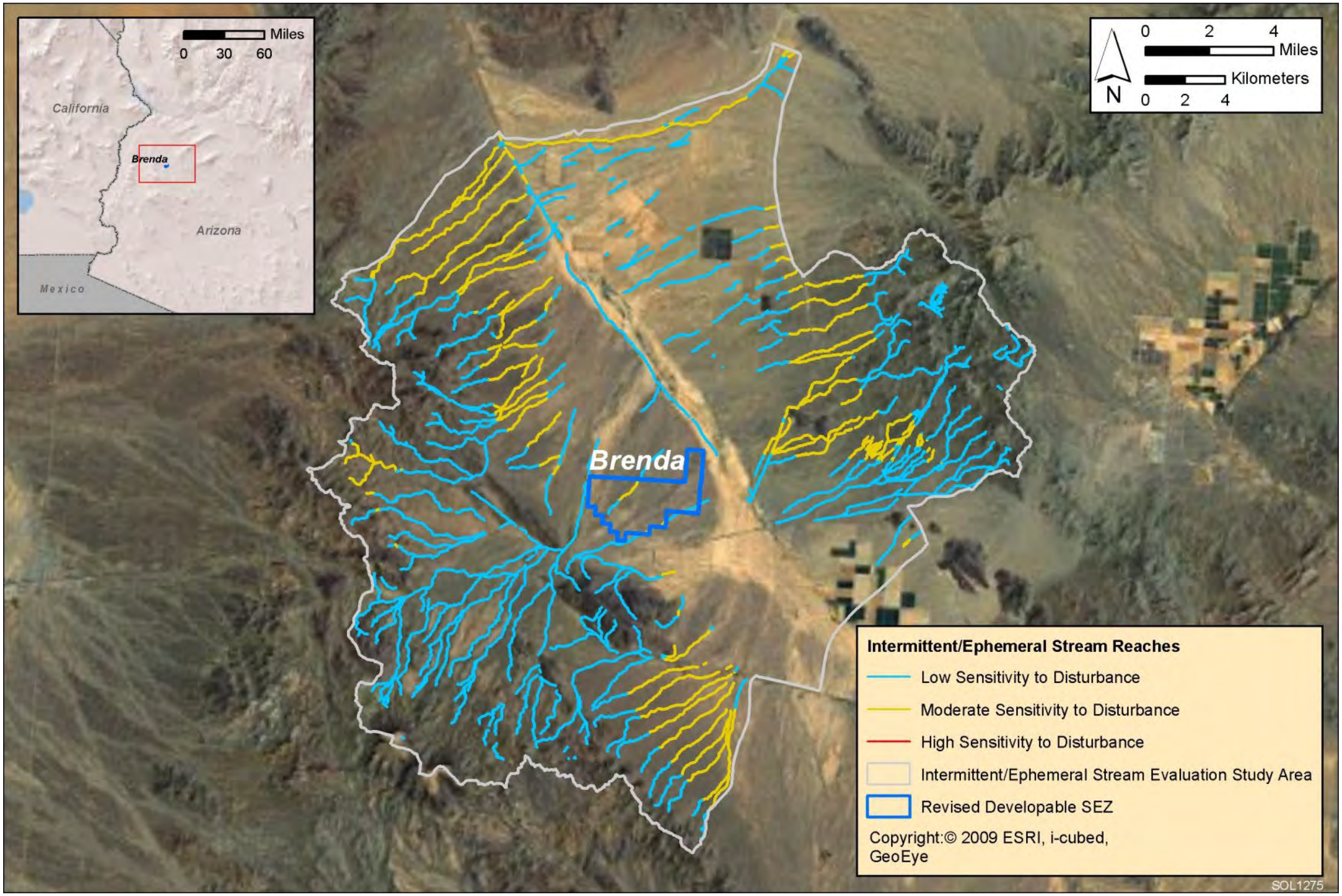


FIGURE 8.1.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Proposed Brenda SEZ as Revised

8.1.9.2.2 Water Use Requirements for Solar Energy Technologies

Changes in the Brenda SEZ boundaries resulted in changes to the estimated water use requirements and a reduction in the land affected by surface disturbances. This section presents changes in water use estimates for the reduced SEZ area and additional analyses pertaining to groundwater. 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 8.1.9.2-1 presents the revised estimates of water requirements for both construction and operation of solar facilities at the Brenda SEZ, assuming full build-out of the SEZ and accounting for its decreased size. A basin-scale groundwater budget was assembled using available data on groundwater inputs, outputs, and storage, with results presented in Table 8.1.9.2-2.

The estimated total water use requirements during the peak construction year are as high as 1,758 ac-ft/yr (2.2 million m^3/yr), which is potentially greater than the average annual recharge to the basin but constitutes a minor portion of current groundwater withdrawals and estimated groundwater storage in the Ranegras Plain basin. Given the short duration of construction activities, the water use estimate for construction is not a primary concern to water resources in the basin. The long duration of groundwater pumping during operations (20 years) poses a greater threat to groundwater resources. This analysis considered 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 solar facility types on the basis of operations estimates for proposed utility-scale solar energy facilities). The low, medium, and high pumping scenarios result in groundwater withdrawals that range from 15 to 2,687 ac-ft/yr (18,500 to 3.3 million m^3/yr), or 300 to 53,750 ac-ft (370,000 to 66.3 million m^3) over the 20-year operational period. From a groundwater budgeting perspective, the high pumping scenario would represent 76% of the low-end estimate of total annual groundwater inputs to the basin and 1% of the estimated groundwater storage over the 20-year operational period. However, given the current imbalance between groundwater inputs and outputs (Table 8.1.9.2-2), this groundwater withdrawal rate could potentially result in a 5% decrease in the estimated aquifer storage over the 20-year operational period. The low and medium pumping scenarios have annual withdrawals that represent less than 1% and 11%, respectively, of the low estimate of groundwater inputs to the basin (Table 8.1.9.2-2), which are more in the realm of suitable recharge-based sustainable yield estimates, although sustainable yield estimates based solely on recharge are typically not recommended (Zhou 2009).

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

TABLE 8.1.9.2-1 Estimated Water Requirements for the Proposed Brenda SEZ as Revised[a]

Activity	Parabolic Trough	Power Tower	Dish Engine	PV
Construction—Peak Year				
Water use requirements				
Fugitive dust control (ac-ft)[b]	1,313	1,758	1,758	1,758
Potable supply for workforce (ac-ft)	74	40	17	8
Total water use requirements (ac-ft)	1,387	1,798	1,775	1,766
Wastewater generated				
Sanitary wastewater (ac-ft)	74	40	17	8
Operations				
Water use requirements				
Mirror/panel washing (ac-ft/yr)	268	149	149	15
Potable supply for workforce (ac-ft/yr)	8	3	3	<1
Dry cooling (ac-ft/yr)	107–536	60–298	NA	NA
Wet cooling (ac-ft/yr)	2,411–7,767	1,339–4,315	NA	NA
Total water use requirements				
Non-cooled technologies (ac-ft/yr)	NA[c]	NA	152	15
Dry-cooled technologies (ac-ft/yr)	383–812	212–450	NA	NA
Wet-cooled technologies (ac-ft/yr)	2,687–8,043	1,491–4,467	NA	NA
Wastewater generated				
Blowdown (ac-ft/yr)	152	85	NA	NA
Sanitary wastewater (ac-ft/yr)	8	2	3	<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.

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. It should be noted, however, that the aquifer parameters used for the one-dimensional groundwater model (Table 8.1.9.2-3) represent available literature data and that the model aggregates these value ranges into a simplistic representation of the aquifer.

Currently, the depth to groundwater ranges between 160 and 240 ft (49 and 73 m) in the vicinity of the SEZ. The modeling results suggest that groundwater withdrawals for solar energy development would result in groundwater drawdown in the vicinity of the SEZ (approximately a

TABLE 8.1.9.2-2 Groundwater Budget for the Ranegras Plain Groundwater Basin, Which Includes the Proposed Brenda SEZ as Revised

Process	Amount
Inputs	
Groundwater recharge (ac-ft/yr)[a,b]	400–5,500
Underflow from Butler Valley (ac-ft/yr)	300
Irrigation return flow (ac-ft/yr)	2,800
Outputs	
Underflow to Bouse Wash (ac-ft/yr)	860
Irrigation withdrawals (ac-ft/yr)	27,500
Public withdrawals (ac-ft/yr)	400
Evapotranspiration (ac-ft/yr)	800–1,300
Storage	
Aquifer storage (ac-ft)[c]	9,000,000–27,000,000

[a] Groundwater recharge includes mountain front, intermittent/ephemeral channel seepage, and direct infiltration recharge processes.

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

[c] Source: ADWR (2011).

Source: Tillman et al. (2011).

2-mi [3.2-km] radius) that ranges from 15 to 75 ft (4.6 to 23 m) for the high pumping scenario, 3 to 10 ft (1 to 3 m) for the medium pumping scenario, and less than 1 ft (0.3 m) for the low pumping scenario (Figure 8.1.9.2-2). The modeled groundwater drawdown for the high pumping scenario suggests a potential for 10 ft (3 m) of drawdown at a distance of 3 mi (5 km) from the center of the SEZ, which could impair groundwater-surface water connectivity via infiltration processes during channel inundation, along with alterations to the riparian vegetation along Bouse Wash and the unnamed intermittent/ephemeral stream along the western edge of the SEZ.

8.1.9.2.3 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

TABLE 8.1.9.2-3 Aquifer Characteristics and Assumptions Used in the One-Dimensional Groundwater Model for the Proposed Brenda SEZ as Revised

Parameter	Value[a]
Aquifer type/conditions	Basin fill/unconfined
Aquifer thickness (ft)[b,c]	1,100–1,493 (1,493)
Hydraulic conductivity (ft/day)[d]	0.1–43 (3.5)
Transmissivity (ft^2/day)[d]	1,000–41,000 (5,225)
Storage coefficient[d]	0.05–0.15 (0.05)
Analysis period (yr)	20
High pumping scenario (ac-ft/yr)[e]	2,687
Medium pumping scenario (ac-ft/yr)[f]	383
Low pumping scenario (ac-ft/yr)[g]	15

[a] Values used for the model are in parentheses.

[b] See Metzger (1951) and Johnson (1990).

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

[d] See Anderson and Freethey (1995).

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

[f] Equivalent to full build-out water use requirements for wet-cooled, parabolic trough, and a 30% operational time.

[g] Equivalent to full build-out water use requirements for dry-cooled, parabolic trough, and a 30% operational time.

[h] Equivalent to full build-out water use requirements for PV.

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.

8.1.9.2.4 Summary of Impacts on Water Resources

The additional information and analyses of water resources presented in this update agree with the information provided in the Draft Solar PEIS, which indicates that the Brenda SEZ is located in a desert valley with predominately intermittent/ephemeral surface water features and groundwater in a basin-fill aquifer. Historical groundwater use in the region has led to groundwater declines ranging from 25 to 146 ft (7.6 to 44 m) from 1946 to 2006, along with land subsidence of 1.9 in. (5 cm) that occurred between 2004 and 2010. These baseline conditions suggest that water resources are scarce in the vicinity of the Brenda SEZ, and that the primary

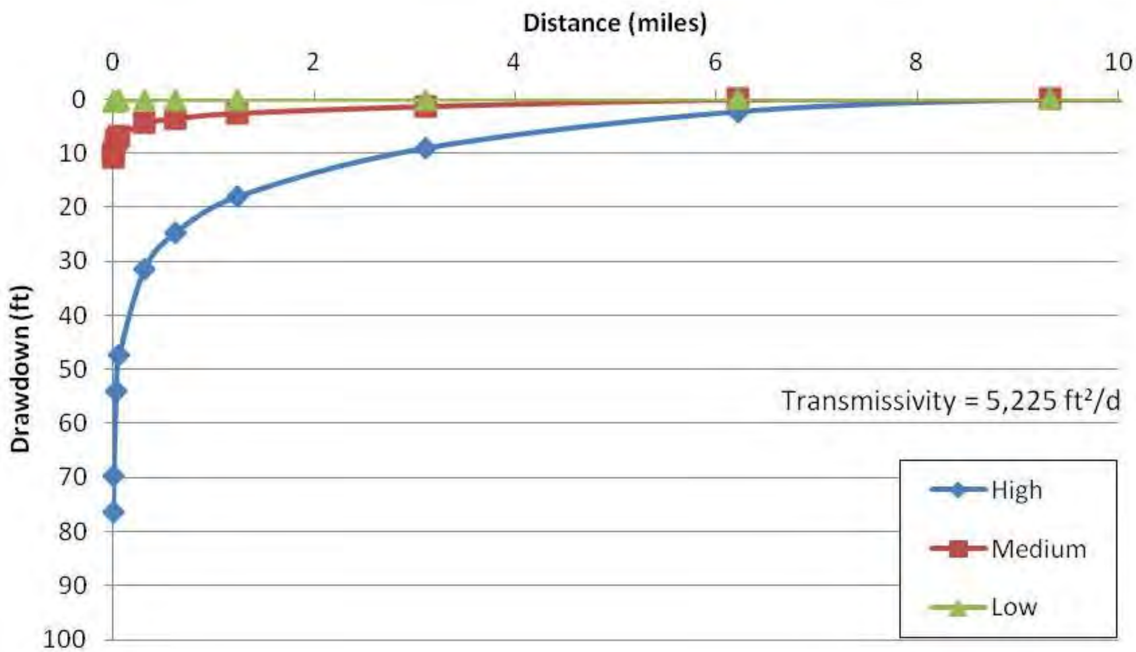


FIGURE 8.1.9.2-2 Estimated One-Dimensional Groundwater Drawdown Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Brenda SEZ as Revised

potential for impacts resulting from solar energy development comes from surface disturbances and groundwater use.

The change in boundaries of the Brenda SEZ resulted in a decrease in total water demand by approximately 15% for all technologies (Table 8.1.9.2-1), and the areas excluded from the SEZ contain portions of Bouse Wash along the northeastern edge of the SEZ and an unnamed wash along the western edge of the SEZ. These changes in the SEZ boundaries have reduced potential impacts associated with groundwater withdrawals and surface disturbance on surface water features.

Disturbance to intermittent/ephemeral stream channels within the Brenda SEZ should not pose a significant impact on the critical functions of groundwater recharge, sediment transport, flood conveyance, and ecological habit given the relatively small footprint of the Brenda SEZ with respect to the study area, along with the sensitivity of identified intermittent/ephemeral streams. The proposed water use for full build-out scenarios at the Brenda SEZ indicate that the low and medium pumping scenarios are preferable, given that the high pumping scenario has the potential to greatly affect both the annual and long-term groundwater budget, and that the high pumping scenario may impair potential groundwater-surface water connectivity in Bouse Wash and the unnamed intermittent/ephemeral stream along the western edge of the SEZ.

Predicting impacts associated with groundwater withdrawals in desert regions 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 to protect water resources is the implementation of long-term monitoring and adaptive management (see Section A.2.4 of Appendix A). 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 the development of a more detailed numerical groundwater model for the Brenda SEZ, which would more accurately predict potential impacts on surface water features and groundwater drawdown. This modeling framework can also be used to interpret groundwater monitoring data and guide adaptive management plans. When the detailed model is completed, it will be made available through the project Web site (http://solareis.anl.gov) for use by applicants, the BLM, and other stakeholders.

8.1.9.3 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-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.

8.1.10 Vegetation

8.1.10.1 Affected Environment

Revisions to the boundaries of the proposed Brenda SEZ have eliminated the Bouse Wash area on the east side and the area to the west of the county road on the west side from the SEZ. In addition, the assumed transmission line was removed from consideration.

As presented in the Draft Solar PEIS, four cover types were identified within the area of the proposed Brenda SEZ, while nine cover types were identified in the area of indirect effects, including the previously assumed transmission line corridor and within 5 mi (8 km) of the SEZ boundary. For this updated assessment, a specifically located hypothetical transmission line is no longer being assumed (see Section 8.1.23 for an updated transmission assessment for this SEZ). Sensitive habitats on the SEZ include desert dry wash and dry wash woodland. Characteristic

Sonoran Desert species observed on the SEZ include creosotebush, saguaro cactus, palo verde, ironwood, acacia, and ocotillo. Because of the change in SEZ boundaries, the Agriculture and Sonora-Mojave Mixed Salt Desert Scrub cover types no longer occur within the SEZ. Figure 8.1.10.1-1 shows the cover types within the affected area of the Brenda SEZ as revised.

8.1.10.2 Impacts

As presented in the Draft Solar PEIS, the construction of solar energy facilities within the proposed Brenda SEZ would result in direct impacts on plant communities because of 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 change in boundaries of the proposed SEZ, approximately 2,678 acres (10.8 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; (3) *large*: >10% of a cover type would be lost.

8.1.10.2.1 Impacts on Native Species

The analysis presented in the Draft Solar PEIS based on the original Brenda SEZ developable area indicated that development would result in a small impact on all land cover types occurring within the SEZ (Table 8.1.10.1-1 in the Draft Solar PEIS). Development within the revised Brenda SEZ could still directly affect some of the cover types evaluated in the Draft Solar PEIS, with the exception of Agriculture and Sonora-Mojave Mixed Salt Desert Scrub. The small reduction in the developable area would result in reduced impact levels on these cover types in the affected area; however, the impact magnitudes would remain unchanged compared to original estimates in the Draft Solar PEIS.

With the change in SEZ boundaries and the change in transmission analysis, direct impacts on Bouse Wash or the previously identified hypothetical transmission corridor are no longer predicted. However, direct impacts on dry washes, dry wash woodland, ironwood (including those outside of washes) could still occur. Indirect impacts on habitats associated with washes or chenopod scrub habitats within or near the SEZ, as described in the Draft Solar PEIS, could also occur. Groundwater use within the SEZ could affect groundwater-dependent communities, such as mesquite bosque communities and microphyll (palo verde/ironwood) woodland communities (including ironwood and palo verde located outside of washes).

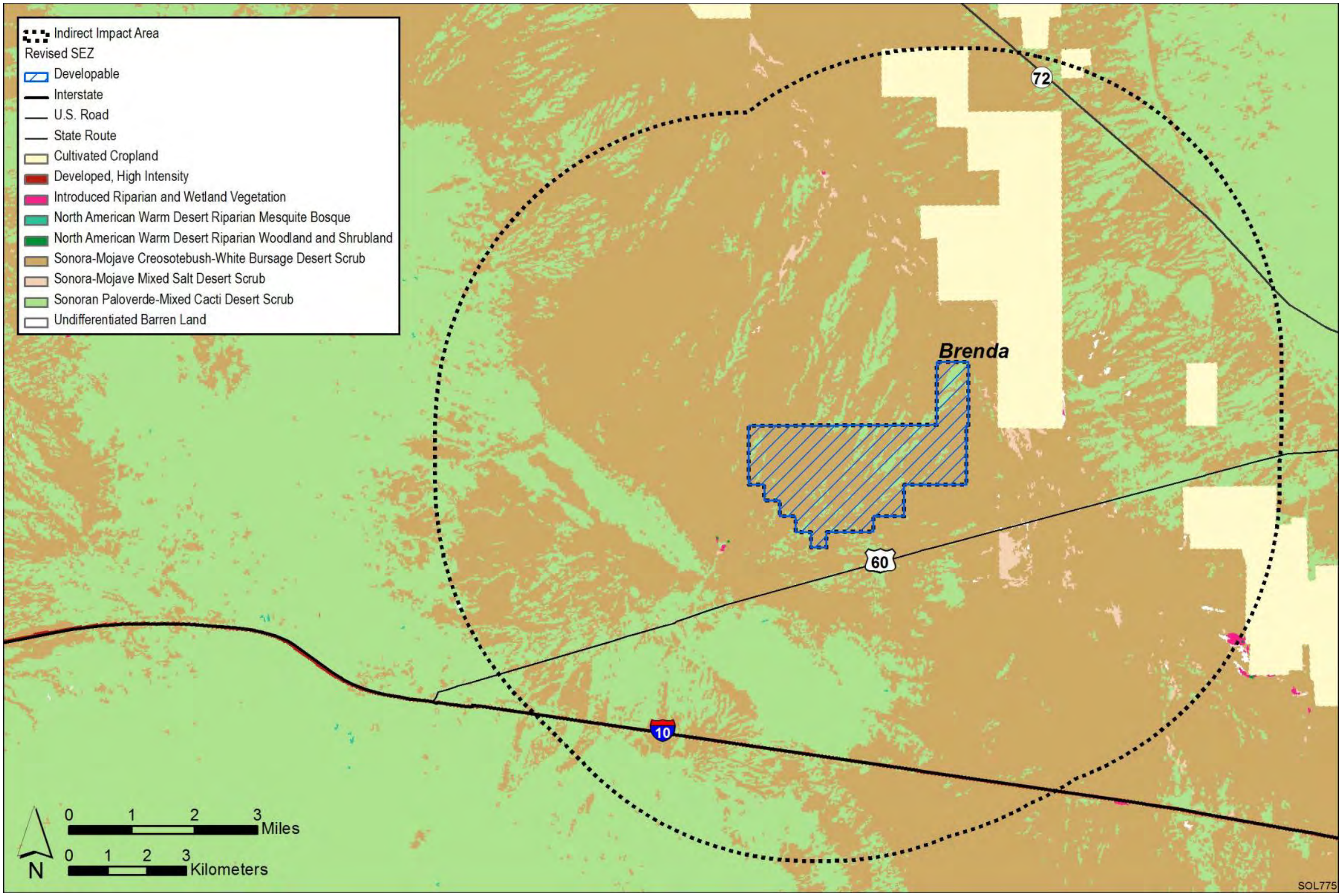


FIGURE 8.1.10.1-1 Land Cover Types within the Proposed Brenda SEZ as Revised

8.1.10.2.2 Impacts from Noxious Weeds and Invasive Plant Species

As presented the Draft Solar PEIS, land disturbance from project activities and indirect effects of construction and operation within the Brenda SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 8.1.10.1 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.

8.1.10.3 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. SEZ-specific species and habitats will determine how programmatic design features are applied, for example:

- All dry wash, dry wash woodland, saguaro cactus, and ironwood (including those outside of washes) communities within the SEZ shall be avoided to the extent practicable, and any impacts minimized and mitigated in consultation with appropriate agencies. A buffer area should be maintained around dry washes and dry wash woodland habitats to reduce the potential for impacts.

- Appropriate engineering controls shall be used to minimize impacts on dry wash, dry wash woodland, and chenopod scrub, 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.

- Groundwater withdrawals shall be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite bosque communities, and microphyll (palo verde/ironwood) communities.

It is anticipated that implementation of these programmatic design features will reduce a high potential for impacts from invasive species and impacts on dry wash, dry wash woodland, mesquite bosque, and saguaro cactus communities to a minimal potential for impact. Residual impacts on groundwater-dependent habitats could result from limited groundwater withdrawal and the like; 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.

8.1.11 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.

8.1.11.1 Amphibians and Reptiles

8.1.11.1.1 Affected Environment

As presented in the Draft Solar PEIS, representative amphibian and reptile species expected to occur within the Brenda SEZ include the Great Basin spadefoot (*Spea intermontana*), red-spotted toad (*Bufo punctatus*), desert horned lizard (*Phrynosoma platyrhinos*), Great Basin collared lizard (*Crotaphytus bicinctores*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), common kingsnake (*Lampropeltis gentula*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), groundsnake (*Sonora semiannulata*), and nightsnake (*Hypsiglena torquata*). The Mohave rattlesnake (*Crotalus scutulatus*), sidewinder (*C. cerastes*), and western diamond-backed rattlesnake (*C. atrox*) would be the most common poisonous snake species expected to occur on the SEZ. The reduction in size of the Brenda SEZ does not alter the potential for these species to occur in the affected area.

8.1.11.1.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Brenda SEZ could affect potentially suitable habitats for the representative amphibian and reptile species. The analysis presented in the Draft Solar PEIS for the original Brenda SEZ indicated that development would result in a small overall impact on the representative amphibian and reptile species (Table 8.1.11.1-1 in the Draft Solar PEIS). The reduction in size of the Brenda 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.

8.1.11.1.3 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 are anticipated to be small.

Because of the change in the SEZ boundaries, the SEZ-specific design feature identified in the Draft Solar PEIS (i.e., Bouse Wash 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.

8.1.11.2 Birds

8.1.11.2.1 Affected Environment

As presented in the Draft Solar PEIS, a large number of bird species could occur or have potentially suitable habitat within the affected area of the proposed Brenda SEZ. Representative bird species identified in the Draft Solar PEIS included (1) shorebirds: killdeer (*Charadrius vociferus*); (2) passerines: ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), Brewer's sparrow (*Spizella breweri*), cactus wren (*Campylorhynchus brunneicapillus*), common poorwill (*Phalaenoptilus nuttallii*), common raven (*Corvus corax*), Costa's hummingbird (*Calypte costae*), Gila woodpecker (*Melanerpes uropygialis*), 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*), Lucy's warbler (*Vermivora luciae*), phainopepla (*Phainopepla nitens*), Say's phoebe (*Sayornis saya*), and verdin (*Auriparus flaviceps*); (3) raptors: American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*); and (4) upland gamebirds: Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), and white-winged dove (*Zenaida asiatica*). The reduction in size of the Brenda SEZ does not alter the potential for these species or other bird species to occur in the affected area.

8.1.11.2.2 Impacts

Solar energy development within the Brenda SEZ could affect potentially suitable bird habitats. The analysis presented in the Draft Solar PEIS indicated that development would result in a small overall impact on the representative bird species (Table 8.1.11.2-1 in the Draft Solar PEIS). The reduction in size of the Brenda 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.

8.1.11.2.3 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 bird species are anticipated to be small.

Because of the change in the SEZ boundaries, one of the SEZ-specific design features identified in the Draft Solar PEIS (i.e., Bouse Wash shall 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 for birds. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.1.11.3 Mammals

8.1.11.3.1 Affected Environment

As presented in 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 Brenda SEZ. Representative mammal species identified in the Draft Solar PEIS included (1) big game species: cougar (*Puma concolor*) and mule deer (*Odocoileus hemionus*); (2) furbearers and small game species: the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), gray fox (*Urocyon cinereoargenteus*), javelina or collared peccary (*Pecari tajacu*), kit fox (*Vulpes macrotis*), ringtail (*Bassariscus astutus*), and striped skunk (*Mephitis mephitis*); and (3) small nongame species: Arizona pocket mouse (*Perognathus amplus*), Botta's pocket gopher (*Thomomys bottae*), cactus mouse (*Peromyscus eremicus*), canyon mouse (*P. crinitis*), deer mouse (*P. maniculatus*), desert pocket mouse (*Chaetodipus penicillatus*), desert shrew (*Notiosorex crawfordi*), desert woodrat (*Neotoma lepida*), Merriam's pocket mouse (*Dipodomys merriami*), round-tailed ground squirrel (*Spermophilus tereticaudus*), southern grasshopper mouse (*Onychomys torridus*), 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*), silver-haired bat (*Lasionycteris noctivagans*), spotted bat (*Euderma maculatum*), and western pipistrelle (*Pipistrellus hesperus*). However, roost sites for the bat species (e.g., caves, hollow trees, rock crevices, or buildings) would be limited, to absent, within the SEZ. Several other special status bat species that could occur within the SEZ area are addressed in Section 8.1.12.1.

8.1.11.3.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Brenda SEZ could affect potentially suitable habitats of mammal species. The analysis presented in the Draft Solar PEIS indicated that development would result in a small overall impact on the representative mammal species analyzed (Table 8.1.11.3-1 in the Draft Solar PEIS). The reduction in size of the Brenda SEZ would result in reduced habitat impacts for all representative mammal species; resultant impact levels for all representative mammal species would still be small.

8.1.11.3.3 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 are anticipated to be small.

Because of the change in the SEZ boundaries, one of the SEZ-specific design features identified in Section 8.1.11.3.3 of the Draft Solar PEIS (i.e., Bouse Wash 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 mammals 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.

8.1.11.4 Aquatic Biota

8.1.11.4.1 Affected Environment

There are no permanent water bodies or perennial streams within the boundaries of the Brenda SEZ. The boundaries of the Brenda SEZ given in the Draft Solar PEIS have been reduced. Based on the boundary changes, updates to the Draft Solar PEIS include the following:

- Bouse Wash is no longer located within the SEZ, but it is located within the area of potential indirect effects within 5 mi (8 km) of the SEZ.

- Intermittent streams are the only surface water feature in the area of direct and indirect effects, and their area represents less than 2% of the total amount of intermittent stream present in the 50-mi (80-km) SEZ region.

Aquatic biota present in the surface water features in the Brenda SEZ have not been characterized. 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 the aquatic biota, if present, in Bouse Wash.

8.1.11.4.2 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:

- Bouse Wash is no longer located within the SEZ; therefore, Bouse Wash would not be directly affected by construction activities. However, as described in the Draft Solar PEIS, Bouse Wash could be affected indirectly by solar development activities within the SEZ.

8.1.11.4.3 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 guide how programmatic design features are applied, for example:

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

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 Brenda 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.

8.1.12 Special Status Species

8.1.12.1 Affected Environment

As presented in the Draft Solar PEIS, 20 special status species were identified that could occur or have potentially suitable habitat within the affected area of the proposed Brenda SEZ. The reduction in size of the Brenda SEZ by 530 acres (2.1 km^2) does not alter the potential for these species or any additional special status species to occur in the affected area. In the Draft Solar PEIS, the Sonoran population of the desert tortoise (*Gopherus agassizii*) was described as under review for listing under the Endangered Species Act (ESA). Since publication of the Draft Solar PEIS, the Sonoran population of the desert tortoise was determined to be a candidate for listing under the ESA with a Listing Priority Number (LPN) of 6 (75 CFR 78094).

8.1.12.2 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 Brenda SEZ could affect potentially suitable habitats of special status species. The analysis presented in the Draft Solar PEIS for the original Brenda SEZ indicated that development would result in no impact or a small overall impact on all special status species. Development within the revised Brenda SEZ could still affect the same 20 special status species as evaluated in the Draft Solar PEIS. The reduction in size of the Brenda SEZ would result in reduced (but still small) impact levels compared to original estimates in the Draft Solar PEIS.

8.1.12.3 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 guide how programmatic design features are applied, for example:

- Pre-disturbance surveys shall be conducted within the area of direct effects to determine the presence and abundance of special status species, including those identified in Table 8.1.12.1-1 of the Draft 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 effect 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 of dunes and sand flats in the area of direct effects shall be avoided or minimized to reduce impacts on the arid tansy-aster.

- Disturbance of any agricultural and riparian habitats in the area of direct effects shall be avoided or minimized to reduce impacts on the lowland leopard frog.

- Consultation with the USFWS and the Arizona Game and Fish Department (AZGFD) shall be conducted to address the potential for impacts on the Sonoran population of bald eagle, a species listed as threatened under the ESA and California Endangered Species Act (CESA). Consultation would identify an appropriate survey protocol, avoidance 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 AZGFD should be conducted to address the potential for impacts on the Sonoran population of the desert tortoise, a species under review for listing under the ESA. Coordination would identify an appropriate survey protocol and mitigation requirements, which may include avoidance, minimization, translocation, or compensation.

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 new 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.

8.1.13 Air Quality and Climate

8.1.13.1 Affected Environment

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

8.1.13.1.1 Existing Air Emissions

The Draft Solar PEIS presented La Paz County emissions data for 2002. More recent data for 2008 (EPA 2011a) were reviewed for this Final Solar PEIS. The two emissions inventories used different sources and assumptions. For example, the 2008 data did not include biogenic volatile organic compound (VOC) emissions. All emissions except PM_{10} (particulate matter with an aerodynamic diameter of 10 μm or less) were lower in the more recent data; PM_{10} emissions were about 2% higher in the 2008 data. These changes would not affect the modeled air quality impacts presented in this update.

8.1.13.1.2 Air Quality

The calendar quarterly average National Ambient Air Quality Standard (NAAQS) of 1.5 μg/m^3 for lead (Pb) presented in Table 8.1.13.1-2 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), 1-hour ozone (O_3), and annual PM_{10} (particulate matter with a diameter of 10 μm or less) standards have been revoked as well (EPA 2011b). Arizona adopted the NAAQS, and these changes are thus reflected in the Arizona State Ambient Air Quality Standards (SAAQS). These changes will not affect the modeled air quality impacts presented in this update.

8.1.13.2 Impacts

8.1.13.2.1 Construction

Methods and Assumptions

Except as noted below, the methods and modeling assumptions have not changed from those presented in the Draft Solar PEIS.

The developable area of the proposed Brenda SEZ was reduced by 530 acres (2.1 km^2) by eliminating the area of Bouse Wash on the east side of the SEZ and eliminating the area on the west side of the SEZ to the west of the county road. In the Draft Solar PEIS, concentrations at human receptors and cities were estimated indirectly from contours based on modeled concentrations at gridded receptors. In this Final Solar PEIS, concentrations are estimated directly at those receptors.

Modeling for the Draft Solar PEIS assumed that up to 3,000 acres (12.1 km^2) would be disturbed at any one time. This Final Solar PEIS assumed that up to 2,678 acres (10.8 km^2), or 80% of the developable area, would be disturbed at any one time.

Results

Since the annual PM_{10} standard has been rescinded, the discussion of annual PM_{10} impacts in the Draft Solar PEIS is no longer applicable.

As noted in Table 8.1.13.2-1 of the Draft Solar PEIS, the background levels of 24-hour PM_{10} and $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5 μm or less) available for the Draft Solar PEIS were above the standard levels, and any increase from construction emissions would increase levels already above the standard levels. Background levels of annual $PM_{2.5}$ were about 90% of the standard level.

With the reduced size of the Brenda SEZ, predicted concentrations for this Final Solar PEIS, as shown in Table 8.1.13.2-1, would be lower than or comparable to those presented in the Draft Solar PEIS. However, the conclusions in the Draft Solar PEIS remain valid at the boundary. Predicted 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$ concentration levels could exceed the standard levels at the SEZ boundaries and in the immediate surrounding areas during

TABLE 8.1.13.2-1 Maximum Air Quality Impacts from Emissions Associated with Construction Activities for the Proposed Brenda SEZ as Revised

			Concentration ($\mu g/m^3$)				Percentage of NAAQS	
Pollutant[a]	Averaging Time	Rank[b]	Maximum Increment[b]	Background[c]	Total	NAAQS	Increment	Total
PM_{10}	24 hours	H6H	400	204	604	150	267	403
$PM_{2.5}$	24 hours	H8H	26.3	42.3	68.6	35	75	196
	Annual	–[d]	7.3	13.5	20.8	15	49	139

[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 8.1.13.1-2 of the Draft Solar PEIS.

[d] A dash indicates not applicable.

the construction of solar facilities. High PM_{10} concentrations would be limited, however, to the immediate areas surrounding the SEZ boundary and would decrease quickly with distance.

Given that background particulate levels appear to be high, the Draft Solar PEIS presented concentration increments at human receptors. For this Final Solar PEIS, these increments were remodeled directly as noted above.[1] Predicted maximum 24-hour PM_{10} concentration increments would be about 141 $\mu g/m^3$ at Pioneer (about 0.4 mi [0.6 km] south of the SEZ), about 13 $\mu g/m^3$ at Brenda, about 15 $\mu g/m^3$ at Vicksburg, about 7 $\mu g/m^3$ at Bouse, and about 4 $\mu g/m^3$ at Quartzsite. At Pioneer, predicted maximum 24-hour and annual $PM_{2.5}$ concentration increments would be about 9.3 and 0.9 $\mu g/m^3$, respectively. Given that even these small impacts would, during the construction period, add to air quality levels already exceeding standard levels, refined modeling and a site-specific determination of local particulate background levels should be undertaken for specific projects.

[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. Therefore, it has been assumed that an area of 2,678 acres (10.8 km^2), that is, 80% of the developable area, would be disturbed continuously; thus 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.

Updated 24-hour and annual PM_{10} concentration increments at the surrogate receptors[2] for the nearest Class I Area—Joshua Tree National Park (NP) in California—would still be less than Prevention of Significant Deterioration (PSD) increments for the Class I area. These surrogate receptors are more than 45 mi (72 km) from Joshua Tree NP, and thus concentrations in Joshua Tree NP would be much lower than those at the surrogates and would not exceed the Class I PSD increments.

In conclusion, predicted 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$ concentration levels could exceed the NAAQS levels at the SEZ boundaries and in the immediate 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 concentrations of particulates at nearby communities would be much lower, but would still add to impacts on those communities because background particulate levels are high. Modeling indicates that emissions from construction activities are not anticipated to exceed Class I PSD PM_{10} increments at the nearest federal Class I area (Joshua Tree NP in California). Construction activities are not subject to the PSD program, and the comparison provides only a screen for gauging the magnitude of the impact. Accordingly, it is anticipated that impacts of construction activities on ambient air quality would be moderate and temporary.

The transmission assessment for the proposed Brenda SEZ has been updated; the hypothetical transmission corridor assessed in the Draft Solar PEIS is no longer applicable. General air quality impacts associated with construction and operation of transmission lines are discussed in Section 5.11 of the Draft Solar PEIS and this Final Solar PEIS.

8.1.13.2.2 Operations

The reduction in the developable area of the proposed Brenda SEZ by 13.7% from 3,878 acres (15.7 km^2) to 3,348 acres (13.5 km^2) decreases the generating capacity and annual power generation and thus the potentially avoided emissions presented in the Draft Solar PEIS. Total revised power generation capacity ranging from 298 to 536 MW is estimated for the Brenda SEZ for various solar technologies (see Section 8.1.2). 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 use that is avoided. Updated estimates for emissions potentially avoided by a solar facility can be obtained from the table in the Draft Solar PEIS by reducing the tabulated estimates by about 13.7%, as shown in the revised Table 8.1.13.2-2. For example, for the technologies estimated to require 9 acres/MW (power tower, dish engine, and PV), up to 618 tons/yr of NO_x (= 86.3% × the value of 716 tons/yr tabulated in the Draft Solar PEIS) could be avoided by full solar development of the Brenda SEZ as revised for this Final Solar PEIS. Even with the reduction in size of the proposed Brenda SEZ, the conclusions of the Draft Solar PEIS remain valid. Full solar development of the proposed

[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 direction of the nearest Class I area were selected as surrogates for the PSD analysis.

TABLE 8.1.13.2-2 Annual Emissions from Combustion-Related Power Generation Avoided by Full Solar Development of the Proposed Brenda 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
3,847	342–616	599–1,078	461–830	710–1,279	0.007–0.012	509–917
Percentage of total emissions from electric power systems in the state of Arizona[e]			0.87–1.6%	0.87–1.6%	0.87–1.6%	0.87–1.6%
Percentage of total emissions from all source categories in the state of Arizona[f]			0.42–0.75%	0.20–0.35%	–[g]	0.48–0.86%
Percentage of total emissions from electric power systems in the six-state study area[e]			0.18–0.33%	0.19–0.35%	0.22–0.40%	0.19–0.35%
Percentage of total emissions from all source categories in the six-state study area[f]			0.10–0.18%	0.03–0.05%	–	0.06–0.11%

[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 aces (0.036 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 1.54, 2.37, 2.2×10^{-5}, and 1,700 lb/MWh, respectively, were used for the state of Arizona.

[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).

Brenda SEZ could reduce fuel combustion–related emissions in Arizona to some extent, but relatively less so than those built in other states with higher fossil use rates.

8.1.13.2.3 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 would be moderate and temporary.

8.1.13.3 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 BLM's 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 for air quality 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.

8.1.14 Visual Resources

8.1.14.1 Affected Environment

The SEZ boundaries have been revised and extend approximately 2 mi (3.2 km) north to south at its greatest extent and 3.5 mi (5.6 km^2) east to west. The SEZ has been revised to eliminate 530 acres (2.1 km^2). The proposed Brenda SEZ now occupies an area of 3,348 acres (13.5 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.

The Lake Havasu Final Environmental Impact Statement identifies the areas within the Brenda SEZ as having low scenic quality and low visual sensitivity (BLM 2006). The International Dark Sky Association also has identified lands in the vicinity of the Brenda SEZ as important night sky–observing sites.

8.1.14.2 Impacts

The reduction in size of the SEZ would reduce 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 would reduce the geographic extent of the visible infrastructure.

The reduction in size of the SEZ eliminated approximately 14% 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 nonelevated 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.

8.1.14.2.1 Impacts on the Proposed Brenda SEZ

Although the reduction in size of the SEZ discussed in Section 8.1.14.2 would reduce visual contrasts associated with solar development, solar development within the SEZ still would involve major modification of the existing character of the landscape and would likely 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.

8.1.14.2.2 Impacts on Lands Surrounding the Proposed Brenda 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 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. Figure 8.1.14.2-1 shows the combined results of the viewshed analyses for all four solar technologies. The colored portions 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 the absence of screening vegetation or structures and adequate lighting and other atmospheric conditions. 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 light brown and the additional areas shaded 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 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 could be visible from the additional areas shaded medium brown.

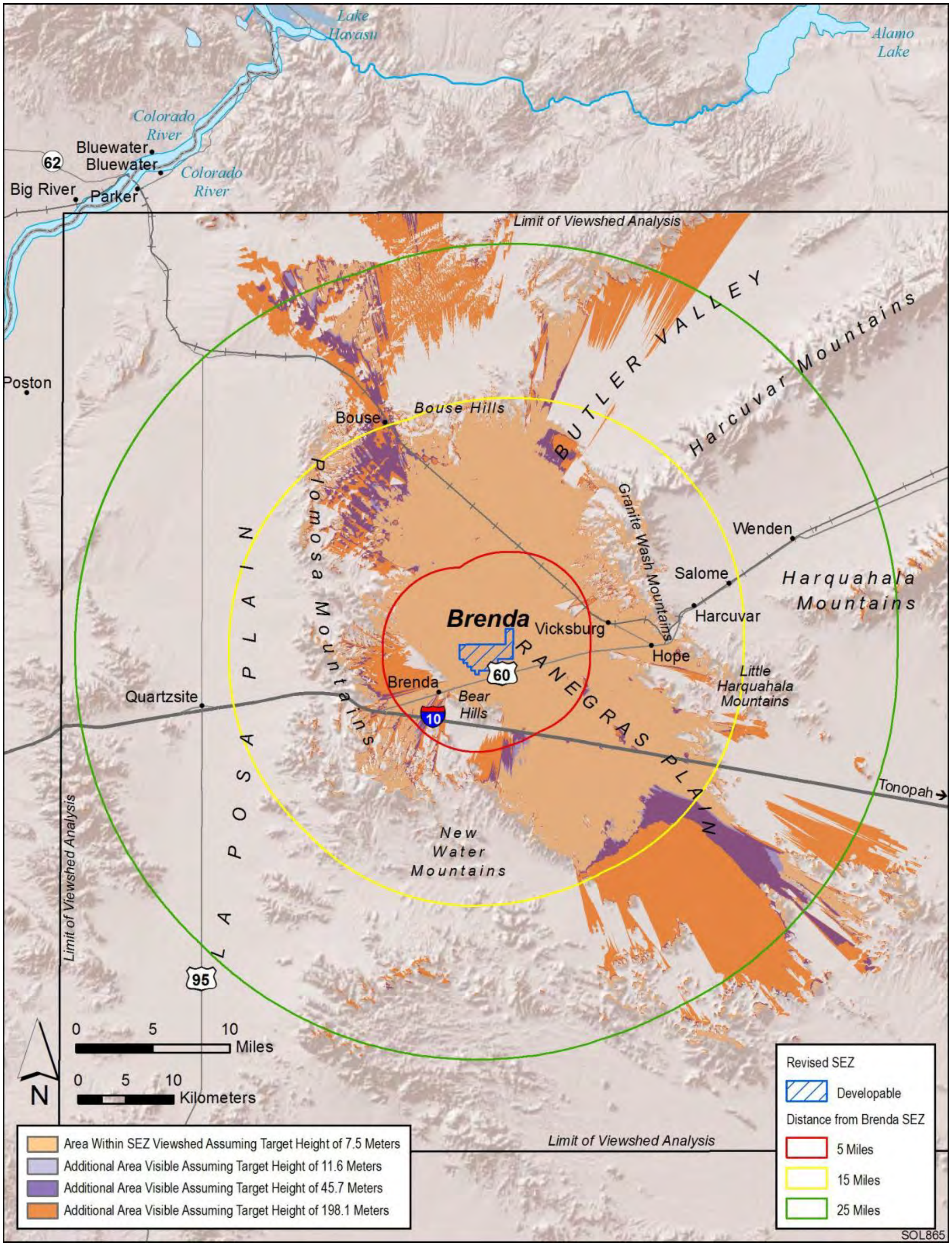


FIGURE 8.1.14.2-1 Viewshed Analyses for the Proposed Brenda SEZ as Revised and Surrounding Lands, Assuming Viewshed Heights of 24.6 ft (7.5 m), 38 ft (11.6 m), 150 ft (45.7 m), and 650 ft (198.1 m) (shaded areas indicate lands from which solar development and/or associated structures within the SEZ could be visible)

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

Figure 8.1.14.2-2 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 could have views of solar facilities within the SEZ and therefore potentially would be subject to visual impacts from those facilities. Distance zones that correspond with BLM's Visual Resource Management (VRM) System-specified foreground-middleground distance (5 mi [8 km]), background distance (15 mi [24 km]), and a 25-mi (40-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 viewshed analyses 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;
- 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 8.1.14.2-1. 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.

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 most of the surrounding scenic resource areas listed in Table 8.1.14.2-1. An exception includes the Plomosa SRMA,

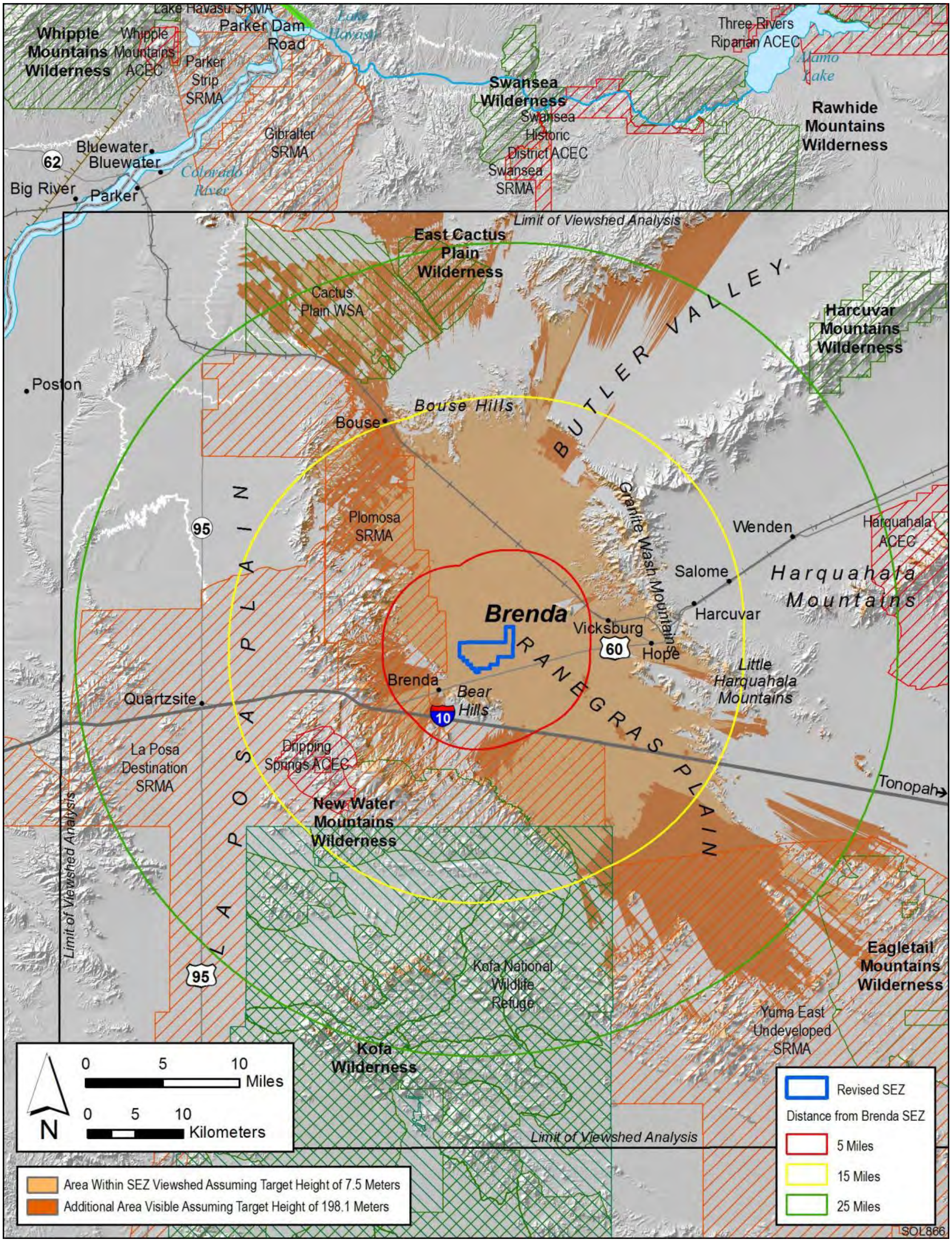


FIGURE 8.1.14.2-2 Overlay of Selected Sensitive Visual Resource Areas onto Combined 650-ft (198.1-m) and 24.6-ft (7.5-m) Viewsheds for the Proposed Brenda SEZ as Revised

TABLE 8.1.14.2-1 Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Proposed Brenda SEZ as Revised, Assuming a Target Height of 650 ft (198.1 m)

		Feature Area or Linear Distance[b,c]		
			Visible Between	
Feature Type	Feature Name (Total Acreage/Linear Distance)[a]	Visible within 5 mi	5 and 15 mi	15 and 25 mi
Wilderness Areas (WAs)	East Cactus Plain (14,317 acres)	0 acres (0%)	0 acres (0%)	9,218 acres (64%)
	Kofa (547,730 acres)	0 acres (0%)	1,481 acres (0%)	4,247 acres (1%)
	New Water Mountains (24,627 acres)	0 acres (0%)	3,871 acres (16%)	0 acres (0%)
WSA	Cactus Plain (58,893 acres)	0 acres (0%)	0 acres (0%)	24,899 acres (42%)
NWR	Kofa (665,435 acres)	0 acres (0%)	6,950 acres (1%)	5,055 acres (1%)
SRMA	Plomosa[d] (109,314 acres)	15,931 acres (15%)	34,717 acres (32%)	3,078 acres (3%)
ACEC	Dripping Springs (11,081 acres)	0 acres (0%)	378 acres (3%)	0 acres (0%)
	Harquahala (77,201 acres)	0 acres (0%)	0 acres (0%)	34 acres (0%)

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

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

[c] To convert mi to km, multiply by 1.609.

[d] The Plomosa Backcountry Byway, Plomosa Bouse Plain, and the Plomosa Mountains SRMAs were combined into one SRMA since the Draft Solar PEIS was published. The acreage reported in this Final Solar PEIS is for the combined SRMA.

which still would be subject to minimal to strong contrasts, depending on viewer location within the SRMA.

In addition to these areas, impacts on other lands and resource areas also were evaluated. These areas include U.S. 60, Interstate-10 (I-10), and the communities of Vicksburg, Brenda, and Hope.

8.1.14.2.4 Summary of Visual Resource Impacts for the Proposed Brenda SEZ

The visual contrast analysis in the Draft Solar PEIS determined that because there could be multiple solar facilities within the Brenda SEZ, a variety of technologies employed, 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 revision of the SEZ would reduce 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 Brenda SEZ: Contrasts experienced by viewers within the SEZ would be reduced due to the elimination of acreage within the Bouse Wash and a small area within the western portion of the SEZ. However, strong contrasts still could be observed in the remaining developable area.

- East Cactus Plain Wilderness Area (WA): A very slight reduction in contrasts would be anticipated; however, solar energy development within the SEZ still would cause minimal contrasts.

- Kofa WA: A very slight reduction in contrasts would be anticipated; however, solar energy development within the SEZ still would cause minimal to weak contrasts.

- New Water Mountains: A slight reduction in contrasts would be anticipated; however, solar energy development within the SEZ still would cause minimal to weak contrasts, with higher levels of contrast expected for the higher elevation viewpoints within the WA.

- Cactus Plain WSA: A very slight reduction in contrasts would be anticipated; however, solar energy development within the SEZ still would cause minimal contrasts.

- Kofa NWR: A very slight reduction in contrasts would be anticipated; however, solar energy development within the SEZ still would cause minimal to weak contrasts. Higher levels of contrast would be expected for the higher elevation viewpoints within the NWR.

- Plomosa SRMA: The Plomosa Backcountry Byway, Plomosa Bouse Plain, and the Plomosa Mountains SRMAs were combined into one SRMA since the Draft Solar PEIS was published. As presented in the Draft Solar PEIS, a range of minimal to strong contrasts would have been observed in the three SRMAs, depending on viewer location within the SRMAs.

- Because of the elimination of acreage within the western portions of the SEZ, a slight overall reduction in contrasts would be anticipated for observers within the combined SRMA; however, solar energy development within the SEZ still would cause minimal to strong contrasts, dependent on the viewer location within the combined Plomosa SRMA.

- Dripping Springs (and Dripping Springs ACEC): A very slight reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause minimal to weak contrasts, depending on viewer location within the ACEC. Higher levels of contrast would be expected for the higher elevation viewpoints within the ACEC.

- Harquahala ACEC: No reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal contrasts. Higher levels of contrast would be expected for the higher elevation viewpoints within the ACEC.

- U.S. 60: A slight reduction in contrasts would be anticipated due to the elimination of acreage within the eastern and western portions of the SEZ; however, solar development within the SEZ still would cause weak to strong contrasts, depending on viewer location on U.S. 60.

- I-10: The view from I-10, immediately south of the SEZ, largely is screened by the Bear Hills. Views of the SEZ, however, would be possible from locations east and west of the hills. A slight reduction in contrasts would be anticipated due to the elimination of acreage within the eastern and western portions of the SEZ; solar development within the SEZ still would cause weak to moderate contrasts, depending on viewer location on I-10.

- Vicksburg: A slight reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak to moderate contrasts, depending on viewer location in Vicksburg.

- Brenda: A slight reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak to moderate contrasts, depending on viewer location in Brenda.

- Hope: A slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak contrasts.

In addition to those areas evaluated within the Draft Solar PEIS, the following areas also may potentially be affected by solar development within the SEZ:

- La Posa Destination SRMA: This SRMA is located to the south and west of the Brenda SEZ. A portion immediately south of the SEZ would be screened from view of the solar development by the Bear Hills. The northeastern boundary of this SRMA is the I-10 corridor. Solar development within the SEZ would be expected to cause minimal to moderate contrasts, dependent on the viewer's location within the SRMA.

- Yuma East Undeveloped SRMA: This SRMA is located approximately 15 mi (24 km) to the southeast of the Brenda SEZ. The western boundary of the SRMA abuts the Kofa NWR. Solar development within the SEZ would be expected to cause minimal contrasts.

Table 8.4.14.2-2 provides the acreage of these areas that would be visible within the 650 ft (198.1 m) viewshed.

8.1.14.3 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 would 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.

8.1.15 Acoustic Environment

8.1.15.1 Affected Environment

The developable area of the proposed Brenda SEZ was reduced by about 13.7% from 3,878 acres (15.7 km^2) to 3,348 acres (13.5 km^2). Distances between the SEZ and nearby noise receptors in this Final Solar PEIS remain the same or increase about 1 mi (1.6 km) compared to the corresponding distance in the Draft Solar PEIS. Except as noted below, the conclusions in the Draft Solar PEIS remain valid.

TABLE 8.1.14.2-2 Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Proposed Brenda SEZ as Revised, Assuming a Target Height of 650 ft (198.1 m)

		Feature Area or Linear Distance[b,c]		
			Visible Between	
Feature Type	Feature Name (Total Acreage/Linear Distance)[a]	Visible within 5 mi	5 and 15 mi	15 and 25 mi
SRMA	La Posa Destination (362,523 acres)	2,547 acres (1%)	38,115 acres (11%)	15 acres (0%)
	Yuma East Undeveloped (517,443 acres)	0 acres (0%)	0 acres (0%)	47,084 acres (9%)

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

[b] To convert mi to km, multiply by 1.609.

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

8.1.15.2 Impacts

8.1.15.2.1 Construction

Except for wildlife impacts in the Plomosa SRMA, the results and conclusion presented in the Draft Solar PEIS remain valid.

On the basis of comments received and recent references as applicable, this Final Solar PEIS used an updated 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. As a result of this updated analysis, the assessment of impacts has been updated as follows. The estimated noise level at the boundary of the Plomosa SRMA (as close as bout 0.85 mi [1.4 km] to the west of the SEZ) from construction activities occurring near the western edge of the proposed Brenda SEZ is about 44 dBA. This estimated level is below the significance threshold, and thus noise from construction in the proposed Brenda SEZ is not anticipated to considerably affect wildlife in the nearby specially designated areas. As discussed in Section 5.10.2 of the Draft Solar PEIS and this Final Solar PEIS, there is the potential for other effects to occur at lower noise levels (Barber et al. 2011). On the basis of 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 project-specific basis, including consideration of site-specific background levels and hearing sensitivity for terrestrial wildlife of concern.

Given the small changes in the boundaries of the SEZ, construction noise and vibration impacts would be the same or slightly less than those presented in the Draft Solar PEIS. Construction would cause some unavoidable but localized short-term noise impacts on neighboring communities, particularly for activities occurring near the southern proposed SEZ boundary, close to the nearby residences along U.S. 60. No adverse impacts from vibration, including vibration from pile driving for dish engines, are anticipated from construction activities.

8.1.15.2.2 Operations

Except for wildlife impacts in the Plomosa SRMA, the results and conclusions presented in the Draft Solar PEIS remain valid.

Parabolic Trough and Power Tower

Given the small change in the developable area in the proposed SEZ, the conclusions of the Draft Solar PEIS for parabolic trough and power tower technologies remain valid. If thermal energy storage (TES) were not used for parabolic trough and power tower technologies, estimated noise levels at the nearest residences would be 47 dBA L_{dn}, exceeding the 40-dBA typical daytime mean rural background noise level, but for 12 hours of daytime operation, 45 dBA L_{dn}, would not exceed the EPA guideline level of 55 dBA L_{dn} for residential areas. If TES were used (resulting in a longer daily operating period), facilities located near the SEZ boundary could result in adverse noise impacts at the nearest residences, depending on background noise levels and meteorological conditions.

As stated above under construction impacts, for this Final Solar PEIS, an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. With operation of a parabolic trough or power tower facility with TES at the SEZ, revised estimated daytime and nighttime noise levels at the boundary of the Plomosa SRMA are about 42 and 52 dBA, respectively. These estimated levels are below the significance threshold, and thus noise from operations in the proposed Brenda SEZ is not anticipated to considerably affect wildlife in the nearby specially designated areas. However, there is the potential for other effects to occur at lower noise levels. On the basis of these impacts and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from operation noise from parabolic trough or power tower facilities would have to be considered on a project-specific basis, including consideration of site-specific background levels and hearing sensitivity for terrestrial wildlife of concern.

Dish Engine

Even though the total number of dish engines would be reduced by about 14% if the proposed Brenda were fully developed, the conclusions of the Draft Solar PEIS for dish engine technologies remain valid, because the overall noise level at any receptor is mostly influenced by the nearest dish engines. The expected noise level of 51 dBA at the nearest residences exceeds 40 dBA, a typical daytime mean rural background noise level. For 12 hours of daytime operations, the estimated level of 49 dBA L_{dn} at these residences would be below the EPA guideline of 55 dBA L_{dn} for residential areas. However, noise from dish engines could adversely impact the nearest residences, depending on background noise levels and meteorological conditions. Consideration of minimizing noise impacts is very important during the siting of dish engine facilities.

As stated above for construction impacts, for this Final Solar PEIS, an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. With operation of a dish engine facility at the SEZ, the revised estimated noise level at the boundary of the Plomosa SRMA is about 46 dBA, which is below the updated significance threshold. Accordingly, noise from operations of a dish engine facility in the proposed Brenda SEZ would not be anticipated to adversely affect wildlife in the Plomosa SRMA. However, considering the potential for impacts at lower noise levels, impacts on terrestrial wildlife from dish engine operation noise would have to be considered on a project-specific basis, including consideration of site-specific background levels and hearing sensitivity for terrestrial wildlife of concern.

Given the small changes in the boundaries of the SEZ, the discussions of vibration and transformer and switchyard noise presented in the Draft Solar PEIS remain valid. Noise impacts from these sources would be negligible.

8.1.15.2.3 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 moderate and temporary. Potential noise and vibration impacts on surrounding communities would be less than those for construction activities.

8.1.15.3 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 to the SEZ boundaries, and consideration of comments received as applicable, the following SEZ-specific design feature for noise has been identified:

- Because of the proximity of the proposed Brenda SEZ to nearby residences and the Plomosa SRMA and the relatively high noise levels around the SEZ due to U.S. 60, refined modeling would be warranted along with background noise measurements during project-specific assessments.

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.

8.1.16 Paleontological Resources

8.1.16.1 Affected Environment

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

- 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 3b as used in the Draft Solar PEIS.

8.1.16.2 Impacts

The potential for impacts on significant paleontological resources is unknown. A more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted. The assessment provided in the Draft Solar PEIS remains valid.

8.1.16.3 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 due to changes in the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for paleontological resources have been identified. Because the PFYC of the proposed Brenda SEZ is Class 3b (unknown potential), paleontological surveys would be needed to identify those areas that may have significant paleontological resources; therefore, the need for and nature of any SEZ-specific design features will depend on the findings 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 paleonotological 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.

8.1.17 Cultural Resources

8.1.17.1 Affected Environment

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

- A total of 530 acres (2.1 km^2) of land previously within the Brenda SEZ are now outside of the SEZ boundary.

- 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) potential trail networks through existing ethnographic reports, and (3) overall cultural sensitivity of the landscape.
  - Results of a Class II reconnaissance-level stratified random sample survey of 192 acres (0.8 km^2), or roughly 5.7% of the proposed 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 specific local interest, as determined through a Class I review, and, if appropriate, subsurface testing of dune and/or colluvium areas should be considered in the sampling strategies for 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 2011a), 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.

8.1.17.2 Impacts

As stated in the Draft Solar PEIS, direct impacts on significant cultural resources could occur in the proposed Brenda SEZ; however, further investigation is needed. Data provided in the Draft Solar PEIS remain valid, with the following update:

- Previously identified potential impacts on cultural resources along the Bouse Wash are no longer applicable with the reduction in size of the SEZ.

8.1.17.3 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 due to changes in the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for cultural resources have been identified.

The need for and nature of SEZ-specific design features would be determined in consultation with the Arizona State Historic Preservation Office (SHPO) and affected tribes and would depend on the results of future investigations. Impacts on culturally significant sites and landscapes in the vicinity of the Brenda SEZ at locations such as Ranegras Plain, Granite Wash Pass, Harquahala Mountains, and nearby ACECs and Special Cultural Resource Management Areas (SCRMAs) would need to be avoided, minimized, or otherwise mitigated if solar energy development were to be initiated in the proposed Brenda SEZ. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.1.18 Native American Concerns

8.1.18.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid.

8.1.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. No comments have been received to date concerning the Brenda SEZ; however, the Quechan Indian Tribe has indicated that some of the land in the SEZs lies within their tribal traditional use area. This Tribe has stressed the importance of evaluating impacts on the surrounding landscape as a whole. As consultation with the tribes continues and project-specific analyses are undertaken, it is possible that Native Americans will express concerns over potential visual and other effects of solar energy development within the SEZ.

In relation to past transmission line projects in the area, the Quechan and Yavapai Tribes have expressed concerns regarding the loss of many resources, including among others natural habitat, wild plant resources, game animals, viewsheds, and cremation or burial sites (see also Section 8.1.18.2 of the Draft Solar PEIS). 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.

8.1.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on Native American concerns are described in Section A.2.2 of 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 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 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 affected tribes as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis. The Quechan Tribe has requested that they be consulted at the inception of any solar energy project that would affect resources important to them. The Quechan also suggest that the clustering of large solar energy facilities be avoided; that priority for development be given to lands already disturbed by agricultural or military use; and that the feasibility of placing solar collectors on existing structures be considered, thus minimizing or avoiding the use of undisturbed lands (Jackson 2009). Potentially significant sites and landscapes in the vicinity of the SEZ associated with the Ranegras Plain, Granite Wash Pass, Harquahala Mountains, and nearby ACECs and SCRMAs, as well as traditional plant and animal resources and important water sources, should be considered and discussed during consultation.

8.1.19 Socioeconomics

8.1.19.1 Affected Environment

Although the boundaries of the Brenda SEZ have been reduced compared to the boundaries given in the Draft Solar PEIS, 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 updates to the affected environment information given in the Draft are required.

8.1.19.2 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 the BLM, the in-migration of solar facility workers and their families, impacts on local housing markets and on local community service employment. The impact assessment has been updated in the following sections.

8.1.19.2.1 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 4,683 jobs (Table 8.1.19.2-1). Construction activities would constitute 0.4% of total ROI employment. A solar facility would also produce $275.9 million in income. Direct sales taxes would be $12.3 million, and direct income taxes, $5.6 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 local workforce, 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 663 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 229 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.4% 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, one physician, and one public safety employee (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.

TABLE 8.1.19.2-1 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Brenda SEZ as Revised with Trough Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	1,557	117
Total	4,683	191
Income[c]		
Total	275.9	7.2
Direct state taxes[c]		
Sales	12.3	0.2
Income	5.6	0.2
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	3.5
In-migrants (no.)	663	15
Vacant housing[f] (no.)	229	9
Local community service employment		
Teachers (no.)	6	0
Physicians (no.)	1	0
Public safety (no.)	1	0

[a] Construction impacts are based on the development at the site in a single year; it was assumed that one facility with a combined capacity of up to 536 MW (corresponding to 2,678 acres [11 km^2] of land disturbance) could be built.

[b] Operations impacts are based on full build-out of the site, producing a total output of 536 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] 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 2010a), assuming a solar facility with no storage capability and full build-out of the site. Projects with 3 or more hours of storage would generate higher payments, based on a fee of $7,884/MW.

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

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 191 jobs (Table 8.1.19.2-1). Such a solar facility would also produce $7.2 million in income. Direct sales taxes would be $0.2 million, and direct income taxes, $0.2 million. On the basis of fees established by the BLM (BLM 2010a), acreage rental payments would be $0.2 million, and solar generating capacity payments would total at least $3.5 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 15 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 nine 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.

8.1.19.2.2 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 1,865 jobs (Table 8.1.19.2-2). Construction activities would constitute 0.2% of total ROI employment. Such a solar facility would also produce $109.9 million in income. Direct sales taxes would be less than $4.9 million, with direct income taxes of $2.2 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 local workforce, 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 264 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 91 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.

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

TABLE 8.1.19.2-2 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Brenda SEZ as Revised with Power Tower Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	620	60
Total	1,865	83
Income[c]		
Total	109.9	2.9
Direct state taxes[c]		
Sales	<4.9	<0.1
Income	2.2	0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	2.0
In-migrants (no.)	264	8
Vacant housing[f] (no.)	91	5
Local community service employment		
Teachers (no.)	2	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts are based on the development at the site in a single year; it was assumed that one facility with a combined capacity of up to 298 MW (corresponding to 2,678 acres [11 km^2] of land disturbance) could be built.

[b] Operations impacts are based on full build-out of the site, producing a total output of 298 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] The BLM annual capacity payment was based on a fee of $6,570/per MW, established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010a), assuming a solar facility with no storage capability, and full build-out of the site. Projects with 3 or more hours of storage would generate higher payments, based on a fee of $7,884/MW.

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

two new teachers would be required in the ROI. This increase would represent less than 0.1% of total ROI employment expected in this occupation.

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 83 jobs (Table 8.1.19.2-2). Such a solar facility would also produce $2.9 million in income. Direct sales taxes would be less than $0.1 million, and direct income taxes, $0.1 million. On the basis of fees established by the BLM (BLM 2010a), acreage rental payments would be $0.2 million, and solar generating capacity payments would total at least $2.0 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to eight 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 five 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.

8.1.19.2.3 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 758 jobs (Table 8.1.19.2-3). Construction activities would constitute 0.1% of total ROI employment. Such a solar facility would also produce $44.7 million in income. Direct sales taxes would be less than $2.0 million, and direct income taxes, $0.9 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 local workforce, 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 107 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 37 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 8.1.19.2-3 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Brenda SEZ as Revised with Dish Engine Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	252	59
Total	758	81
Income[c]		
Total	44.7	<2.8
Direct state taxes[c]		
Sales	<2.0	<0.1
Income	0.9	0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	2.0
In-migrants (no.)	107	7
Vacant housing[f] (no.)	37	5
Local community service employment		
Teachers (no.)	1	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts are based on the development at the site in a single year; it was assumed that one facility with a combined capacity of up to 298 MW (corresponding to 2,678 acres [11 km^2] of land disturbance) could be built.

[b] Operations impacts are based on full build-out of the site, producing a total output of 298 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] 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 2010a), assuming a solar facility with no storage capability and full build-out of the site. Projects with 3 or more hours of storage would generate higher payments, based on a fee of $7,884/MW.

[f] 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, one new teacher would be required in the ROI. This increase would represent less than 0.1% of total ROI employment expected in this occupation.

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 81 jobs (Table 8.1.19.2-3). Such a solar facility would also produce less than $2.8 million in income. Direct sales taxes would be less than $0.1 million, and direct income taxes, $0.1 million. On the basis of fees established by the BLM (BLM 2010a), acreage rental payments would be $0.2 million, and solar generating capacity payments would total at least $2.0 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to seven 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 five 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.

8.1.19.2.4 Photovoltaic

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of PV technologies would be up to 354 jobs (Table 8.1.19.2-4). Construction activities would constitute less than 0.1% of total ROI employment. Such a solar development would also produce $20.8 million in income. Direct sales taxes would be $0.9 million, and direct income taxes, $0.4 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 local workforce, 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 50 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

TABLE 8.1.19.2-4 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Brenda SEZ as Revised with PV Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	118	6
Total	354	8
Income[c]		
Total	20.8	0.3
Direct state taxes[c]		
Sales	0.9	<0.1
Income	0.4	<0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	1.6
In-migrants (no.)	50	1
Vacant housing[f] (no.)	17	0
Local community service employment		
Teachers (no.)	0	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts are based on the development at the site in a single year; it was assumed that one facility with a combined capacity of up to 298 MW (corresponding to 2,678 acres [11 km^2] of land disturbance) could be built.

[b] Operations impacts are based on full build-out of the site, producing a total output of 298 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] 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 2010a), assuming full build-out of the site.

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

rental housing units would not be expected to be large, with up to 17 rental units expected to be occupied in 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 eight jobs (Table 8.1.19.2-4). Such a solar facility would also produce $0.3 million in income. Direct sales taxes would be less than $0.1 million, and direct income taxes, less than $0.1 million. On the basis of fees established by the BLM (BLM 2010a), acreage rental payments would be $0.2 million, and solar generating capacity payments would total at least $1.6 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with one person 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 no 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.

8.1.19.3 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. 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 to address socioeconomic impacts 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.

8.1.20 Environmental Justice

8.1.20.1 Affected Environment

The data presented in the Draft Solar PEIS for the proposed Brenda SEZ have not substantially changed. There are no minority or low-income populations in the Arizona portion of the 50-mi (80-km) radius of the SEZ. There is a minority population in the California portion of the 50-mi (80-km) radius of the SEZ.

8.1.20.2 Impacts

Potential impacts (e.g., from noise and dust during construction and operations, visual impacts, cultural impacts, and effects on property values) 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, although there are minority populations defined by Council on Environmental Quality (CEQ) guidelines (CEQ 1997) (see Section 8.1.20.1 of the Draft Solar PEIS) within the 50-mi (80-km) radius around the boundary of the SEZ. That is, any adverse impacts of solar projects could disproportionately affect minority populations. Because there are no low-income populations within the 50-mi (80-km) radius, there would be no impacts on low-income populations.

8.1.20.3 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, updates to those analyses due to changes in 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.

8.1.21 Transportation

8.1.21.1 Affected Environment

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

8.1.21.2 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). The volume of traffic on U.S. 60 would represent an increase in traffic of about 130% in the area of the Brenda SEZ for a solar project. Such traffic levels would represent about a 10 or 100% increase in the traffic levels experienced on I-10 or State Route 72 at their junctions with U.S. 60, respectively, if all project traffic were to be routed through I-10 or State Route 72. Because higher traffic volumes would be experienced during shift changes, traffic on I-10 or State Route 72 could experience minor slowdowns during these time periods in the area of their junctions with U.S. 60. Local road improvements would be necessary on any portion of U.S. 60 that might be developed so as not to overwhelm the local access roads near any site access point(s).

Solar development within the SEZ would affect public access along off-highway vehicle (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.

8.1.21.3 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, will 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 in the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features to address transportation impacts in the proposed Brenda 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.

8.1.22 Cumulative Impacts

The analysis of potential impacts in the vicinity of the proposed Brenda SEZ presented in the Draft Solar PEIS is still generally applicable for this Final Solar PEIS. The size of the developable area of the proposed SEZ has been reduced by about 14%. The following sections include an update to the information presented in the Draft Solar PEIS regarding cumulative effects for the proposed Brenda SEZ.

8.1.22.1 Geographic Extent of the Cumulative Impact 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., impacts on air quality may have a greater geographic extent than impacts on visual resources). The BLM, the U.S. Forest Service (USFS), and DoD administer most of the land around the SEZ; the Colorado River Reservation Tribal lands are also about 25 mi (40 km) northwest of the SEZ. The BLM administers approximately 58% of the lands within a 50-mi (80-km) radius of the SEZ.

8.1.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The Draft Solar PEIS included two other proposed SEZs in Arizona. One of these, Bullard Wash, has been removed from consideration.

There are approximately 26 pending ROW applications for solar facilities within 50 mi (80 km) of the Brenda SEZ that could generate up to about 16,900 MW of electricity on public lands in Arizona (see Table B-1 of 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 one, the Quartzsite Solar Energy Project (discussed below), has firm near-term plans and environmental documentation and is thus considered a reasonably foreseeable action. As of the end of October 2011, the remainder of the applications were not considered reasonably foreseeable future actions.

The ongoing and reasonably foreseeable future actions described below are grouped into two categories: (1) actions related to energy production and distribution (Section 8.1.22.2.1); and (2) other ongoing and reasonably foreseeable actions, including those related to electric power generation and distribution, water management, wildlife management, military facility improvement, and mining (Section 8.1.22.2.2). Together, these actions and trends have the potential to affect human and environmental receptors within the geographic range of potential impacts over the next 20 years.

8.1.22.2.1 Energy Production and Distribution

The list of reasonably foreseeable future actions that relate to energy production and distribution near the proposed Brenda SEZ has been updated and is presented in Table 8.1.22.2-1. Both projects were described in the Draft Solar PEIS. Projects listed in the table are shown in Figure 8.1.22.2-1.

TABLE 8.1.22.2-1 Reasonably Foreseeable Future Actions Related to Energy Development and Distribution near the Proposed Brenda SEZ as Revised[a]

Description	Status	Resources Affected	Primary Impact Location
Renewable Energy Projects on BLM-Administered Lands			
Solar Millennium Blythe Solar Project (CACA 48811), **1000-MW originally planned as parabolic trough facility converting to PV; 7,025 total acres[b]**	**ROD, October 22, 2010, construction started February 2011, construction on hold pending receipt of revised data[c]**	Land use, visual, terrestrial habitats, wildlife, groundwater	About 45 mi[d] west of the Brenda SEZ, within the Riverside East SEZ
Quartzsite Solar Energy Project (AZA 34 666), 100-MW power tower, 1,500 BLM acres	**NOI, January 1, 2010 Draft EIS, November 10, 2011**	**Land use, visual, terrestrial habitats, wildlife**	**10 mi west–northwest of the Brenda SEZ**
Transmission and Distribution Systems			
None			

[a] Includes projects in later stages of agency environmental review and project development. For projects on BLM-administered lands, includes those approved in 2010, and priority projects for 2011 and 2012 (BLM 2011c). Projects with status changed from that given in the Draft Solar PEIS are shown in bold text.

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

[c] Project modified; see BLM (2011d) for details.

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

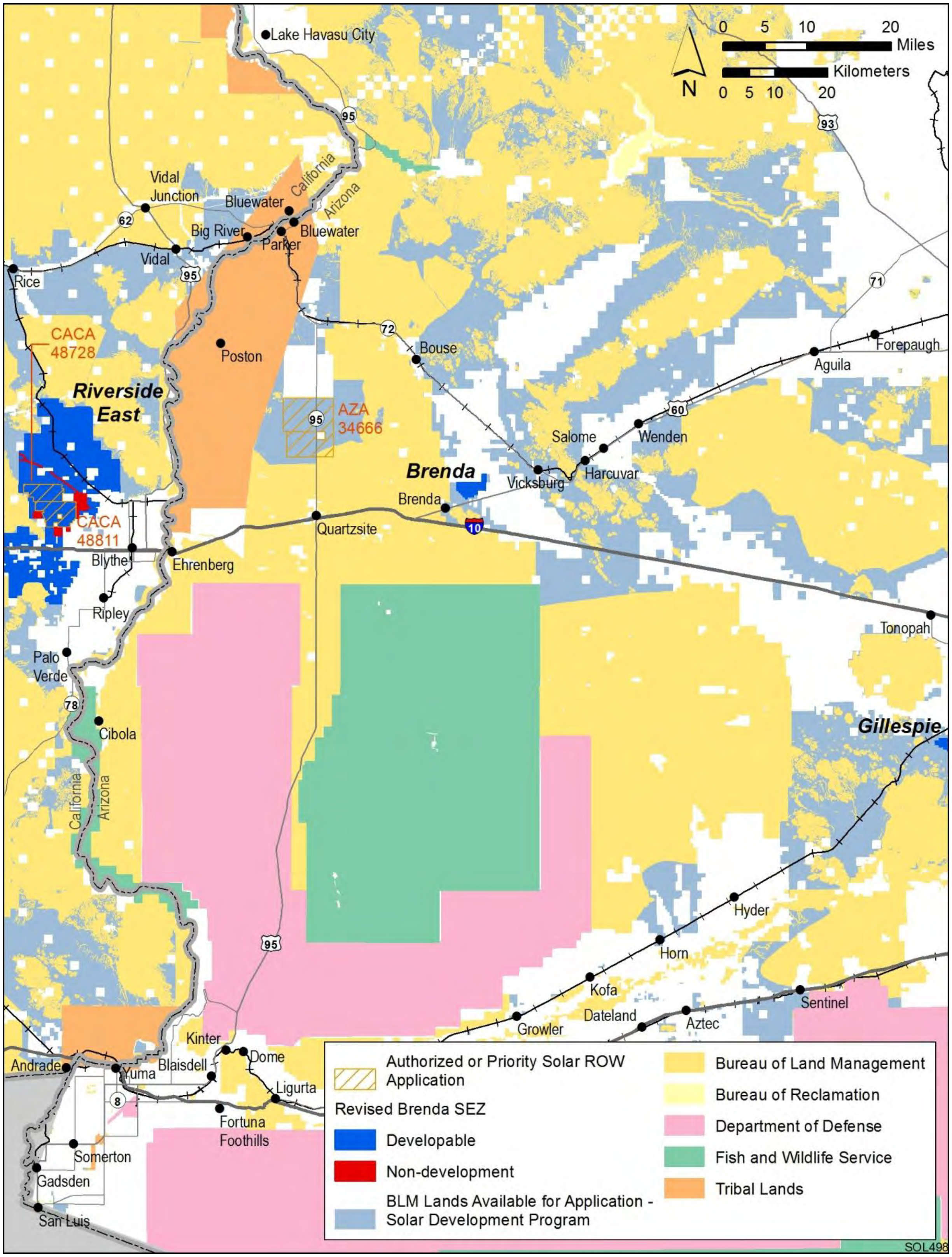
Quartzsite Solar Energy Project

Quartzsite Solar, LLC, proposes to construct a 100-MW power tower solar facility. The proposed site is located on about 1,500 acres (6.1 km^2) of BLM land, approximately 10 mi (16 km) north of Quartzsite, Arizona, and 10 mi (16 km) west–northwest of the Brenda SEZ The facility will interconnect to Western's transmission system throughout the existing Bouse–Kofa transmission line (BLM 2011b).

The plant will utilize a solar power boiler at the top of a 538-ft (164-m) tower, surrounded by a field of approximately 17,500 heliostats (mirrors) that focus the solar energy on the solar power boiler. The receiver would be composed of tube panels through which liquid salt flows.

The cooling system will be dry cooling. Approximately 1,000 ac-ft (1,233,000 m^3) of water will be required during the first year of construction. An estimated 150 ac-ft (185,000 m^3) would be required during the remainder of construction. Approximately 200 ac-ft/yr

1



2 **FIGURE 8.1.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy**
3 **Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Brenda SEZ as Revised**

(250,000 m^3) of water would be required during operation. Water will be provided from on-site wells. Construction of the facility will require about 400 to 500 workers at the peak of construction. Operation and maintenance will employ up to 47 workers.

8.1.22.2.2 Other Actions

Other major ongoing and foreseeable actions identified within 50 mi (80 km) of the proposed Brenda SEZ have been updated and are listed in Table 8.1.22.2-2. All but one of these projects was described in the Draft Solar PEIS.

Fancher Project

Luxicor Gold, LP, proposes to extract 60,000 tons (54,000 metric tons) of gold ore from an underground mine at a site 26 mi (42 km) south–southeast of the SEZ. The mine site has been extensively disturbed by past mining and exploration. The proposed mining operation would be complete within 3 years, and reclamation would require an additional month. The ore would be hauled to a mill site at the Rio del Monte Mine, located 16 mi (28 km) east of the SEZ on private property near Salome, Arizona. The total project area would be 12.25 acres (0.05 km^2), of which only 0.80 acres (0.003 km^2) would be new disturbance. Approximately 15 jobs would be created (BLM 2011e).

8.1.22.3 General Trends

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

8.1.22.4 Cumulative Impacts on Resources

Total disturbance over 20 years in the proposed Brenda SEZ would be about 2,678 acres (10.8 km^2), or 80% of the developable area of the 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 Brenda SEZ may include impacts on water quantity and quality, air quality, ecological resources such as habitat and species, cultural and visual resources, and specially designated lands.

One reasonably foreseeable project on BLM-administered land will require additional case processing and environmental review prior to authorization to consider a request to change technology from CSP to PV—the Blythe Solar Millenium Project. The change in technology for this project is expected to result in lower water use. One additional major action within 50 mi (80 km) of the SEZ has been identified that was not known at the time of the Draft Solar PEIS, the Fancher Project. Luxicor Gold, LP, proposes to extract 60,000 tons (54,000 metric tons) of gold ore from an underground mine at a site 26 mi (42 km) south–southeast of the SEZ.

TABLE 8.1.22.2-2 Other Major Actions near the Proposed Brenda SEZ as Revised[a]

Description	Status	Resources Affected	Primary Impact Location
Algae Biomass Project	Private enterprise expected to begin operation in 2010; **project on hold[b]**	Land use, terrestrial habitat, visual	Near Vicksburg, about 6 mi[c] east of the SEZ
Bouse-Kofa 161-kV Transmission Line	Operating	Terrestrial habitat, wildlife, vegetation, visual	Corridor runs parallel to U.S. 95 in Quartzsite, Arizona, about 18 mi west of the SEZ
Fancher Project	**EA, September 2011**	**Terrestrial habitat, wildlife, air quality, noise/vibration, cultural, visual**	**Mine site 26 mi south–southeast of the SEZ; mill site 16 mi east of the SEZ**
Impact Area Expansion Yuma Proving Ground	EA, March 2010	Terrestrial habitat, wildlife	Boundary about 30 mi south–southwest of the SEZ
Limiting Mountain Lion Predation on Desert Bighorn Sheep on the Kofa NWR	EA, December 2009	Wildlife	Boundary 10 mi south of the SEZ
Palo Verde–Devers 500-kV Transmission Line	Operating	Terrestrial habitat, wildlife, vegetation, visual	Corridor passes 20 mi south of the SEZ
Parker Dam and Power Plant	Operating since 1942	Aquatic biota	40 mi northwest of the SEZ
Reopening of the Copperstone Mine	EA, May 2010; **FONSI October 20, 2010[d]**	Groundwater, terrestrial habitat, wildlife, air quality, noise/vibration, cultural, visual	9.5 mi north of Quartzite and 18 mi northwest of the SEZ
Wild Burro Reduction Cibola-Trigo HMA	EA, July 2010; **FONSI July 13, 2010[e]**	Terrestrial habitat, wildlife	About 20 mi west of the SEZ

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

[b] See Schwartz (2011) for details.

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

[d] See BLM (2010b) for details.

[e] See BLM (2010c) for details.

In total, reasonably foreseeable solar projects (i.e., the Blythe Solar Millenium Project and the Quartzsite Project) near the proposed Brenda SEZ would have a combined capacity of 1,100 MW and encompass approximately 8,525 acres (34.5 km^2). No new solar projects have advanced to consideration as reasonably foreseeable since publication of the Draft Solar PEIS,

Overall, the incremental cumulative impacts associated with development in the proposed Brenda SEZ during construction, operation, and decommissioning are expected to be the same as or less than those discussed in the Draft Solar PEIS. This is because the proposed Bullard Wash SEZ (one of three SEZs in Arizona proposed in the Draft) has been eliminated from consideration, and also because the technology for one of the reasonably foreseeable projects (the Blythe Solar Millenium Project) has been changed from CSP to PV, thus decreasing the projected water use impacts.

8.1.23 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 Brenda 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 8.1.2 through 8.1.22, this section is not an update of previous analysis for the Brenda 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 Brenda SEZ is estimated to have the potential to generate 536 MW of marketable solar power at full build-out.

8.1.23.1 Identification and Characterization of Load Areas

The primary candidates for Brenda SEZ load areas are the major surrounding cities. Figure 8.1.23.1-1 shows the possible load areas for the Brenda SEZ and the estimated portion of their market that could be served by solar generation. Possible load areas for the Brenda SEZ include Phoenix, Arizona; the major cities of San Bernardino and Riverside Counties, California; Las Vegas, Nevada; and San Diego, California, via two different routes (one through Yuma, Arizona, and El Centro, California, and the other through Riverside County, California).

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

1. Phoenix, Arizona, and

2. Major cities of San Bernardino and Riverside Counties, California.

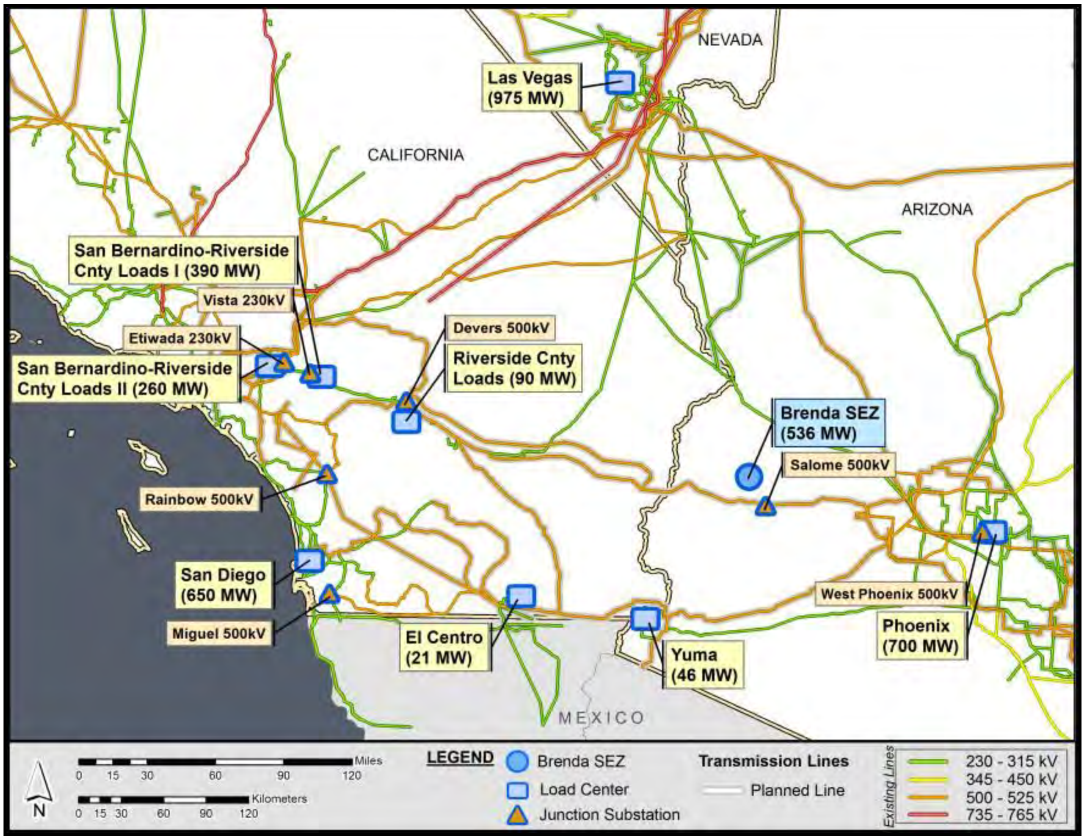


FIGURE 8.1.23.1-1 Location of the Proposed Brenda SEZ and Possible Load Areas (Source for background map: Platts 2011)

Figure 8.1.23.1-2 shows the most economically viable transmission scheme for the Brenda SEZ (transmission scheme 1), and Figure 8.1.23.1-3 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 536 MW could be fully allocated.

Table 8.1.23.1-1 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.

8.1.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the Brenda SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The new transmission lines(s) would directly convey the 536-MW output of the Brenda 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

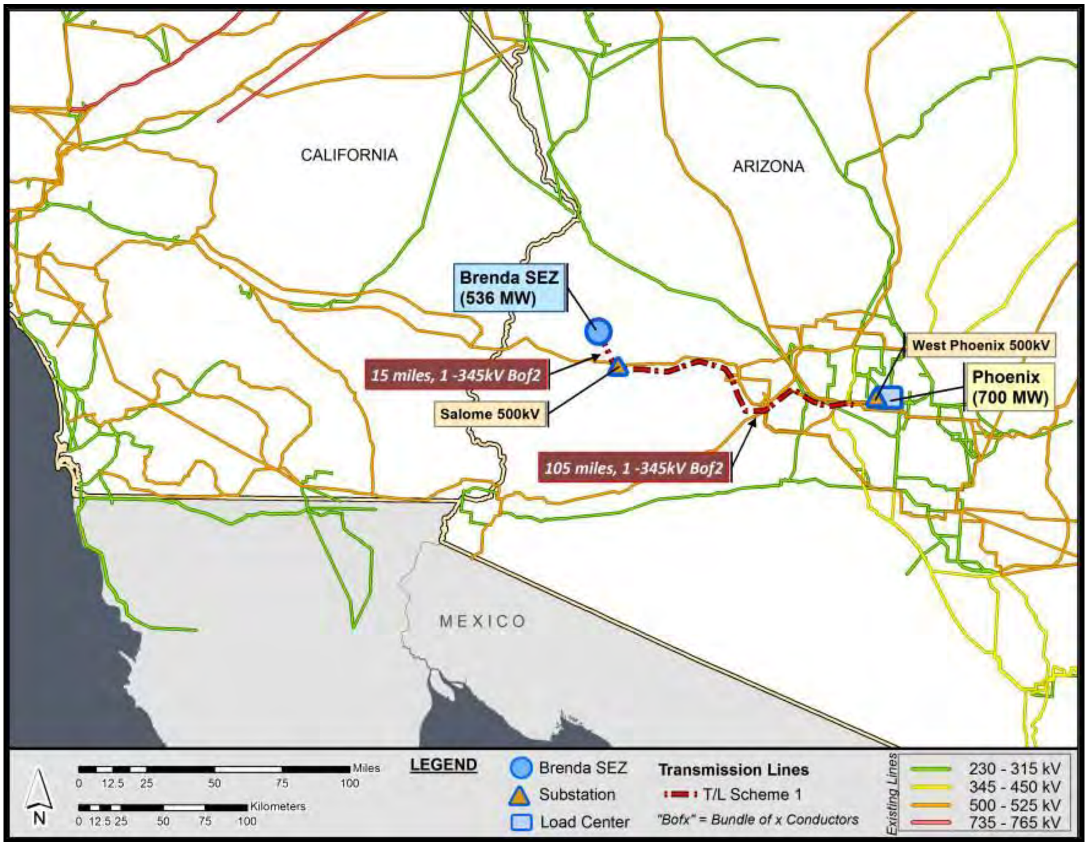


FIGURE 8.1.23.1-2 Transmission Scheme 1 for the Proposed Brenda SEZ (Source for background map: Platts 2011)

and have little or no available capacity to accommodate the SEZ's output throughout the entire 10-year study horizon.

Figures 8.1.23.1-2 and 8.1.23.1-3 display the pathways that new dedicated lines might follow to distribute solar power generated at the Brenda SEZ via the two identified transmission schemes described in Table 8.1.23.1-1. 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.

For transmission scheme 1, serving Phoenix, with a potential solar market capacity of 700 MW, a new line would be constructed following two segments. The first segment would extend about 15 mi (24 km) from the SEZ to the Salome Substation, and the second segment would extend about 105 mi (167 km) from the Salome Substation to Phoenix. The transmission configuration options for each segment were determined by using the line "loadability" curve 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.

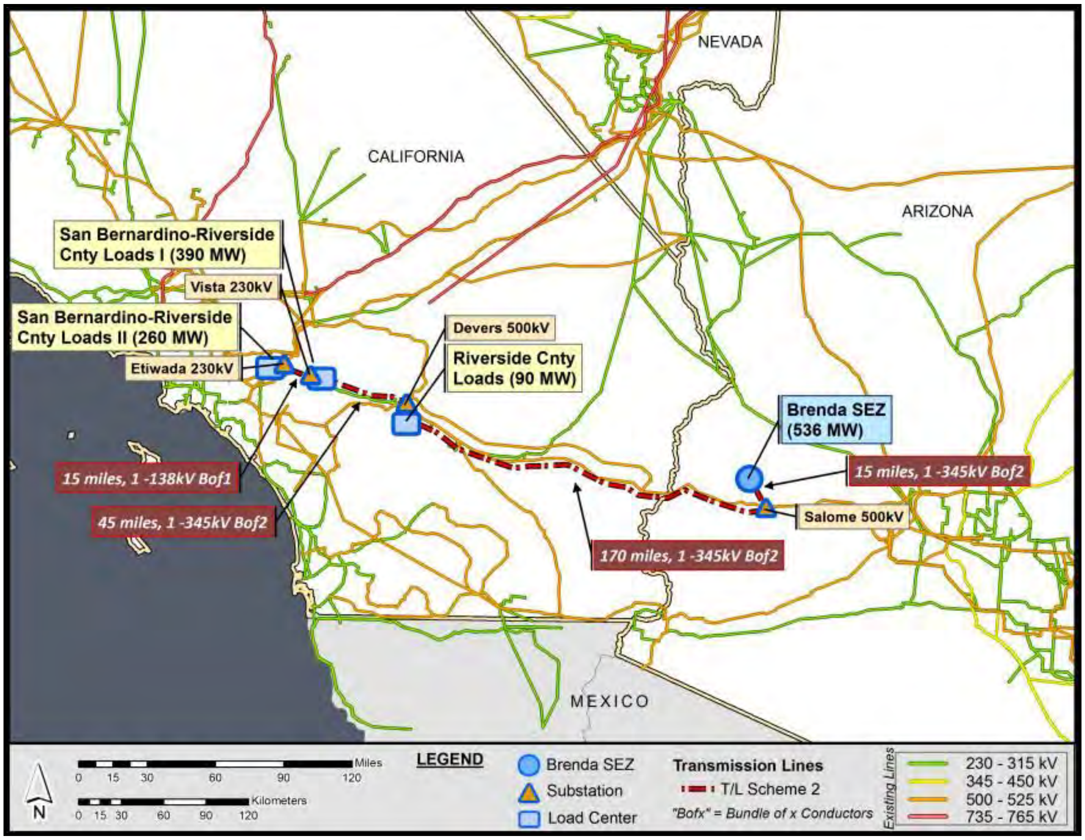


FIGURE 8.1.23.1-3 Transmission Scheme 2 for the Proposed Brenda SEZ (Source for background map: Platts 2011)

For transmission scheme 2, the target load centers are the major cities within Riverside and San Bernardino Counties, California. This scheme has four segments. The first segment, from the SEZ to the Salome Substation, is 15 mi (24 km) long; the second segment, from the Salome Substation to the Devers Substation, is about 170 mi (274 km) long; the third segment, from the Devers Substation to the Vista Substation, is about 45 mi (72 km) long; and the last leg, from the Vista Substation to the Etiwanda Substation, is about 15 mi (24 km) long. The design of the transmission lines takes into account the thermal, voltage drop, and stability limits associated with the operation of the various line segments.

Table 8.1.23.2-1 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. 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 will consist of one or more step-down transformers, while the originating substation at the SEZ would consist of several step-up transformers. 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

TABLE 8.1.23.1-1 Candidate Load Area Characteristics for the Proposed Brenda SEZ

Transmission Scheme	City/Load Area Name	Position Relative to SEZ	2010 Population[e]	Estimated Total Peak Load (MW)	Estimated Peak Solar Market (MW)
1	Phoenix, Arizona[a]	East	1,400,000	3,614	700
2	Riverside County load, California[b]	West	180,000	429	90
	San Bernardino–Riverside County load I, California[c]	West	780,000	1,967	390
	San Bernardino–Riverside County load II, California[d]	West	520,000	1,312	260

a The load area represents the city named.

b The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

c The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

d The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

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

additional equipment to regulate voltage. The originating substation would have a combined substation rating of at least 536 MW (to match the SEZ's output), while the combined load substations would have a similar total rating of 536 MW.

Table 8.1.23.2-2 provides estimates 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 the costs and area disturbed would be scheme 1, which would serve the Phoenix market and for which the construction of new transmission lines and substations is estimated to disturb about 2,558 acres (10.4 km^2) of land. The less favorable transmission scheme with respect to minimizing the costs and area disturbed would be scheme 2 (serving Riverside and San Bernardino Counties). For scheme 2, the construction of new transmission lines and substations is estimated to disturb a land area in the order of 5,037 acres (20.4 km^2).

Table 8.1.23.2-3 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 focuses on serving Phoenix. The secondary case (transmission scheme 2),

TABLE 8.1.23.2-1 Potential Transmission Schemes, Estimated Solar Markets, and Distances to Load Areas for the Proposed Brenda SEZ

Transmission Scheme	City/Load Area Name	Estimated Peak Solar Market (MW)[e]	Total Solar Market (MW)	Sequential Distance (mi)[f]	Total Distance (mi)[f]	Line Voltage (kV)	No. of Substations
1	Salome, Arizona[a]	0	700	15	120	345	3
	Phoenix, Arizona[a]	700		105			
2	Salome, Arizona[a]	0	740	15	245	345, 138	5
	Riverside County load, California[b]	90		170			
	San Bernardino–Riverside County load I, California[c]	390		45			
	San Bernardino–Riverside County load II, California[d]	260		15			

[a] The load area represents the city named.

[b] The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

[c] The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

[d] The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

[e] From Table 8.1.23.1-1.

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

which excludes one or more of the primary pathways used in scheme 1, is the less economically attractive option and focuses on delivering power to major cities in Riverside and Bernardino Counties, California. Note that both schemes exhibit positive NPV under the current assumption of a 20% utilization factor.

Table 8.1.23.2-4 shows the effect of varying the value of the utilization factor on the NPV of the transmission schemes. The table shows that at about 20% utilization, NPVs for both schemes are positive. 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 Brenda SEZ are as follows:

- Transmission scheme 1, which identifies Phoenix as the primary market, represents the most favorable option based on NPV and land use requirements. This scheme would result in new land disturbance of about 2,558 acres (10.4 km^2).

TABLE 8.1.23.2-2 Comparison of the Various Transmission Line Configurations with Respect to Land Use Requirements for the Proposed Brenda SEZ

				Land Use (acres)[f]		
Transmission Scheme	City/Load Area Name	Total Distance (mi)[e]	No. of Substations	Transmission Line	Substation	Total
1	Salome, Arizona[a] Phoenix, Arizona[a]	120	3	2,545	13	2,558
2	Salome, Arizona[a] Riverside County load, California[b] San Bernardino–Riverside County load I California[c] San Bernardino-Riverside County load II, California[d]	245	5	5,024	13	5,037

[a] The load area represents the city named.

[b] The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

[c] The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

[d] The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

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

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

- Transmission scheme 2 represents an alternative configuration if Phoenix is excluded and serves the major cities in San Bernardino and Riverside Counties. This configuration would result in new land disturbance of about 5,037 acres (20.4 km^2).

- 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 Brenda 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 proposed Brenda SEZ indicates no reduction of impacts from increasing the solar-eligible load assumption for transmission scheme 1, which brings power to Phoenix. Increasing the solar-eligible percentage would have no effect, because an adequate load area was identified under the 20% assumption that would accommodate all of the SEZ's capacity. Thus, line distances and voltages would not be affected by increasing the solar-eligible load assumption, and

TABLE 8.1.23.2-3 Comparison of Potential Transmission Lines with Respect to NPV (Base Case) for the Proposed Brenda 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	Salome, Arizona[a] Phoenix, Arizona[a]	264.0	35.4	93.9	725.1	425.8
2	Salome, Arizona[a] Riverside County load, California[b] San Bernardino–Riverside County load I, California[c] San Bernardino–Riverside County load II, California[d]	515.2	35.4	93.9	725.1	174.6

[a] The load area represents the city named.

[b] The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

[c] The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

[d] The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

similarly the associated costs and land disturbance would not be affected. However, for transmission scheme 2, which serves the major cities in San Bernardino and Riverside Counties, increasing the solar-eligible load assumption could result in lower cost and land disturbance estimates, because it is possible that fewer load areas would be needed to accommodate the SEZ's capacity.

8.1.24 Impacts of the Withdrawal

The BLM is proposing to withdraw 3,878 acres (15.7 km^2) of public land comprising the proposed Brenda 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

TABLE 8.1.23.2-4 Effect of Varying the Utilization Factor on the NPV of the Transmission Schemes for the Proposed Brenda SEZ

Transmission Scheme	City/Load Area Name	NPV ($ million) at Different Utilization Factors					
		20%	30%	40%	50%	60%	70%
1	Salome, Arizona[a] Phoenix, Arizona[a]	425.8	788.3	1,150.9	1,513.4	1,876.0	2,238.6
2	Salome, Arizona[a] Riverside County load, California[b] San Bernardino–Riverside County load I, California[c] San Bernardino–Riverside County load II, California[d]	174.6	537.1	899.7	1,262.3	1,624.8	1,987.4

[a] The load area represents the city named.

[b] The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

[c] The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

[d] The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

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 Brenda 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 2012). There has been no documented mining with 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 January 2012), there are no recorded mining claims within the land withdrawal area.

Although the mineral potential of the lands within the Brenda 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).

8.1.25 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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8.1.26 Errata for the Proposed Brenda SEZ

This section presents corrections to material presented in the Draft Solar PEIS and the Supplement to the Draft Solar PEIS. 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 8.1.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

TABLE 8.1.26-1 Errata for the Proposed Brenda SEZ (Section 8.1 of the Draft Solar PEIS and Section C.1.1 of the Supplement to the Draft Solar PEIS)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
8.1.11.2					All uses of the term "neotropical migrants" in the text and tables of this section should be replaced with the term "passerines."
8.1.14.1	8.1-171	25-27			The Draft PEIS incorrectly indicated that a VRI was completed for the areas included within the Brenda SEZ in 2010. According to the Lake Havasu RMP, the VRI was completed in mid-2004.

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8.2 BULLARD WASH

As stated at the beginning of this chapter, the Bullard Wash SEZ was dropped from further consideration through the Supplement to the Draft Solar PEIS. This section presents the information (with minor updates) provided in Appendix B of the Supplement to the Draft Solar PEIS on the rationale for dropping this SEZ.

8.2.1 Summary of Potential Impacts Identified in the Draft Solar PEIS

The proposed Bullard Wash SEZ, as presented in the Draft Solar PEIS, had a total area of 7,239 acres (29.3 km^2). It is located in Maricopa County in west-central Arizona (Figure 8.2.1-1). The town of Aguila is located about 12 mi (19 km) south of the SEZ.

The Draft Solar PEIS identified a 500-kV transmission line that passes about 5 mi (8 km) northeast of the SEZ as the nearest point of connection of the SEZ to the grid. The Draft Solar PEIS also identified State Route 71, located about 5 mi (8 km) southeast of the southeastern tip of the SEZ, as the nearest major road, and assumed that a new access road would be constructed from the proposed SEZ to State Route 71 to support development.

Potential environmental and other impacts identified in the Draft Solar PEIS included the following:

- Wilderness characteristics in the Tres Alamos WA between 3.5 and 7 mi (6 and 11 km) of the border of the SEZ and within the viewshed of the SEZ would be adversely affected.

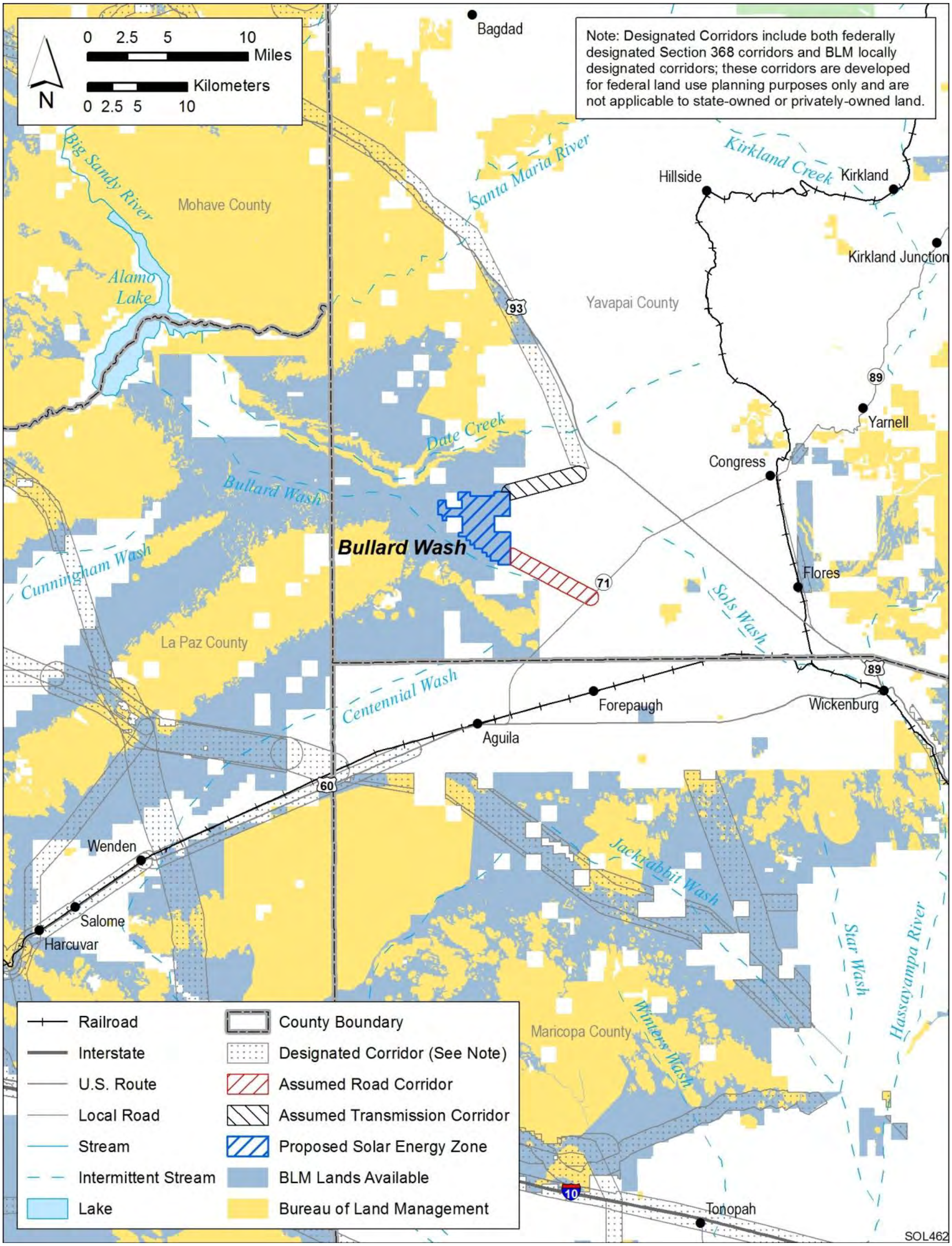
- There would be small adverse impacts on the Pipeline Ranch and Central Arizona Ranch Company grazing allotments.

- Areas developed for solar energy production would be closed to recreational use. Inventoried OHV routes would be closed.

- The DoD expressed concern that any development in the SEZ that exceeds 250 ft (76 m) in height would interfere with military operations in three MTRs.

- Impacts on soil resources (e.g., soil compaction, soil horizon mixing, soil erosion by wind and runoff, sedimentation, and soil contamination) could occur.

- Groundwater use would deplete the aquifer to the extent that, at a minimum, wet-cooling options would not be feasible.

1 

2 **FIGURE 8.2.1-1 Proposed Bullard Wash SEZ as Presented in the Draft Solar PEIS**

- Over much of this SEZ, the dominant species present include Joshua tree and saguaro cactus. Clearing of a large portion of the proposed SEZ could primarily affect wetland, dry wash, dry wash woodland, mesquite bosque, riparian, Joshua tree, and saguaro cactus communities, depending on the amount of habitat disturbed. The establishment of noxious weeds could result in habitat degradation.

- Potentially suitable habitat for 39 special status species occurs in the affected area of the proposed SEZ; less than 1% of the potentially suitable habitat for any of these species and any wildlife species occurs in the region that would be directly affected by development.

- If aquatic biota are present, they could be affected by the direct removal of surface water features within the construction footprint, a decline in habitat quantity and quality due to water withdrawals and changes in drainage patterns, as well as increased sediment and contaminant inputs associated with ground disturbance and construction activities.

- Temporary exceedances of ambient air quality standards for particulate matter at the SEZ boundaries are possible during construction. These high concentrations, however, would be limited to the immediate area surrounding the SEZ boundary.

- Although the SEZ is in an area of low scenic quality, strong visual contrasts could be observed by residents nearest to the SEZ. Strong visual contrasts could also be observed by visitors to the Tres Alamos WA. Weak to moderate visual contrasts could be observed by visitors to the Arrastra Mountain WA, while moderate to strong visual contrasts could be observed by travelers on Joshua Forest Scenic Road.

- The potential for impacts on significant paleontological and cultural resources is unknown. No surveys have been conducted in the proposed SEZ, and no sites have been recorded to date. Development within the SEZ may result in visual or audible disturbance to sacred areas in the nearby mountains. The SEZ itself does contain plant and animal species traditionally important to the Yavapai, and development in the proposed SEZ would eliminate some traditionally important plants and some habitat of traditionally important animals.

8.2.2 Summary of Comments Received

Most of the comments received from environmental groups on the proposed Bullard Wash SEZ were in favor of eliminating the area as an SEZ (The Wilderness Society et al.,[1] Western Watersheds Project, and Tonopah Area Coalition) because of concerns about the plant and wildlife community present in the SEZ, potential effects on special status species in the area, and its remote location. The Wilderness Society et al. were also concerned about groundwater availability and the effect of water withdrawals on groundwater-dependent species, and commented that development should be considered only in areas toward the southern end of the SEZ where low-density plant communities exist. The Tonopah Area Coalition expressed concern that the SEZ is located in an important transition zone between the Joshua Tree forest and the Sonoran Desert. The Western Watersheds Project recommended that the PEIS must consider the impact of noise on native and migratory wildlife species and also expressed concern for the Sonoran desert tortoise that may occur in the affected area of the SEZ.

The BLM staff in Arizona has confirmed that the eastern portion of the proposed SEZ has dense vegetative communities composed of saguaro cactus, Joshua trees, creosote brush, palo verde, and desert grasses. The BLM Arizona staff also noted that the combination of the dense vegetation and active washes in the SEZ contribute to a sustained community of wildlife, and that the southern boundary is relatively close to a major wash that would be cut off to wildlife migrating from the northern mountain range if this area were developed.

8.2.3 Rationale for Eliminating the SEZ

On the basis of public comments received on the Draft Solar PEIS, review by the BLM, and continued review of potential impacts identified in the Draft Solar PEIS, the Bullard Wash SEZ was eliminated from further consideration and will not be identified as a SEZ in applicable land use plans. The potential impacts from solar development in the proposed Bullard Wash SEZ were considered sufficient reason to eliminate the area from further consideration.

Although the area has been dropped from consideration as an SEZ, the lands that composed the proposed Bullard Wash SEZ will be retained as solar ROW variance areas, because the BLM expects that individual projects could be sited in this area to avoid and/or minimize impacts. Any solar development within this area in the future would require appropriate environmental analysis.

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[1] The Wilderness Society, Sonoran Institute, Sierra Club–Grand Canyon Chapter, Arizona Wilderness Coalition, Tucson Audubon Society, Friends of Ironwood Forest, Defenders of Wildlife, Sky Island Alliance, Grand Canyon Wildlands Council, Natural Resources Defense Council, Soda Mountains Wilderness Council, and Sierra Treks submitted joint comments on the proposed Arizona SEZs. Those comments are attributed to The Wilderness Society et al.

8.3 GILLESPIE

8.3.1 Background and Summary of Impacts

8.3.1.1 General Information

The proposed Gillespie SEZ is located in Maricopa County in west-central Arizona. In 2008, the county population was 3,958,263. The nearest town is Arlington, about 7 mi (11 km) northeast of the SEZ, with a population of less than 500, while the larger town of Buckeye is located about 17 mi (27 km) northeast and has a population of more than 50,000.

The nearest major road access to the SEZ is via Old U.S. 80, which runs north–south 3 mi (5 km) from the eastern tip of the Gillespie SEZ. The nearest railroad is a branch of the Union Pacific (UP) Railroad that passes within 0.5 mi (0.8 km) of the northwestern edge of the SEZ, and the nearest stop is in Buckeye, 20 mi (30 km) northeast of the SEZ. As of October 28, 2011, there was one existing application for solar development on BLM-administered lands immediately adjacent to the SEZ.

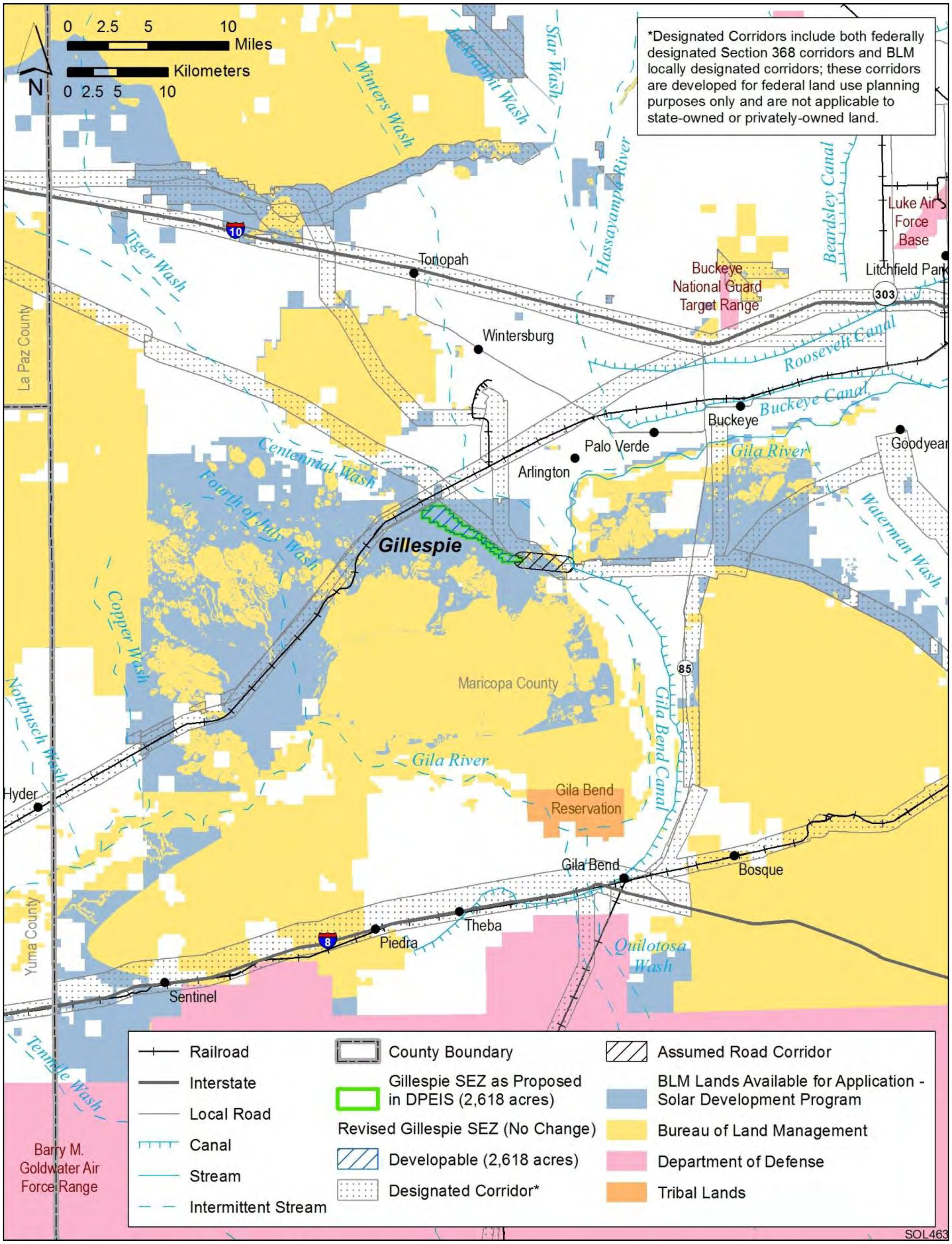
As published in the Draft Solar PEIS (BLM and DOE 2010), the proposed Gillespie SEZ had a total area of 2,618 acres (11 km^2) (see Figure 8.3.1.1-1). In the Supplement to the Draft Solar PEIS (BLM and DOE 2011), no boundary revisions or non-developable areas for the proposed Gillespie SEZ were identified (see Figure 8.3.1.1-2).

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 proposed Gillespie SEZ as described in the Draft Solar PEIS.

8.3.1.2 Development Assumptions for the Impact Analysis

Maximum solar development of the Gillespie SEZ is assumed to be 80% of the SEZ area over a period of 20 years, a maximum of 2,094 acres (8.5 km^2). Full development of the Gillespie SEZ would allow development of facilities with an estimated total of between 233 MW (power tower, dish engine, or PV technologies, 9 acres/MW [0.04 km^2/MW]) and 419 MW (solar trough technologies, 5 acres/MW [0.02 km^2/MW]) of electrical power capacity (Table 8.3.1.2-1).

Availability of transmission from SEZs to load centers will be an important consideration for future development in SEZs. For the proposed Gillespie SEZ, the nearest existing transmission line, as identified in the Draft Solar PEIS, is a 500-kV line that runs less than 1 mi (1.6 km) west of the SEZ. It is possible that the existing line could be used to provide access from the SEZ to the transmission grid, but the capacity of the line could be inadequate for the

1 

2 **FIGURE 8.3.1.1-1 Proposed Gillespie SEZ**

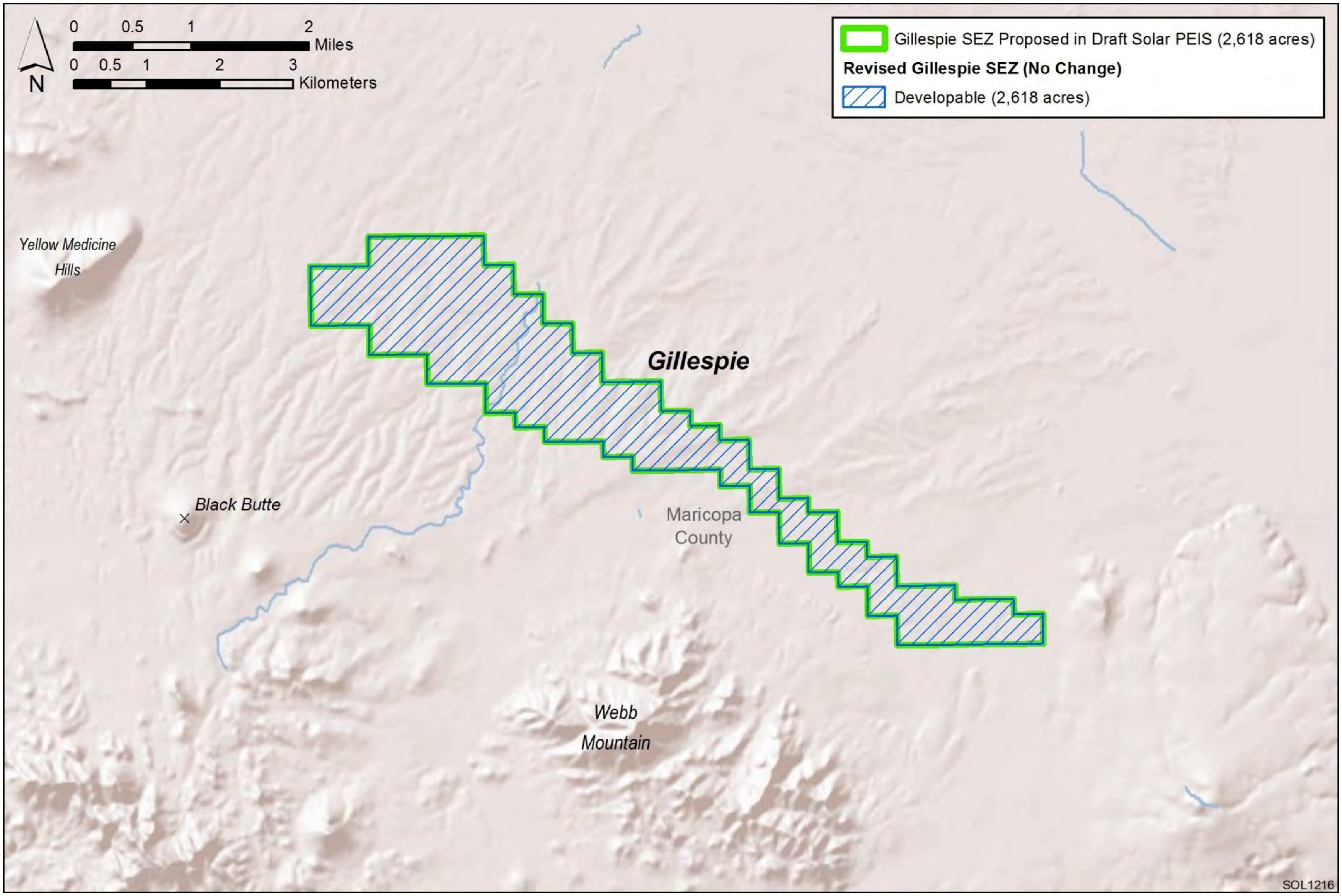


FIGURE 8.3.1.1-2 Developable Areas for the Proposed Gillespie SEZ

TABLE 8.3.1.2-1 Assumed Development Acreages, Solar MW Output, and Nearest Major Road and Transmission Line for the Proposed Gillespie SEZ

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 Corridor[e]
2,618 acres[a] and 2,094 acres	233 MW[b] 419 MW[c]	Old U.S. 80 3 mi[d]	<1 mi and 500 kV	22 acres	Adjacent

[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 1.609.

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

possible 233 to 419 MW of new capacity. Therefore, at full build-out capacity, new transmission and/or upgrades of existing transmission lines would be required to bring electricity from the proposed Gillespie SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Gillespie SEZ and a general assessment of the impacts of constructing and operating new transmission facilities to those load centers is provided in Section 8.3.23. In addition, the generic impacts of transmission and associated infrastructure construction and of line upgrades for various resources are discussed in Chapter 5 of this 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.

For the proposed Gillespie SEZ, an additional 22 acres (0.9 km^2) would be needed for new road access to support solar energy development. This estimate was based on the assumption that a new 3-mi (5-km) access road to the nearest major road, Old U.S. 80, would support construction and operation of solar facilities.

8.3.1.3 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, reduce, 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 8.3.2 through 8.3.22) 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 Gillespie SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Gillespie 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 and Supplement to the Draft Solar PEIS. All applicable SEZ-specific design features identified to date (including those from the Draft Solar PEIS that are still applicable) are presented in Sections 8.3.2 through 8.3.22.

8.3.2 Lands and Realty

8.3.2.1 Affected Environment

There are no changes to the boundary of the proposed Gillespie SEZ; therefore the description in the Draft Solar PEIS remains valid. The overall character of the land in the SEZ area is rural and undeveloped; it is used primarily for grazing and some recreational activities. Portions of the SEZ, especially the southeastern third of the area, are heavily dissected by small drainages.

8.3.2.2 Impacts

The major impacts on the proposed Gillespie SEZ remain as described in the Draft Solar PEIS. Development of the area for solar energy production would establish an isolated industrial area that would exclude other existing and potential uses of the land. Because the area is rural and undeveloped, utility-scale solar development would be a new and discordant use in the area. The Agua Caliente Road meanders through the SEZ and may need to be relocated to facilitate solar energy development and operations.

8.3.2.3 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 completely mitigate 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 induced land use changes, if any, on nearby or adjacent state and private lands may not be fully mitigated.

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

- Priority consideration should be given to utilizing the existing Agua Caliente Road to provide construction and operations access to the SEZ. Any potential impacts on the existing country road should be discussed with the county.

The need for additional SEZ-specific design features may be established for parcels within the Gillespie SEZ through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.3 Specially Designated Areas and Lands with Wilderness Characteristics

8.3.3.1 Affected Environment

The description of specially designated areas contained in the Draft Solar PEIS remains valid. Three areas, Signal Mountain and Woolsey Peak WAs and the Saddle Mountain SRMA, are close to the proposed Gillespie SEZ, and users in these areas would have clear views of solar development within the SEZ.

8.3.3.2 Impacts

The analysis of potential impacts on specially designated areas in the Draft Solar PEIS remains valid. Principal impacts include adverse impacts on wilderness characteristics in the Signal Mountain and Woolsey Peak WAs, and solar development could also have adverse impacts on scenic resources and recreational use of the Saddle Mountain SRMA.

8.3.3.3 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.

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features for specially designated areas have been identified. Some SEZ-specific design features may ultimately be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.4 Rangeland Resources

8.3.4.1 Livestock Grazing

8.3.4.1.1 Affected Environment

Four grazing allotments intersect with the proposed Gillespie SEZ. The description in the Draft Solar PEIS remains valid.

8.3.4.1.2 Impacts

Grazing use would be excluded from developed portions of the SEZ; thus the analysis of impacts in the Draft Solar PEIS remains valid. The percentage of three of the four allotments that intersect the proposed SEZ is less than 1.5% of each allotment, and it is anticipated there would be no impact on these allotments. The Layton allotment is an ephemeral allotment, and because of the erratic nature of ephemeral use, the potential impact on the allotment cannot be determined. It is assumed for analysis purposes that since 14.6% of the allotment is within the SEZ, a comparable amount of forage would be lost should solar energy development occur.

8.3.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on livestock grazing 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.

No SEZ-specific design features to protect livestock grazing have been identified in this Final Solar PEIS. Some SEZ-specific design features may ultimately be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.4.2 Wild Horses and Burros

8.3.4.2.1 Affected Environment

As presented in the Draft Solar PEIS, no wild horse or burro HMAs occur within the proposed Gillespie SEZ or in close proximity to it.

8.3.4.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Gillespie SEZ would not affect wild horses and burros.

8.3.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features to address wild horses and burros are required for the proposed Gillespie SEZ.

8.3.5 Recreation

8.3.5.1 Affected Environment

The area in which the proposed Gillespie SEZ is located is lightly used for recreation, although the Agua Caliente Road, which passes through the proposed SEZ, is an important access route to public lands to the west. Several designated routes depart the county road in or near the SEZ and provide access to old mining areas, livestock facilities, and the wilderness areas south of the road. Agua Caliente Road is being considered for possible designation as a scenic road in the ongoing BLM Sonoran Desert National Monument Management Plan and Phoenix South RMP Amendment (BLM undated). The description of the affected environment in the Draft Solar PEIS remains valid.

8.3.5.2 Impacts

There would be no significant loss of recreational use within the proposed SEZ from solar development, but access routes to the south could be closed, adversely affecting access to areas south of the SEZ. Although the potential impact on wilderness recreational use is unknown, portions of both the Signal Mountain and Woolsey Peak WAs are within the most visually sensitive wilderness zone, and recreational use of these areas may be adversely affected. Should the SEZ be developed, any scenic qualities of Agua Caliente Road through the SEZ would be lost.

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 as a part of the environmental analysis of specific solar energy projects.

8.3.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreation 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.

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

- Because of the potential for solar development to sever current access routes departing the county road within the SEZ, legal access to the areas to the south should be maintained consistent with existing land use plans.

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.

8.3.6 Military and Civilian Aviation

8.3.6.1 Affected Environment

The airspace above the SEZ is covered by an existing MTR and is located within an extensive web of military airspace. The analysis in the Draft Solar PEIS remains valid.

8.3.6.2 Impacts

Through comments on the Draft Solar PEIS, the military has indicated that construction of solar energy and related facilities higher than 250 ft (76 m) could interfere with military training activities and could be a safety concern.

8.3.6.3 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.

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

8.3.7 Geologic Setting and Soil Resources

8.3.7.1 Affected Environment

8.3.7.1.1 Geologic Setting

Data provided in the Draft Solar PEIS remain valid. The boundaries of the proposed SEZ remain the same, and no non-development areas within the SEZ have been identified.

8.3.7.1.2 Soil Resources

Data provided in the Draft Solar PEIS remain valid.

8.3.7.2 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. The assessment provided in the Draft Solar PEIS remains valid.

8.3.7.3 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 and consideration of comments received as applicable, no SEZ-specific design features were identified for soil resources at the proposed Gillespie SEZ. Some SEZ-specific design features may ultimately be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Gillespie 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 8.3.24.

8.3.8.1 Affected Environment

The proposed Gillespie SEZ contains one active placer mining claim located on about 260 acres (1 km^2) in the northwestern portion of the SEZ. The description of the SEZ in the Draft Solar PEIS remains valid.

8.3.8.2 Impacts

The existing mining claim is a prior existing right and, if valid, likely would preclude development of the portion of the SEZ in which the claim is located. The analysis of impacts in the Draft Solar PEIS remains valid.

8.3.8.3 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 and consideration of comments received as applicable, no SEZ-specific design features for mineral 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.

8.3.9 Water Resources

8.3.9.1 Affected Environment

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

The proposed Gillespie SEZ is within the Lower Gila River subregion of the Lower Colorado Hydrologic Region. This SEZ is located in a valley northeast of the Gila Bend Mountains, with the Palo Verde Hills and other small mountain ranges to the north. Precipitation in the valley is estimated to be less than 8 in./yr (20 cm/yr), and pan evaporation rates are estimated to be on the order of 105 in./yr (267 cm/yr). No perennial surface water features or wetlands have been identified within the SEZ, but several intermittent/ephemeral wash tributaries to Centennial Wash (a tributary to the Gila River) flow in a northeasterly direction through the SEZ. Flood hazards are estimated to be between the 100-year and 500-year floodplains in the vicinity of the SEZ. The Gillespie SEZ is located in the Lower Hassayampa groundwater basin, where the primary aquifer is composed of basin-fill alluvium deposits of varying particle sizes and a thickness of up to 1,000 ft (300 m). Pre-disturbance groundwater underflow from neighboring basins was estimated to be 32,000 ac-ft/yr (39 million m^3/yr) in the Lower Hassayampa Basin. Between the 1950s and 1980, water levels declined by up to 90 ft (27 m) as a result of groundwater pumping. In addition, land subsidence was measured at a rate of approximately 0.8 in./yr (2 cm/yr) between 2006 and 2008. Levels of TDS in the basin are considered high and exceed the secondary MCL. In addition, concentrations of fluoride, arsenic, nitrate, and volatile or semivolatile organic compounds have all been recorded above the drinking water standard.

The ADWR is responsible for water conservation and distribution throughout the state and created guidelines in 2010 to manage water for solar-generating facilities. The Gillespie SEZ is located within the Phoenix Active Management Area (AMA) and, as a result, groundwater management activities are coordinated by a Ground Water Users Advisory Council, which manages groundwater within each AMA. The goal of each council is to ensure that total inflow in the basin is equal to outflow. Between 2001 and 2005, the average annual groundwater use was 814,300 ac-ft/yr (1.0 billion m^3/yr), and the average annual surface water use was 1.44 million ac-ft/yr (1.8 billion m^3/yr), with an estimated natural recharge of 24,200 ac-ft/yr (29.8 million m^3/yr). Because the Gillespie SEZ is within the Phoenix AMA, water conservation strategies are often mandated and may include the use of reclaimed water sources (e.g., effluent from municipal wastewater) that have been used at other power generation facilities in the AMA boundaries.

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 Gillespie SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 8.3.9.1-1 through 8.3.9.1-7 and in Figures 8.3.9.1-1 and 8.3.9.1-2. Fieldwork and hydrologic analyses needed to determine jurisdictional water bodies would need to be

TABLE 8.3.9.1-1 Watershed and Water Management Basin Information Relevant to the Proposed Gillespie SEZ[a]

Basin	Name	Area (acres)[b]
Subregion (HUC4)[a]	Lower Gila (1507)	9,650,701
Cataloging unit (HUC8)	Centennial Wash (15070104)	1,209,117
Cataloging unit (HUC8)	Lower Gila–Painted Rock Reservoir (15070101)	1,286,603
Groundwater basin	Lower Hassayampa	768,000[c]
SEZ	Gillespie	2,618

[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.

[c] Area listed is for both the Lower and Upper Hassayampa basins.

TABLE 8.3.9.1-2 Climate Station Information Relevant to the Proposed Gillespie SEZ

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.)
Buckeye, Arizona (021026)	870	19	1893–2003	7.59	0.00
Gila Bend, Arizona (023393)	735	24	1892–2011	6.04	0.00
Painted Rock Dam, Arizona (026194)	550	15	1960–2011	5.39	0.00
Tonopah, Arizona (028641)	1,110	15	1951–2010	7.63	0.00

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

[b] Surface elevations for the proposed Gillespie SEZ range from 880 to 1,040 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 8.3.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ Scale Relevant to the Proposed Gillespie SEZ

		Cataloging Unit, HUC8		
Water Feature	Subregion, HUC4 (ft)[a]	Centennial Wash (ft)	Lower Gila–Painted Rock Reservoir (ft)	SEZ (ft)
Unclassified streams	7,720	267	2,021	0
Perennial streams	803,106	68	255,999	0
Intermittent/ephemeral streams	230,532,875	22,320,299	64,270,758	153,583
Canals	11,308,948	4,596,884	1,684,423	0

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

Source: USGS (2012a).

TABLE 8.3.9.1-4 Stream Discharge Information Relevant to the Proposed Gillespie SEZ

	Station (USGS ID)	
Parameter	Winters Wash near Tonopah, Arizona (09517400)	Centennial Wash at Southern Pacific Railroad Bridge (09517490)
Period of record	2000	1990–2011
No. of observations	1	22
Discharge, median (ft^3/s)[a]	432	160.5
Discharge, range (ft^3/s)	–[b]	1.54–8230
Discharge, most recent observation (ft^3/s)	432	152
Distance to SEZ (mi)[c]	16	3

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

[b] A dash indicates only one data point at this site.

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

Source: USGS (2012b).

TABLE 8.3.9.1-5 Surface Water Quality Data Relevant to the Proposed Gillespie SEZ

Station (USGS ID)	Period of Record	No of Records
No water quality data are available for surface water stations in the SEZ's HUC8.	NA[a]	NA

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

Source: USGS (2012b).

coordinated with appropriate federal, state, and local agencies. Areas within the Gillespie SEZ determined to be jurisdictional will be subject to the permitting process described in the CWA.

8.3.9.2 Impacts

8.3.9.2.1 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 proposed Gillespie SEZ could potentially affect drainage patterns, along with groundwater

TABLE 8.3.9.1-6 Water Quality Data from Groundwater Samples Relevant to the Proposed Gillespie SEZ

	Station (USGS ID)[a]		
Parameter	331829112495701	331845112522301	331909112501901
Period of record	1974–1977	1974–1977	1953–1974
No. of records	2	2	2
Temperature (°C)[b]	34	27 (26–28)	29
Total dissolved solids (mg/L)	1,200	NA	998
Dissolved oxygen (mg/L)	NA[c]	NA	NA
pH	8	8.5	8.2
Nitrate + nitrite (mg/L as N)	3.3	NA	NA
Phosphate (mg/L)	0.03	NA	NA
Organic carbon (mg/L)	NA	NA	NA
Calcium (mg/L)	31	NA	45
Magnesium (mg/L)	13	NA	17
Sodium (mg/L)	380	NA	NA
Chloride (mg/L)	410	NA	308
Sulfate (mg/L)	240	NA	222
Arsenic (µg/L)	NA	NA	NA
Fluoride (mg/L)	5 (4.5–5.5)	5.45 (5.2–5.7)	2.2 (1.8–2.6)

[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).

recharge and discharge properties. 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. At the Gillespie SEZ, these impacts are mostly relevant to the several intermittent/ephemeral tributaries of Centennial Wash.

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 Gillespie SEZ is a subset of the Centennial Wash and Lower Gila-Painted Rock Reservoir

TABLE 8.3.9.1-7 Groundwater Surface Elevations Relevant to the Proposed Gillespie SEZ

	Station (USGS ID)			
Parameter	331547112474401	331801112541601	331909112501901	332053112570801
Period of record	1970–2000	1970–1981	1954–1986	1963–2001
No. of observations	22	2	8	28
Surface elevation (ft)[a]	779	890	864	939
Well depth median (ft)	700	337	1,130	500
Depth to water, median (ft)	43.7	211.45	176.9	260.15
Depth to water, range (ft)	38.2–61.8	196.2–226.7	147.95–257.6	204.68–271.8
Depth to water, most recent observation (ft)	44.3	226.7	179.3	237.9
Distance to SEZ (mi)[b]	5	3	5	7

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

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

Source: USGS (2012b).

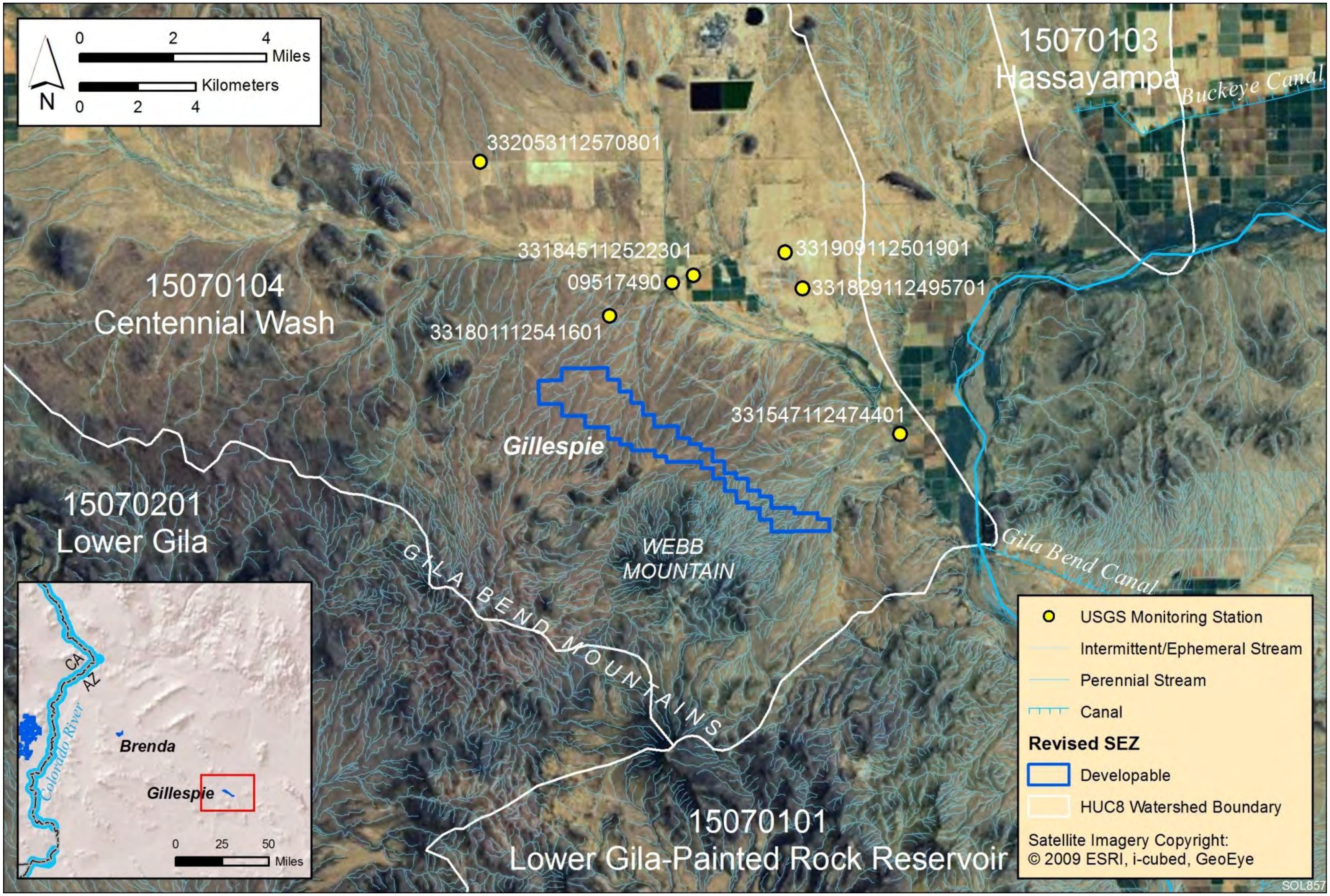


FIGURE 8.3.9.1-1 Water Features near the Proposed Gillespie SEZ

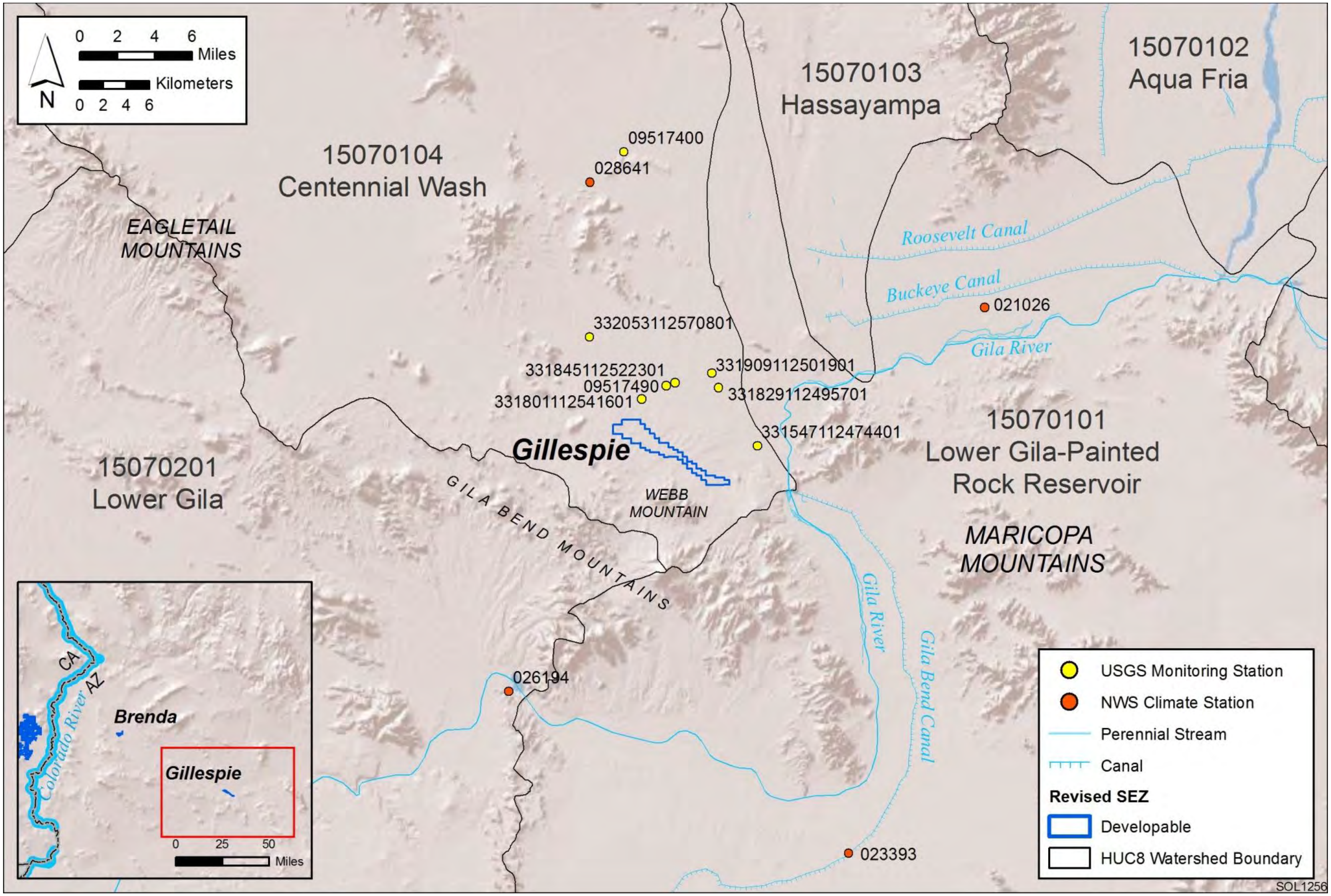


FIGURE 8.3.9.1-2 Water Features within the Centennial Wash and Lower Gila Watersheds, Which Include the Proposed Gillespie SEZ

watersheds (HUC8), for which information regarding stream channels is presented in Tables 8.3.9.1-3 and 8.3.9.1-4 of this Final Solar PEIS. The results of the intermittent/ephemeral stream evaluation are shown in Figure 8.3.9.2-1, which depicts a subset of flow lines from the National Hydrography Dataset (USGS 2012a) labeled as having low, moderate, or high sensitivity to land disturbance (Figure 8.3.9.2-1). The analysis indicated that 30% of the total length of the intermittent/ephemeral stream channel reaches in the evaluation had low sensitivity, 65% had moderate sensitivity, and 5% had high sensitivity to land disturbance. Three intermittent/ephemeral channels within the Gillespie SEZ were classified as having high sensitivity to land disturbance, and a significant quantity of intermittent/ephemeral channels within the SEZ were classified as having moderate sensitivity to land disturbance.

8.3.9.2.2 Water Use Requirements for Solar Energy Technologies

This section presents additional analyses of groundwater, including a basin-scale groundwater budget and a simplified, one-dimensional groundwater model of potential groundwater drawdown in the vicinity of the SEZ. 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.

A basin-scale groundwater budget was assembled using available data on groundwater inputs, outputs, and storage, with results presented in Table 8.3.9.2-1. The Gillespie SEZ is located in the Lower Hassayampa groundwater basin, as recognized by the USGS (e.g., Freethy and Anderson 1986), but the ADWR considers this area to be a part of the Phoenix AMA. The analysis of groundwater withdrawals presented here will be in the context of the Phoenix AMA. This groundwater budget does not include accounting of groundwater that is recharged to the basin as a part of the underground water storage program.

The estimated total water use requirements during the peak construction year are as high as 1,287 ac-ft (1.6 million m^3), which is a minor portion of the average annual recharge to the basin and a very small portion of current groundwater withdrawals and estimated groundwater storage in the Phoenix AMA basin. Given the short duration of construction activities, the water use estimate for construction is not a primary concern to water resources in the basin. The long duration of groundwater pumping during operations (20 years) poses a greater threat to groundwater resources. This analysis considered 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 solar facility types on the basis of operations estimates for proposed utility-scale solar energy facilities).

The low, medium, and high pumping scenarios result in groundwater withdrawals that range from 12 to 2,100 ac-ft/yr (14,800 to 2.6 million m^3/yr) or 240 to 42,000 ac-ft (296,000 to 51.8 million m^3) over the 20-year operational period. From a groundwater budgeting perspective, the high pumping scenario would represent less than 1% of the estimated total annual groundwater inputs to the basin and less than 1% of the estimated groundwater storage in the Lower Hasayampa Basin over the 20-year operational period. However, the average annual

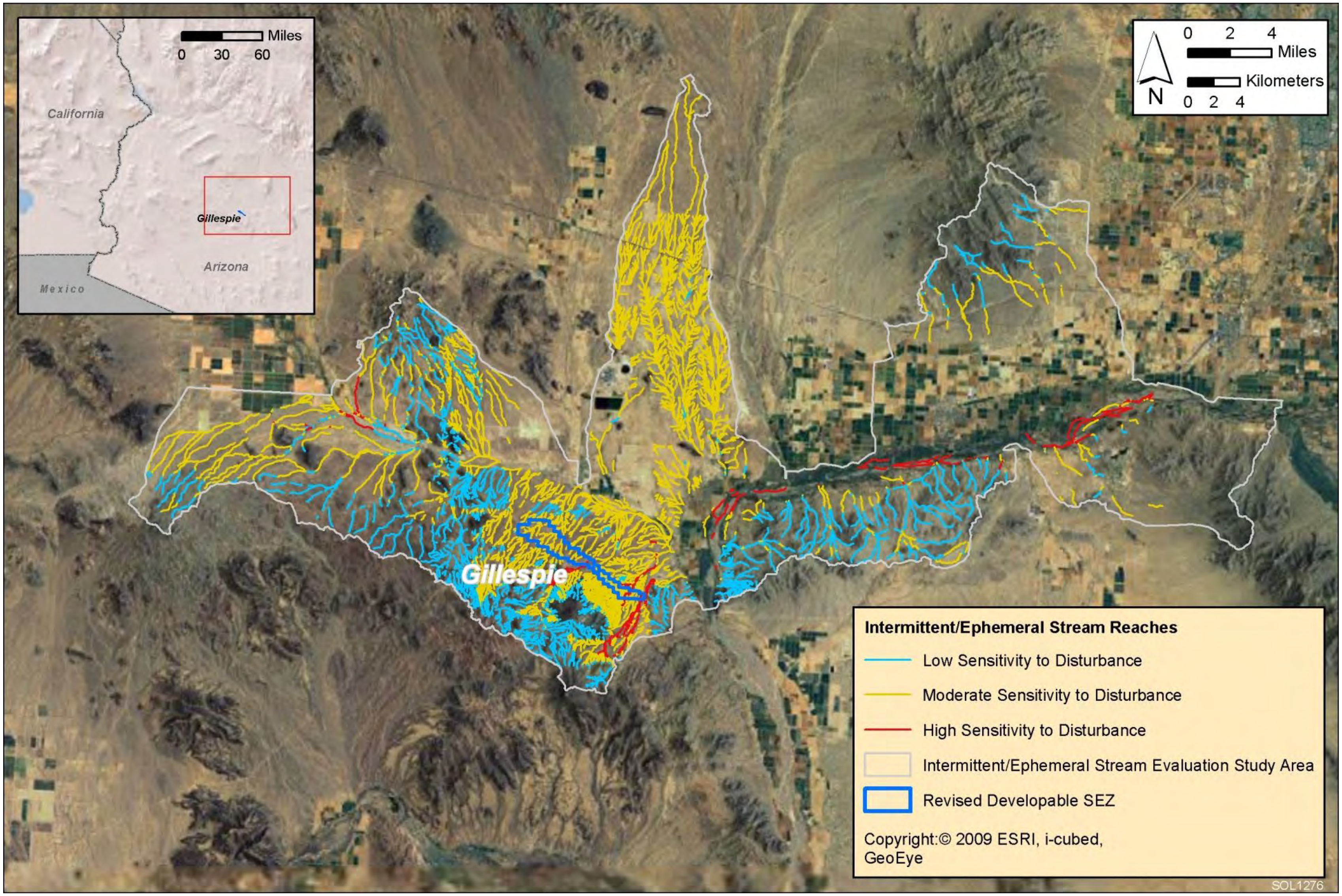


FIGURE 8.3.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Proposed Gillespie SEZ

TABLE 8.3.9.2-1 Groundwater Budget for the Phoenix AMA Groundwater Basin, Which Includes the Proposed Gillespie SEZ

Process	Amount
Inputs	
Groundwater recharge (ac-ft/yr)[a,b]	17,000–24,100
Underflow from adjacent basins (ac-ft/yr)	20,500
Irrigation recharge (ac-ft/yr)	347,000
Recharge from treated effluent (ac-ft/yr)	2,200
Outputs	
Public supply withdrawals (ac-ft/yr)	226,000[c]
Irrigation withdrawals (ac-ft/yr)	354,000[c]
Underflow to adjacent basins (ac-ft/yr)	30,500
Evapotranspiration (ac-ft/yr)	85,800–111,300[d]
Storage	
Aquifer storage (ac-ft)	14,000,000[e]

[a] Groundwater recharge includes mountain front, intermittent/ephemeral channel seepage, and direct infiltration recharge processes.

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

[c] Values reported for the year 2005.

[d] Minimum to maximum average annual evapotranspiration between 2000 and 2007.

[e] Pre-development storage in the Lower Hassayampa Basin

Source: Tillman et al. (2011).

groundwater outputs from the basin are approximately 1.8 times the groundwater inputs to the basin. Increases in groundwater extraction from the basin could impair other users, affect ecological habitats, and lead to land subsidence and fissures.

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. It should be noted, however, that the aquifer parameters used for the one-dimensional groundwater model (Table 8.3.9.2-3) represent available literature data, and that the model aggregates these value ranges into a simplistic representation of the aquifer.

TABLE 8.3.9.2-2 Aquifer Characteristics and Assumptions Used in the One-Dimensional Groundwater Model for the Proposed Gillespie SEZ

Parameter	Value
Aquifer type/conditions	Basin fill/unconfined
Aquifer thickness (ft)[a]	1,200
Hydraulic conductivity (ft/day)	10[c,d]
Transmissivity (ft^2/day)	12,000
Storage coefficient	0.05[e]
Analysis period (yr)	20
High pumping scenario (ac-ft/yr)[b]	2,100
Medium pumping scenario (ac-ft/yr)	299
Low pumping scenario (ac-ft/yr)	12

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

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

[c] Source: ADWR (1999).

[d] Source: Freihoefer et al. (2009).

[e] Source: Freethy and Anderson (1995).

Currently, the depth to groundwater ranges between 44 and 160 ft (13 and 49 m) in the vicinity of the SEZ. The modeling results suggest that groundwater withdrawals for solar energy development would result in groundwater drawdown in the vicinity of the SEZ (approximately a 3-mi [5-km] radius) that ranges from 4 to 20 ft (1.2 to 6.1 m) for the high pumping scenario, 1 to 3 ft (0.3 to 1 m) for the medium pumping scenario, and less than 1 ft (0.3 m) for the low pumping scenario (Figure 8.3.9.2-2). The modeled groundwater drawdown for the high pumping scenario suggests a potential for 4 ft (1.2 m) of drawdown at a distance of 3 mi (5 km) from the center of the SEZ, which could impair groundwater-surface water connectivity via infiltration processes during channel inundation, along with alterations to the riparian vegetation along Centennial Wash and the intermittent/ephemeral stream tributaries to Centennial Wash that flow from southwest to northeast through the SEZ.

8.3.9.2.3 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.

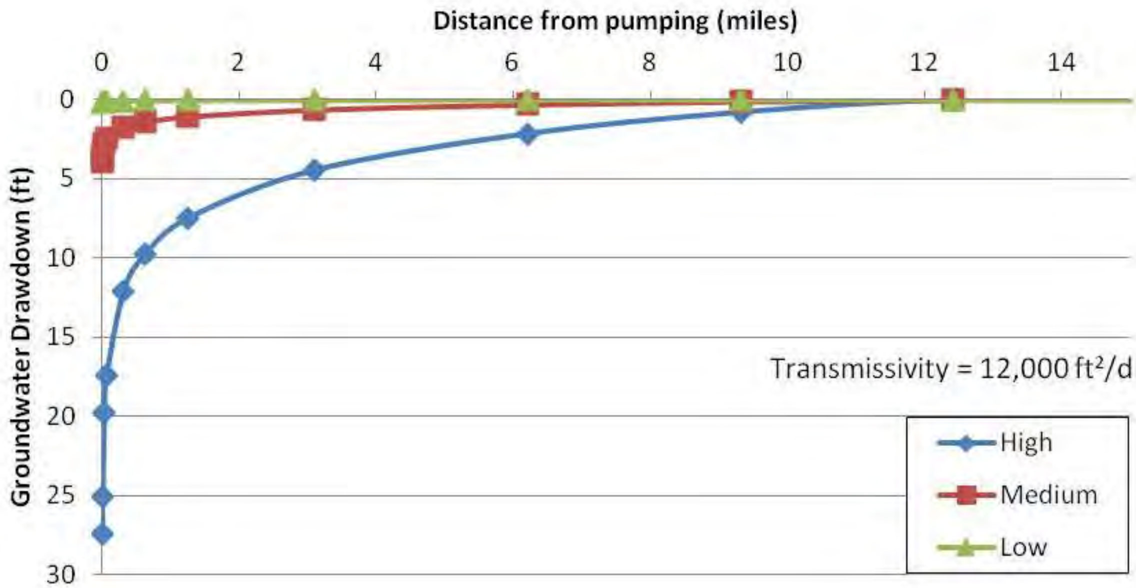


FIGURE 8.3.9.2-2 Estimated One-Dimensional Groundwater Drawdown Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Gillespie SEZ

8.3.9.2.4 Summary of Impacts on Water Resources

The additional information and analyses of water resources presented in this update agree with the information provided in the Draft Solar PEIS, which indicates that the Gillespie SEZ is located on sloping land containing more than 29 mi (46 km) of intermittent/ephemeral surface water features. Groundwater beneath the SEZ is found in a basin-fill aquifer. Historical groundwater use in the region has led to groundwater declines ranging up to 90 ft (27 m) due to agricultural pumping. Groundwater withdrawals have led to a 1,200-ft-long (360-m-long) earth fissure in the basin and land subsidence at a rate of up to 0.8 in./yr (2 cm/yr) between 2006 and 2008. These baseline conditions suggest that water resources in the vicinity of the Gillespie SEZ have the potential to be affected by surface disturbances and groundwater use resulting from solar energy development. Water management plays a significant role in the Phoenix AMA, and a permit would be required for the use of groundwater, surface water, or effluent by a solar facility. A solar facility would be required to demonstrate that there is an assured water supply for the life of the project to gain approval. Use of groundwater from a new well or an increased capacity on an existing well would also require a hydrologic impact analysis report.

Disturbance to intermittent/ephemeral stream channels within the Gillespie SEZ may affect the critical functions of groundwater recharge, sediment transport, flood conveyance, and ecological habitat given the density of intermittent/ephemeral streams within the Gillespie SEZ. The intermittent/ephemeral stream evaluation suggests that three intermittent/ephemeral channels within the SEZ have high sensitivity to disturbance and several have moderate sensitivity to disturbance. Surface disturbances within the Gillespie SEZ could also lead to impacts within upstream and downstream reaches of unnamed intermittent/ephemeral streams that flow through the SEZ. Several of the programmatic design features described in Section A.2.2 of Appendix A of this Final Solar PEIS specify measures to reduce impacts regarding intermittent/ephemeral water features.

The proposed water use for full build-out scenarios at the Gillespie SEZ indicate that the low and medium pumping scenarios are preferable, given that the high pumping scenario has the potential to impair potential groundwater-surface water connectivity in Centennial Wash and the unnamed intermittent/ephemeral stream tributaries to Centennial Wash that flow through the SEZ.

Predicting impacts associated with groundwater withdrawal in desert regions 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 to protect water resources is the implementation of long-term monitoring and adaptive management (see Section A.2.4 of Appendix A). For groundwater, this requires the combination of monitoring and modeling to fully identify the temporal and spatial extent of potential impacts. Water management in the Phoenix AMA relies on monitoring and modeling done by the ADWR (more information is available at http://www.azwater.gov/AzDWR/WaterManagement/AMAs/PhoenixAMA/default.htm). The management tools developed for the Phoenix AMA should be implemented with respect to long-term monitoring and adaptive management strategies for solar energy development occurring within the Gillespie SEZ.

8.3.9.3 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-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.

8.3.10 Vegetation

8.3.10.1 Affected Environment

As presented in the Draft Solar PEIS, 2 cover types were identified within the area of the proposed Gillespie SEZ, while 13 cover types were identified within 5 mi (8 km) of the SEZ boundary (the indirect effects area). There are no changes to the SEZ boundary or developable area; therefore, there are no changes to the land cover types in the affected area. Sensitive habitats on the SEZ include desert dry wash and dry wash woodland habitats. Saguaro cactus, palo verde, and ironwood, characteristic Sonoran Desert species, are present but infrequent.

8.3.10.2 Impacts

As presented in the Draft Solar PEIS, the construction of solar energy facilities within the proposed Gillespie SEZ would result in direct impacts on plant communities because of 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; approximately 2,094 acres (8.5 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.

8.3.10.2.1 Impacts on Native Species

The analysis presented in the Draft Solar PEIS indicated that development would result in a small impact on the land cover types occurring within the Gillespie SEZ (Table 8.3.10.1-1 in the Draft Solar PEIS). Development within the SEZ could still affect the cover types evaluated in the Draft Solar PEIS, and the impact magnitudes would remain unchanged.

Direct impacts on dry washes, dry wash woodland, saguaro cactus, mesquite bosque, wetland, ironwood (including those outside of washes) and riparian habitat within the SEZ or access road corridor could still occur. Indirect impacts on habitats associated with washes, wetlands, or riparian habitats within or near the SEZ, as described in the Draft Solar PEIS, could also occur. Groundwater use within the SEZ could affect groundwater-dependent communities, such as mesquite bosque communities, microphyll (palo verde/ironwood) woodland communities (including ironwood and palo verde located outside of washes), or riparian habitats along the Gila or Hassayampa Rivers.

8.3.10.2.2 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 Gillespie SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 8.3.10.1 of the Draft Solar PEIS. Impacts, such as reduced restoration success and possible widespread habitat degradation, could still occur.

8.3.10.3 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 wetland, dry wash, dry wash woodland, mesquite bosque, riparian, saguaro cactus, and ironwood (including those outside of washes) communities within the SEZ or access road corridor shall be avoided to the extent practicable, and any impacts shall be minimized and mitigated in consultation with appropriate agencies. Any cacti that cannot be avoided should be salvaged. A buffer area shall be maintained around dry washes, dry wash woodland, mesquite bosque, wetland, and riparian habitats to reduce the potential for impacts.

- Appropriate engineering controls shall be used to minimize impacts on wetland, dry wash, dry wash woodland, mesquite bosque, and riparian 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.

- Groundwater withdrawals shall be limited to reduce the potential for indirect impacts on groundwater-dependent communities, such as mesquite bosque communities, microphyll (palo verde/ironwood) communities, or riparian habitats along the Gila or Hassayampa Rivers.

It is anticipated that implementation of these programmatic design features will reduce a high potential for impacts from invasive species and impacts on wetland, dry wash, dry wash woodland, riparian, mesquite bosque, and saguaro cactus communities to a minimal potential for impact. Residual impacts on groundwater-dependent habitats could result from limited 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 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.

8.3.11 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.

8.3.11.1 Amphibians and Reptiles

8.3.11.1.1 Affected Environment

As presented in the Draft Solar PEIS, representative amphibian and reptile species expected to occur within the Gillespie SEZ include the Great Basin spadefoot (*Spea intermontana*), red-spotted toad (*Bufo punctatus*), desert horned lizard (*Phrynosoma platyrhinos*), Great Basin collared lizard (*Crotaphytus bicinctores*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), common kingsnake (*Lampropeltis gentula*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), groundsnake (*Sonora semiannulata*), and nightsnake (*Hypsiglena torquata*). The Mohave rattlesnake (*Crotalus scutulatus*), sidewinder (*C. cerastes*), and western diamond-backed rattlesnake (*C. atrox*) would be the most common poisonous snake species expected to occur on the SEZ.

8.3.11.1.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Gillespie SEZ would result in a small overall impact on the representative amphibian and reptile species (Table 8.3.11.1-1 in the Draft Solar PEIS).

8.3.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on amphibian and reptile 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 amphibian and reptile species would be anticipated to be small.

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

8.3.11.2 Birds

8.3.11.2.1 Affected Environment

As presented in the Draft Solar PEIS, a large number of bird species could occur or have potentially suitable habitat within the affected area of the proposed Gillespie SEZ. Representative bird species identified in the Draft Solar PEIS included (1) passerines: ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), Brewer's sparrow (*Spizella breweri*), cactus wren (*Campylorhynchus brunneicapillus*), common poorwill (*Phalaenoptilus nuttallii*), common raven (*Corvus corax*), Costa's hummingbird (*Calypte costae*), Gila woodpecker (*Melanerpes uropygialis*), greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), ladder-backed woodpecker (*Picoides scalaris*), Le Conte's thrasher (*Toxostoma leconti*), lesser nighthawk (*Chordeiles acutipennis*), loggerhead shrike (*Lanius ludovicianus*), Lucy's warbler (*Vermivora luciae*), phainopepla (*Phainopepla nitens*), Say's phoebe (*Sayornis saya*), and verdin (*Auriparus flaviceps*); (2) 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 (3) upland gamebirds: chukar (*Alectoris chukar*), Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), and white-winged dove (*Zenaida asiatica*).

8.3.11.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Gillespie SEZ would result in a small overall impact on the representative bird species (Table 8.3.11.2-1 in the Draft Solar PEIS).

8.3.11.2.3 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, impacts on bird species would be anticipated to be small.

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features for birds 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.

8.3.11.3 Mammals

8.3.11.3.1 Affected Environment

As presented in 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 Gillespie SEZ. Representative mammal species identified in the Draft Solar PEIS included (1) big game species: cougar (*Puma concolor*) and mule deer (*Odocoileus hemionus*); (2) furbearers and small game species: the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), gray fox (*Urocyon cinereoargenteus*), javelina or collared peccary (*Pecari tajacu*), kit fox (*Vulpes macrotis*), ringtail (*Bassariscus astutus*), and striped skunk (*Mephitis mephitis*); and (3) small nongame species: Arizona pocket mouse (*Perognathus amplus*), Botta's pocket gopher (*Thomomys bottae*), cactus mouse (*Peromyscus eremicus*), canyon mouse (*P. crinitis*), deer mouse (*P. maniculatus*), desert pocket mouse (*Chaetodipus penicillatus*), desert shrew (*Notiosorex crawfordi*), desert woodrat (*Neotoma lepida*), Merriam's pocket mouse (*Dipodomys merriami*), round-tailed ground squirrel (*Spermophilus tereticaudus*), southern grasshopper mouse (*Onychomys torridus*), 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*), silver-haired bat (*Lasionycteris noctivagans*), spotted bat (*Euderma maculatum*), and western pipistrelle (*Pipistrellus hesperus*). However, roost sites for the bat species (e.g., caves, hollow trees, rock crevices, or buildings) would be limited to absent within the SEZ.

8.3.11.3.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Gillespie SEZ would result in a small overall impact on the representative mammal species (Table 8.3.11.3-1 in the Draft Solar PEIS).

8.3.11.3.3 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 would be anticipated to be small.

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

- The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.

If SEZ-specific design features are implemented in addition to required programmatic design features, impacts on mammal species would be small. 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.

8.3.11.4 Aquatic Biota

8.3.11.4.1 Affected Environment

There are no permanent water bodies or perennial streams within the boundaries of the Gillespie SEZ. Because the boundaries of the Gillespie SEZ given in the Draft Solar PEIS have not changed, the amount of surface water features within the area of direct and indirect effects is still valid. An update to the Draft Solar PEIS is as follows:

- Outside of the indirect effects area, but within 50 mi (80 km) of the proposed Gillespie SEZ, are approximately 159 mi (76 km) of perennial streams, 659 mi (1,199 km) of intermittent streams, and 153 mi (246 km) of canals.

Aquatic biota present in the surface water features in the Gillespie SEZ have not been characterized. 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 the aquatic biota, if present, in washes and wetlands within the SEZ.

8.3.11.4.2 Impacts

The types of impacts on aquatic habitats and biota that could occur from the development of utility-scale solar energy facilities are discussed in Section 5.10.3 of the Draft Solar PEIS and the 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.

8.3.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on aquatic 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:

- Appropriate engineering controls shall be implemented to minimize the amount of contaminants and sediment entering wetlands and washes within the SEZ.

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 Gillespie SEZ would be small.

On the basis of impact analyses conducted for the Draft Solar PEIS 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.

8.3.12 Special Status Species

8.3.12.1 Affected Environment

As presented in the Draft Solar PEIS, 29 special status species were identified that could occur or have potentially suitable habitat within the affected area of the proposed Gillespie SEZ. Since there was no change to the boundary of the proposed Gillespie SEZ, there is also no change in the potential for these species to occur in the affected area of the Gillespie SEZ.

8.3.12.2 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 Gillespie SEZ could affect potentially suitable habitats of 29 special status species. The analysis presented in the Draft Solar PEIS for the Gillespie SEZ indicated that development would result in no impact or a small overall impact on all special status species, with the exception of groundwater-dependent species.

In the Draft Solar PEIS, for those species that could be affected by groundwater withdrawals on the SEZ, impacts could range from small to large depending upon the scale of development and the water needed to serve development on the SEZ. 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. Groundwater-dependent species that may be affected by development on the Gillespie SEZ include the following nine special status species: (1) fish: roundtail chub (*Gila robusta*); (2) amphibians: Arizona toad (*Bufo microscaphus*), lowland leopard frog (*Lithobates yavapaiensis*); and (3) birds: cattle egret (*Bubulcus ibis*), great egret (*Ardea alba*), snowy egret

(*Egretta thulai*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), and Yuma clapper rail (*Rallus longirostrisyumanensis*).

8.3.12.3 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 guide how programmatic design features are applied, for example:

- Pre-disturbance surveys shall be conducted within the area of direct effects to determine the presence and abundance of special status species, including those identified in Table 8.3.12.1-1 of the Draft 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 for some species, 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 prepared in coordination with the appropriate federal and state agencies.

- Consultation with the USFWS and AZGFD shall be conducted to address the potential for impacts on the following species currently listed as threatened or endangered under the ESA: Sonoran bald eagle (*Haliaeetus leucocephalus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and Yuma clapper rail (*Rallus longirostrisyumanensis*). Consultation will identify an appropriate survey protocol, avoidance and minimization measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements (if necessary).

- Coordination with the USFWS and AZGFD should be conducted to address the potential for impacts on the following species that are candidates or under review for listing under the ESA: Sonoran desert tortoise (*Gopherus agassizii*), Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*), and western yellow-billed cuckoo (*Coccyzus americanus*). Coordination will identify an appropriate survey protocol and mitigation, which may include avoidance, minimization, translocation, or compensation.

- Avoidance or minimization of groundwater withdrawals to serve solar energy development on the SEZ to reduce or eliminate impacts on nine special status species.

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 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.

8.3.13 Air Quality and Climate

8.3.13.1 Affected Environment

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

8.3.13.1.1 Existing Air Emissions

The Draft Solar PEIS presented Maricopa County emissions data for 2002. More recent data for 2008 (EPA 2011a) were reviewed for this Final Solar PEIS. The two emissions inventories used different sources and assumptions; for example, the 2008 data did not include biogenic emissions. In the 2008 data, emissions of SO_2, NO_x, CO, and VOCs were lower and particulate emissions were higher than in the 2002 data. These changes would not affect the modeled air quality impacts presented in this update.

8.3.13.1.2 Air Quality

The calendar quarterly average NAAQS of 1.5 $\mu g/m^3$ for lead (Pb) presented in Table 8.3.13.1-2 of the Draft Solar PEIS has been replaced by the rolling 3-month standard (0.15 $\mu g/m^3$). The federal 24-hour and annual SO_2, 1-hour O_3, and annual PM_{10} standards have been revoked as well (EPA 2011b). These changes will not affect the modeled air quality impacts presented in this update. Arizona adopts the federal standards and thus the Arizona SAAQS are the same as the NAAQS.

8.3.13.2 Impacts

8.3.13.2.1 Construction

Methods and Assumptions

The methods and modeling assumptions have not changed from those presented in the Draft Solar PEIS. There were no boundary changes to the proposed Gillespie SEZ, and no non-development areas were identified.

Results

Because the annual PM_{10} standard has been rescinded, the discussion of annual PM_{10} impacts in the Draft Solar PEIS is no longer applicable.

Because there were no boundary changes to the proposed Gillespie SEZ, air quality was not remodeled, and the modeled concentrations and conclusions presented in the Draft Solar PEIS remain valid. As shown in Table 8.3.13.2-1 of the Draft Solar PEIS, the background levels of 24-hour PM_{10} and 24-hour $PM_{2.5}$ were above standard levels, and any increase due to construction emissions would increase levels already above standard levels. Background levels of annual $PM_{2.5}$ were about 90% of the standard level.

In the vicinity of the SEZ, the conclusions in the Draft Solar PEIS remain valid. Predicted 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$ concentration levels could exceed the standard levels at the SEZ boundaries and in the immediate surrounding areas during the construction of solar facilities.

Given that background particulate levels appear to be high, the Draft Solar PEIS presented concentration increments at human receptors and these results remain valid.[1] At the nearby residences about 4.1 mi (6.6 km) southeast of the SEZ, predicted maximum 24-hour PM_{10} concentration increments would be about 65 $\mu g/m^3$. At the nearby residences about 3 mi (5 km) north of the SEZ, predicted maximum 24-hour and annual $PM_{2.5}$ concentration increments would be about 2.0 and 0.2 $\mu g/m^3$, respectively. Given that even these small increments could, during the construction period, add to air quality levels already exceeding standard levels, refined modeling and a site-specific determination of local particulate background levels should be undertaken.

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[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. Therefore, it has been assumed that an area of 2,094 acres (8.5 km^2) would be disturbed continuously; thus 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 lower than those in this Final Solar PEIS.

The conclusions in the Draft Solar PEIS concerning impacts on nearby PSD Class I areas remain valid. Predicted 24-hour and annual PM_{10} concentration increments at the surrogate receptors[2] for the nearest Class I Area—Superstition WA—would both be less than the PSD increments for Class I areas.

In conclusion, predicted 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$ concentration levels could exceed the standard levels at the SEZ boundaries and in the immediate 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 concentrations of particulates at nearby communities would be much lower, but would still add to impacts at those communities because background particulate levels are high. Modeling indicates that emissions from construction activities are not anticipated to exceed Class I PSD PM_{10} increments at the nearest federal Class I area (Superstition WA). Construction activities are not subject to the PSD program, and the comparison provides only a screen for gauging the size of the impact. Accordingly, it is anticipated that impacts of construction activities on ambient air quality would be moderate and temporary.

Since there were no areal or boundary changes to the proposed Gillespie SEZ, any potential impacts on air quality related values (AQRVs) at nearby federal Class I areas would be the same as in the Draft Solar PEIS, and the conclusions in the Draft remain valid. Emissions from construction-related equipment and vehicles are temporary and could cause some unavoidable but short-term impacts.

8.3.13.2.2 Operations

Because there were no changes to the proposed Gillespie SEZ boundaries, the potential air emissions displaced by solar project development remain as presented in the Draft Solar PEIS. Solar facilities built in the Gillespie SEZ could reduce fuel combustion–related emissions in Arizona to some extent, but relatively less so than those built in other states with higher fossil fuel use rates.

8.3.13.2.3 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 would be moderate and temporary.

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[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 direction of the nearest Class I area were selected as surrogates for the PSD analysis.

8.3.13.3 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 and consideration of comments received as applicable, no SEZ-specific design features for air quality 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.

8.3.14 Visual Resources

8.3.14.1 Affected Environment

No boundary revisions or non-development areas for the proposed Gillespie SEZ were identified in the Supplement to the Draft Solar PEIS; thus the description of the SEZ in the Draft Solar PEIS remains valid. The general lack of topographic relief, water, and physical variety results in low scenic value within the SEZ itself; however, because of the flatness of the landscape, the lack of trees, and the breadth of the open desert, the SEZ presents a vast panoramic landscape with sweeping views of the surrounding mountains that add significantly to the scenic values within the SEZ viewshed.

8.3.14.2 Impacts

The summary of impacts provided in the Draft Solar PEIS remains valid. The SEZ is located in an area of low scenic quality, with numerous cultural disturbances already present. Large visual impacts within the SEZ would occur due to major modification of the character of the existing landscape. Additional impacts would occur from construction and operation of transmission lines and access roads within the SEZ.

Utility-scale solar energy development within the proposed Gillespie SEZ would likely result in strong visual contrasts for some viewpoints within the Signal Mountain WA and at the Woolsey Peak WA, as well as within the community of Arlington; moderate to strong visual contrasts could be observed by visitors to the Saddle Mountain SRMA. In addition, minimal to weak visual contrasts would be expected for some viewpoints within other sensitive visual resource areas within the SEZ 25-mi (40-km) viewshed.

8.3.14.3 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 would 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 and consideration of comments received as applicable, the following SEZ-specific design feature for the SEZ has been identified:

- The development of power tower facilities should be prohibited within the SEZ. The height of solar power tower receiver structures, combined with the intense light generated by the receiver atop the tower, would be expected to create strong visual contrasts that could not be effectively screened from view for most areas surrounding the SEZ.

Application of this SEZ-specific design feature prohibiting the development of power tower facilities would substantially reduce potential visual impacts on the Woolsey Peak WA, the Sonoran Desert National Monument, the North Maricopa Mountains WA, the Saddle Mountain SRMA, and the Agua Caliente Scenic Drive. 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.

8.3.15 Acoustic Environment

8.3.15.1 Affected Environment

The boundaries of the SEZ have not changed; thus the information for acoustic environment remains the same as that presented in the Draft Solar PEIS.

8.3.15.2 Impacts

8.3.15.2.1 Construction

There were no boundary changes to the proposed Gillespie SEZ. Thus, the predicted noise levels and, except as noted below, the conclusions presented in the Draft Solar PEIS remain valid.

Estimated noise levels at the nearest residences near the southeastern boundary of the SEZ would be below the typical daytime mean rural background level of 40 dBA and well below the EPA guideline of 55 dBA L_{dn} for residential areas (EPA 1974). Noise levels might be masked to some extent by traffic noise on old U.S. 80 and by noise from other nearby industrial and agricultural activities.

On the basis of comments received and recent references, as applicable, this Final Solar PEIS used an updated 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. As a result of this updated significance threshold, the assessment of impacts has been updated as follows. Noise levels associated with construction activities in the SEZ at the boundaries of the Woolsey Peak WA, Signal Mountain WA, and Saddle Mountain SRMA are estimated to be about 34, 28, and 26 dBA, respectively. These estimated levels are below the significance threshold; thus, as concluded in the Draft Solar PEIS, noise from construction in the proposed Gillespie SEZ is not anticipated to adversely affect wildlife in the nearby specially designated areas. However, as discussed in Section 5.10.2 of this Final Solar PEIS, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). On the basis of 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 project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. Nonetheless, even considering potential impacts at lower noise levels, construction noise from the SEZ is not anticipated to affect wildlife in the nearby specially designated areas.

Because the outer boundaries of the proposed SEZ remain unchanged and there is no reduction in the developable area, construction noise and vibration impacts would be the same as those presented in the Draft Solar PEIS. Construction would cause some unavoidable but localized short-term noise impacts on neighboring communities, particularly for activities occurring near the southeastern boundary of the SEZ, close to the nearest residences. No adverse impacts from vibration, including pile driving for dish engines, are anticipated from construction activities.

8.3.15.2.2 Operations

There were no boundary changes to the proposed Gillespie SEZ; thus the predicted noise levels from operating solar technologies in the SEZ as presented in the Draft Solar PEIS remain valid.

Parabolic Trough and Power Tower

If TES were not used for parabolic trough and power tower technologies, estimated noise levels at the nearest residences would be well below the EPA guideline of 55 dBA L_{dn} for residential areas. If TES were used (resulting in a longer daily operating period), nighttime noise levels could exceed the typical nighttime mean rural background level of 30 dBA, but the EPA guideline of 55 dBA L_{dn} for residential areas would still be met. Operating parabolic trough or power tower facilities using TES and located near the southeastern boundary of the SEZ could result in some noise impacts on the nearest residences, depending on background noise levels and meteorological conditions.

As stated above under construction impacts, for this Final Solar PEIS, an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. For an operating parabolic trough or power tower facility equipped with TES at the SEZ, estimated daytime/nighttime noise levels at the boundaries of the Woolsey Peak WA, Signal Mountain WA, and Saddle Mountain SRMA are about 37/47, 32/42, and 30/40 dBA, respectively. These estimated levels are below the significance threshold; thus, as concluded in the Draft Solar PEIS, noise from operating parabolic trough or power tower facilities in the proposed Gillespie SEZ is not anticipated to considerably affect wildlife in the nearby specially designated areas. However, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). On the basis of the approximate significance threshold of 55 dBA and the potential for impacts at lower noise levels, noise impacts on terrestrial wildlife from an operating parabolic trough or power tower facility equipped with TES would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. Nonetheless, even considering potential impacts at lower noise levels, noise from operation of TES at the SEZ is not anticipated to affect wildlife in the nearby specially designated areas.

Dish Engine

Consideration of minimizing noise impacts is very important during the siting of dish engine facilities. As estimated in the Draft Solar PEIS, estimated noise levels from dish engine facilities at the nearest residences to the Gillespie SEZ would be less than 40 dBA (a typical daytime mean rural background noise level), and this noise might be masked by traffic noise on old U.S. 80 and by noise from other nearby industrial and agricultural activities. The levels at these residences would be below the EPA guideline of 55 dBA L_{dn} for residential areas.

However, noise from dish engines could cause some adverse impacts on the nearest residences, depending on background noise levels and meteorological conditions.

As stated above under construction impacts, for this Final Solar PEIS, an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. Associated with operations of a dish engine facility at the SEZ, estimated noise levels at the boundaries of the Woolsey Peak WA, Signal Mountain WA, and Saddle Mountain SRMA are about 39, 38, and 34 dBA, respectively. These estimated levels are below the updated approximate significance threshold; thus, noise from operations in the proposed Gillespie SEZ is not anticipated to considerably affect wildlife in the nearby specially designated areas. 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). Considering the approximate significance threshold and the potential for impacts at lower noise levels, noise impacts on terrestrial wildlife from an operating dish engine facility would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. Nonetheless, even considering potential impacts at lower noise levels, noise from operation of TES at the SEZ is not anticipated to affect wildlife in the nearby specially designated areas.

With no changes in the boundaries of the proposed Gillespie SEZ, the discussions of vibration, transformer and switchyard noise, and transmission line corona discharge presented in the Draft Solar PEIS remain valid. Noise impacts from these sources would be negligible.

8.3.15.2.3 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 negligible.

8.3.15.3 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 and consideration of comments received as applicable, no SEZ-specific design features for noise were identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.16 Paleontological Resources

8.3.16.1 Affected Environment

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

- The BLM Regional Paleontologist may have additional information regarding the paleontological potential of the SEZ and be able to verify the PFYC of the SEZ as Class 3b as used in the Draft Solar PEIS.

8.3.16.2 Impacts

The assessment provided in the Draft Solar PEIS remains valid. A more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted.

8.3.16.3 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 and consideration of comments received as applicable, no SEZ-specific design features for paleontological resources have been identified. Because the PFYC of the proposed Gillespie SEZ is Class 3b (unknown potential), paleontological surveys would be needed to identify those areas that may have significant paleontological resources; therefore, the need for and nature of any SEZ-specific design features will depend on the findings of future paleontological investigations. Mitigation is not likely needed in the PFYC Class 1 volcanic areas located within a portion of the assumed access road corridor. 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://www.solareis.anl.gov) for use by applicants, the BLM, and other stakeholders.

8.3.17 Cultural Resources

8.3.17.1 Affected Environment

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

- 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) potential trail networks through existing ethnographic reports, and (3) overall cultural sensitivity of the landscape.
  – Results of a Class II reconnaissance-level stratified random sample survey of 131 acres (0.53 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 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 create sensitivity zones based on projected site density, complexity, likely presence of human burials, and/or other tribal concerns. BLM will continue to request funding to support additional Class II sample inventories in the SEZ areas. Areas of specific local interest, as determined through a Class I review, and, if appropriate, some subsurface testing of dune and/or colluvium areas should be considered in the 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 IM 2012-032 (BLM 2011a), 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.

8.3.17.2 Impacts

As stated in the Draft Solar PEIS, direct impacts on significant cultural resources could occur in the proposed Gillespie SEZ; however, further investigation is needed. The following summary of potential for impacts presented in the Draft Solar PEIS remains valid:

The potential for impacts on prehistoric cultural resources in the Gillespie SEZ is high in the eastern portion of the SEZ, the area closest to the Gila River, because access to potable water would have been a critical factor for groups in prehistoric times. The northern portion of the SEZ, near the Southern Pacific Railroad spur, has potential for historic resources. Visual impacts on significant cultural resources are possible on those cultural resources that are located close enough to the SEZ for solar development to be visible and for which significance is based on visual integrity.

8.3.17.3 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 and consideration of comments received as applicable, the following SEZ-specific design feature has been identified:

- Recordation of historic structures through Historic American Building Survey/Historic American Engineering Record protocols through the National Park Service would be appropriate and could be required if any historic structures or features would be affected; for example, if the Gillespie Dam Highway Bridge were used as part of an off-site access route for a solar energy project.

The need for and nature of additional SEZ-specific design features would be determined in consultation with the Arizona SHPO, local BLM offices, and affected tribes and would depend on the results of future investigations. Some SEZ-specific design features may be established through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.18 Native American Concerns

8.3.18.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid.

8.3.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. The impacts expected on resources important to Native Americans from solar energy development within the Gillespie SEZ fall into two major categories: impacts on the landscape and impacts on discrete localized resources. As consultation with the tribes continues and project-specific analyses are undertaken, it is possible that Native Americans will express concerns over potential visual and other effects of solar energy development within the SEZ on a culturally important landscape, including features such as the Painted Rock and Gila Bend Mountains. Regarding localized effects, since solar energy facilities cover large tracts of ground, even taking into account the implementation of design features, it is unlikely that avoidance of all resources would be possible. However, as discussed in Sections 8.3.10 and 8.3.11 of this Final Solar PEIS, impacts on plant and animal resources are expected to be small since there is an abundance of similar plant and animal habitat in the area. As discussed in Section 8.3.17.2, potential impacts are possible on cultural resources if those present (or identified in the future) are determined eligible for listing in the NRHP.

8.3.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

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 impact analyses conducted for the Draft Solar PEIS 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 consultations with affected tribes as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis. Culturally significant sites and landscapes in the vicinity of the SEZ associated with the Gila River corridor, rock art, burials, and sacred mountains in the area, as well as traditional plant and animal resources, should be considered during consultation.

8.3.19 Socioeconomics

8.3.19.1 Affected Environment

The boundaries and developable area of the Gillespie SEZ have not changed. The socioeconomic 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; that is, no updates to the affected environment information given in the Draft Solar PEIS are required.

8.3.19.2 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 the BLM, the in-migration of solar facility workers and their families, and impacts on local housing markets and on local community service employment. Since the boundaries of the proposed Gillespie

SEZ and the reduction of the developable area remain unchanged, the impact assessment provided in the Draft Solar PEIS remains valid. During construction, between 288 and 3,813 jobs and between about $18 million and $236 million in income could be associated with solar development in the SEZ. During operations at full build-out, between 6 and 150 jobs and between $0.2 million and $5.9 million in income could be produced. In-migration of workers and their families would mean between 14 and 179 rental housing units would be needed during construction, and between 1 and 7 owner-occupied units during operations.

8.3.19.3 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 and consideration of comments received as applicable, no SEZ-specific design features to address socioeconomic impacts 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.

8.3.20 Environmental Justice

8.3.20.1 Affected Environment

The data presented in the Draft Solar PEIS remain valid. There are minority populations, but no low-income populations, in the 50-mi (80-km) radius of the SEZ taken as a whole. At the individual block group level, there are census block groups in which the minority population exceeds the state average by more than 20 percentage points. These groups occur in most of the southern portion of the 50-mi (80-km) radius around the SEZ and northeast of the site in the greater Phoenix metropolitan area. There are also block groups in the greater Phoenix area in which the minority population exceeds 50% of the total population.

There is one census block group west of the SEZ, and numerous such groups in the greater Phoenix area, with a low-income population that is more than 20 percentage points higher than the state average. Census block groups in which the low-income population exceeds 50% of the total population are located west of the SEZ in Yuma County, southwest of the site, and east of the site in the greater Phoenix area.

8.3.20.2 Impacts

Potential impacts (e.g., from noise and dust during construction and operations, visual impacts, cultural impacts, and effects on property values) 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 to moderate, and within the 50-mi (80-km) radius as a whole there are minority populations, but no low-income populations defined by CEQ guidance (CEQ 1997) (see Section 8.3.20.1 of the Draft Solar PEIS). This means that any adverse impacts of solar projects could disproportionately affect minority populations.

8.3.20.3 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 such impacts.

On the basis of impact analyses conducted for the Draft Solar PEIS and considering comments received as applicable, no SEZ-specific design features for environmental justice impacts in the Gillespie 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.

8.3.21 Transportation

8.3.21.1 Affected Environment

The data in the Draft Solar PEIS remain valid.

8.3.21.2 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). For a single project, this volume of traffic on Old U.S. 80 would represent an increase in traffic of about 200% in the area of the Gillespie SEZ. If all project traffic were to be routed through State Route 85, such traffic levels would represent about a 20% increase in the traffic levels experienced on State Route 85 near the SEZ. Because higher traffic volumes would be experienced during shift changes, traffic on Old U.S. 80 could experience moderate slowdowns during these time periods in the area of any junctions with SEZ site access roads. Local road improvements, in addition to turn lanes, might be necessary on any portion of Old U.S. 80 near any site access point(s).

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.

8.3.21.3 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 and consideration of comments received as applicable, no SEZ-specific design features to address transportation impacts in the proposed Gillespie 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.

8.3.22 Cumulative Impacts

The analysis of potential impacts in the vicinity of the proposed Gillespie SEZ presented in the Draft Solar PEIS is still generally applicable for this Final Solar PEIS. The size of the proposed SEZ has not changed from that described in the Draft Solar PEIS. The following sections include an update to the information presented in the Draft Solar PEIS regarding cumulative effects for the proposed Gillespie SEZ.

8.3.22.1 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). The BLM, DoD, and USFS administer most of the land around the SEZ; there are also several Tribal lands east, southeast, and south of the SEZ. The BLM administers approximately 43% of the lands within a 50-mi (80-km) radius of the SEZ.

8.3.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The area of the proposed Gillespie SEZ remains at 2,618 acres (10.6 km^2). The Draft Solar PEIS included two other proposed SEZs in Arizona; one of these, Bullard Wash, has been removed from consideration.

There are approximately 22 pending ROW applications for solar facilities within 50 mi (80 km) of the Gillespie SEZ that could generate up to about 11,950 MW of electricity on public lands in Arizona (see Table B-1 of 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 one, the Sonoran Solar Energy Project (discussed below), has firm near-term plans and environmental documentation and is thus considered a reasonably foreseeable action. As of the end of October 2011, the rest were not considered reasonably foreseeable future actions.

The ongoing and reasonably foreseeable future actions described below are grouped into two categories: (1) actions related to energy production and distribution, (Section 8.3.22.2.1); and (2) other ongoing and reasonably foreseeable actions, including those related to electric power generation and distribution, wildlife management, and military facility improvement (Section 8.3.22.2.2). Together, these actions and trends have the potential to affect human and environmental receptors within the geographic range of potential impacts over the next 20 years.

8.3.22.2.1 Energy Production and Distribution

The list of reasonably foreseeable future actions related to energy production and distribution near the proposed Gillespie SEZ has been updated and is presented in Table 8.3.22.2-1. Projects listed in the table are shown in Figure 8.3.22.2-1. Most of these projects were described in the Draft Solar PEIS; projects not described there and those with substantial changes are discussed below.

Sonoran Solar Energy Project

As originally proposed, the facility, which was described in the Draft Solar PEIS, was to be a parabolic trough facility with an output of 375 MW and options for natural gas backup and/or thermal storage capabilities; it would have occupied approximately 3,700 acres (15.0 km^2). Once the facility was operational, the total water demand would be 2,305 to 3,003 ac-ft/yr (2,800,000 to 3,700,000 m^3/yr) in an average year. About 870 workers would be employed during the construction of the facility (peaking at about 1,500 workers), and 82 full-time employees during operations. The Record of Decision (ROD), issued on December 20, 2011, approved a 300-MW PV facility on 2,013 acres (8.15 km^2) of BLM-administered land. The operational water requirements for the new proposal would be only 33 ac-ft/yr (40,700 m^3/yr). The peak workforce during construction is estimated to be 358, and the operational workforce 16.

Solana Solar Generating Station

Abengoa Solar intends to operate a 280-MW parabolic trough plant with 6 hours of molten salt thermal storage. Construction began at the end of 2010, and the plant is expected to

1 **TABLE 8.3.22.2-1 Ongoing and Reasonably Foreseeable Future Actions Related to Energy**
2 **Development and Distribution near the Proposed Gillespie SEZ[a]**

Description	Status	Resources Affected	Primary Impact Location
Renewable Solar Energy Projects on BLM-Administered Lands			
Sonoran Solar Energy Project (AZA 034187), originally 375-MW CSP/trough facility, changed to 300-MW PV; 2,013 acres[b]	ROD December 20, 2011[c]	Land use, visual, terrestrial habitats, wildlife, groundwater	About 12 mi[d] east of the Gillespie SEZ
Other Solar Energy Projects			
Mesquite Solar 1, 150-MW PV facility	Construction under way; 42 MW of panels now operating[e]	Land use, visual, terrestrial habitats, wildlife	About 4 mi northeast of the SEZ
Arlington Valley Solar I, 125-MW/trough or PV facility, 1,433 acres	Operation expected in 2013[f]	Land use, visual, terrestrial habitats, wildlife	About 4 mi north of the SEZ
Arlington Valley Solar II, 125 MW, 1,160 acres	Operation expected in 2013[f]	Land use, visual, terrestrial habitats, wildlife	About 1 mi north of the SEZ
Solana Generating Station, 280-MW parabolic trough facility, 1,920 acres	Under construction; operation expected in 2013	Land use, visual, terrestrial habitats, wildlife	About 25 mi south of the SEZ
Cotton Center Solar Plant, 17-MW PV facility, 145 acres	Operating	Land use, visual, terrestrial habitats, wildlife	About 15 mi south–southeast of the SEZ
Paloma Solar Power Plant, 17-MW PV facility, 240 acres	Operating	Land use, visual, terrestrial habitats, wildlife	About 15 mi south–southeast of the SEZ
Hyder Solar Power Plant, 17-MW PV facility, 240 acres	Under construction	Land use, visual, terrestrial habitats, wildlife	About 32 mi southwest of the SEZ
Agua Caliente Solar Project, 290-MW PV facility, 2,400 acres	Under construction	Land use, visual, terrestrial habitats, wildlife	About 40 mi southwest of the SEZ

3

TABLE 8.3.22.2-1 (Cont.)

Description	Status	Resources Affected	Primary Impact Location
Transmission and Distribution Systems			
None	NA[g]	NA	NA

[a] Includes projects in later stages of agency environmental review and project development. For projects on BLM-administered lands, includes those approved in 2010, and priority projects for 2011 and 2012 (BLM 2012b). Projects with status changed from that given in the Draft Solar PEIS are shown in bold text.

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

[c] See BLM (2011b) for details.

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

[e] See Sempra (2011) for details.

[f] See AVSE (2009) for details.

[g] NA = not applicable.

begin operation in 2013. The 1,920-acre (7.77-km^2) site is located 11 mi (18 km) west of Gila Bend, Arizona, and 25 mi (40 km) south of the proposed Gillespie SEZ. The power plant will use 75% less water than the current use of the property. The peak workforce is expected to be about 1,700 workers during construction and 85 full-time employees during operation (Abengoa Solar 2011; APS 2011a).

Cotton Center Solar Plant

Arizona Public Service is operating a 17-MW PV power plant, located on 145 acres (0.59 km^2) of former agricultural land, 6 mi (10 km) north of Gila Bend, Arizona, and 15 mi (24 km) south–southeast of the proposed Gillespie SEZ. The energy produced is connected to the electric grid through a 12-kV line located 0.5 mi (0.8 km) north of the site (APS 2011b).

Paloma Solar Plant

Arizona Public Service is operating a 17-MW PV power plant, located on 242 acres (0.98 km^2) of former agricultural land, 6 mi (10 km) north of Gila Bend, Arizona, and 15 mi (24 km) south–southeast of the proposed Gillespie SEZ. The energy produced is connected to the electric grid through a 12-kV line located 0.5 mi (0.8 km) north of the site (APS 2011c).

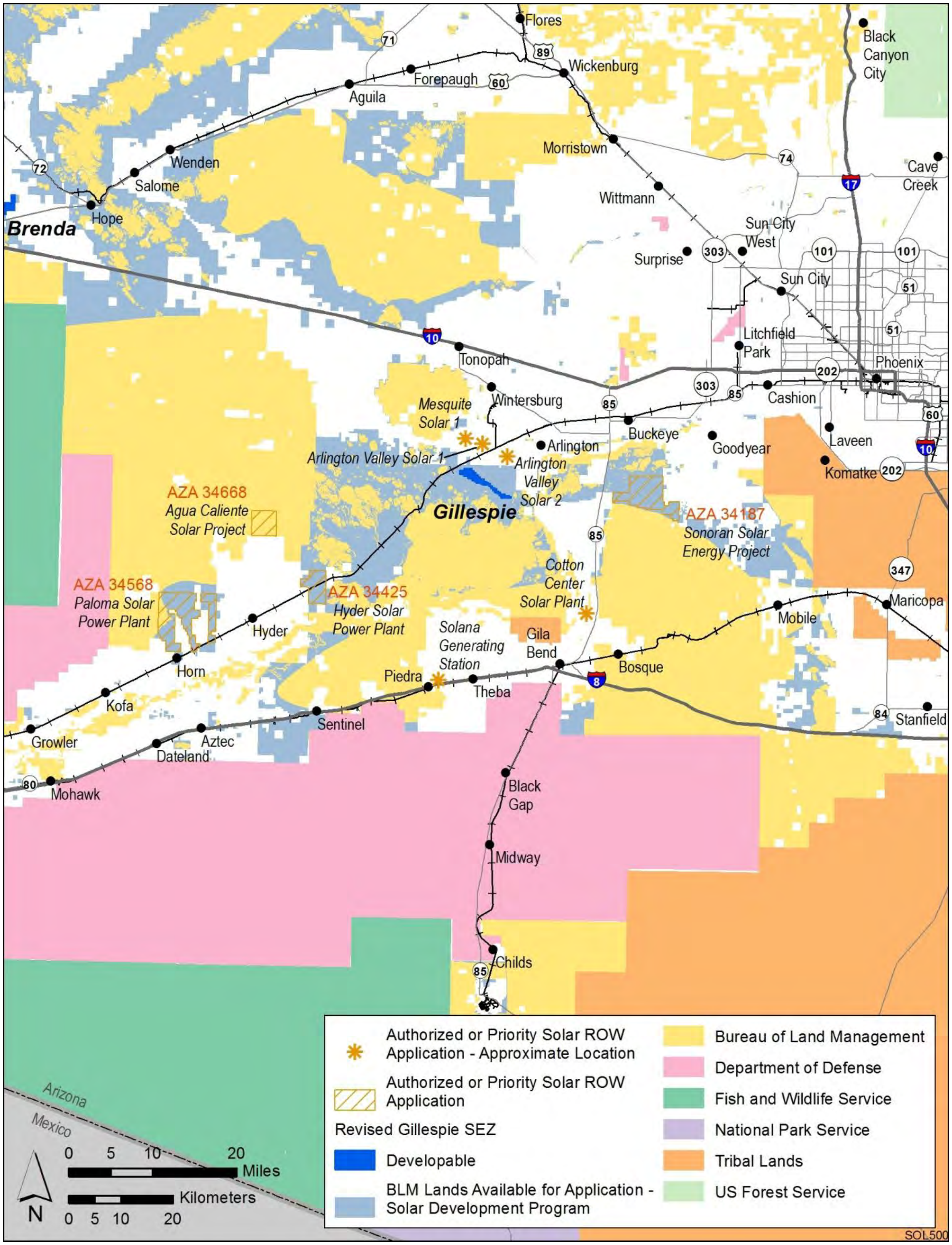

FIGURE 8.3.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Gillespie SEZ

Hyder Solar Plant

Arizona Public Service is constructing a 17-MW PV power plant, located on 240 acres (0.97 km^2) of former agricultural land, near Hyder, Arizona, and 36 mi (51 km) southwest of the proposed Gillespie SEZ.

Agua Caliente Solar Project

First Solar is constructing a 290-MW PV power plant, located on 2,400 acres (9.7 km^2) of previously disturbed farmland near Dateland and Hyder, Arizona, about 40 mi (64 km) southwest of the proposed Gillespie SEZ. The energy produced will be connected to the electric grid by the existing Hassayampa–North Gila 500-kV transmission line, adjacent to the site (First Solar 2011).

8.3.22.2.2 Other Actions

Only two major ongoing and foreseeable actions that were identified within 50 mi (80 km) of the proposed Gillespie SEZ and described in the Draft Solar PEIS have been updated and are listed in Table 8.3.22.2-2. These projects were described in the Draft Solar PEIS. The Draft EIS for the Beddown of Training F-35A Aircraft was issued on January 20, 2012 (U.S. Air Force 2012), and the ROD for Proposed Range Enhancements at the Barry M. Goldwater Range East was issued on May 20, 2011 (Department of the Air Force 2012).

8.3.22.3 General Trends

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

8.3.22.4 Cumulative Impacts on Resources

Total disturbance in the proposed Gillespie SEZ over 20 years is assumed to be up to about 2,094 acres (8.47 km^2) (80% of the developable area of the 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 Gillespie SEZ may include impacts on water quantity and quality, air quality, ecological resources such as habitat and species, cultural and visual resources, and specially designated lands.

Activities in the region that will contribute to cumulative impacts include five additional solar projects that were not known or considered foreseeable at the time of the Draft Solar PEIS: Solana Solar Generating Facility, a 280-MW parabolic trough facility on 1,920 acres (7.77 km^2);

TABLE 8.3.22.2-2 Other Major Actions near the Proposed Gillespie SEZ[a]

Description	Status	Resources Affected	Primary Impact Location
Agua Fria Generating Station	Operating since 1968	Terrestrial habitats, wildlife, water, air, visual	40 mi[b] east of the SEZ
Arlington Valley Energy Facility	Operating since 2002	Terrestrial habitats, wildlife, water, air, visual	4 mi north of the SEZ
Beddown of Training F-35A Aircraft	**Draft EIS January 2012[c]**	Air, visual	35 mi northeast of the SEZ
Harquahala Generating Project	Operating since 2004	Terrestrial habitats, wildlife, water, air, visual	14 mi north of the SEZ
Impact Area Expansion Yuma Proving Ground	EA March 2010	Terrestrial habitat, wildlife	Boundary about 30 mi south and southwest
Kyrene Generating Station	Operating since 1951	Terrestrial habitats, wildlife, water, air, visual	45 mi from the SEZ
Limiting Mountain Lion Predation on Desert Bighorn Sheep on the Kofa NWR	EA December 2009	Wildlife	Boundary 48 mi west of the SEZ
Mesquite Power Generating Station	Operating since 2003	Terrestrial habitats, wildlife, water, air, visual	4 mi north of the SEZ
Palo Verde–Devers 500-kV Transmission Line	Operating	Land use, terrestrial habitats, visual	Corridor passes 6 mi north of the SEZ
Palo Verde Nuclear Generating Station	Operating since 1986	Terrestrial habitats, wildlife, water, air, visual	6 mi north of the SEZ
Proposed Range Enhancements at Barry M. Goldwater Range East	**ROD May 20, 2011[d]**	Terrestrial habitats, wildlife, air, visual	Boundary 22 mi south of the SEZ
Redhawk Power Station	Operating	Terrestrial habitats, wildlife, water, air, visual	3 mi north of the SEZ

TABLE 8.3.22.2-2 (Cont.)

Description	Status[a]	Resources Affected	Primary Impact Location
West Phoenix Power Station	Operating since 1930	Terrestrial habitats, wildlife, water, air, visual	40 mi east of the SEZ

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

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

[c] See U.S. Air Force (2012) for details.

[d] See DoD (2012) for details.

Cotton Center Solar Plant, a 17-MW PV facility on 145 acres (0.59 km^2); Hyder Solar Plant, a 17-MW PV facility on 240 acres (0.97 km^2); Paloma Solar Plant, a 17-MW PV facility on 242 acres (0.98 km^2); and the Agua Caliente Solar Plant, a 290-MW PV facility on 2,400 acres (9.7 km^2).

In total, these five solar projects, all on privately owned land, encompass approximately 4,940 acres (20 km^2) of additional lands committed to renewable energy development. The total capacity and land required for all the reasonably foreseeable solar projects listed in Table 8.3.22.2-1 would be about 1,321 MW and 11,051 acres (44.72 km^2), respectively.

As stated above, several new projects have advanced to consideration as reasonably foreseeable since the publication of the Draft Solar PEIS. However, the elimination of the nearby formerly proposed Bullard Wash SEZ from consideration means it will not be contributing to the cumulative impacts in the region., Also because the size of and the technology for one of the reasonably foreseeable projects (Sonoran Energy Project) has been changed from CSP to PV, the projected water use impacts in the region are expected to be lower than projected in the Draft Solar PEIS..

Overall, the incremental cumulative impacts associated with development in the proposed Gillespie SEZ during construction, operation, and decommissioning are expected to be about the same as those analyzed in the Draft Solar PEIS.

8.3.23 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 Gillespie SEZ, including the identification of potential load areas to be served by power generated at the SEZ and the results of the DLT analysis. Unlike Sections 8.3.2 through 8.3.22, this section is not an update of previous analysis for the Gillespie 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 Gillespie SEZ is estimated to have the potential to generate 419 MW of marketable solar power at full build-out.

8.3.23.1 Identification and Characterization of Load Areas

The primary candidates for Gillespie SEZ load areas are the major surrounding cities. Figure 8.3.23.1-1 shows the possible load areas for the Gillespie SEZ and the estimated portion of their market that could be served by solar generation. Possible load areas for the Gillespie SEZ include Phoenix and Tucson, Arizona; the major cities of San Bernardino and Riverside Counties, California; Las Vegas, Nevada; and San Diego, California, via two different routes (one through Yuma, Arizona, and El Centro, California, and the other through Riverside County, California).

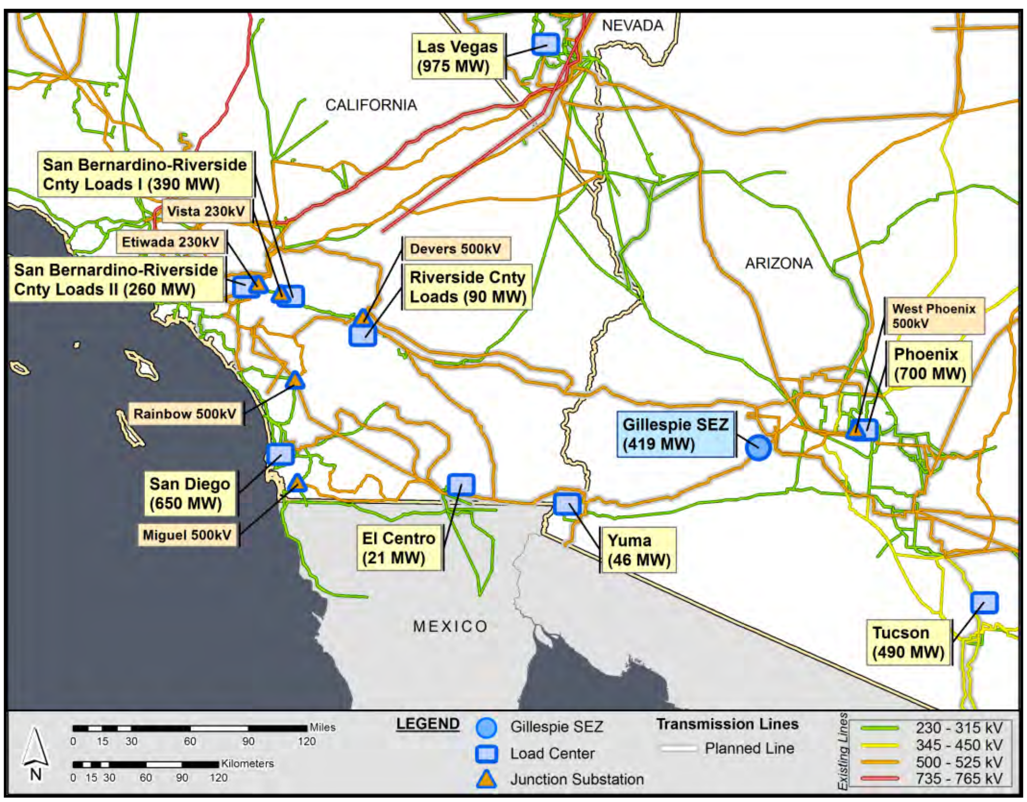

FIGURE 8.3.23.1-1 Location of the Proposed Gillespie SEZ and Possible Load Areas (Source for background map: Platts 2011)

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

1. Phoenix, Arizona, and

2. Tucson, Arizona.

Figures 8.3.23.1-2 shows the most economically viable transmission scheme for the Gillespie SEZ (transmission scheme 1), and Figure 8.3.23.1-3 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 419 MW could be fully allocated.

Table 8.3.23.1-1 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.

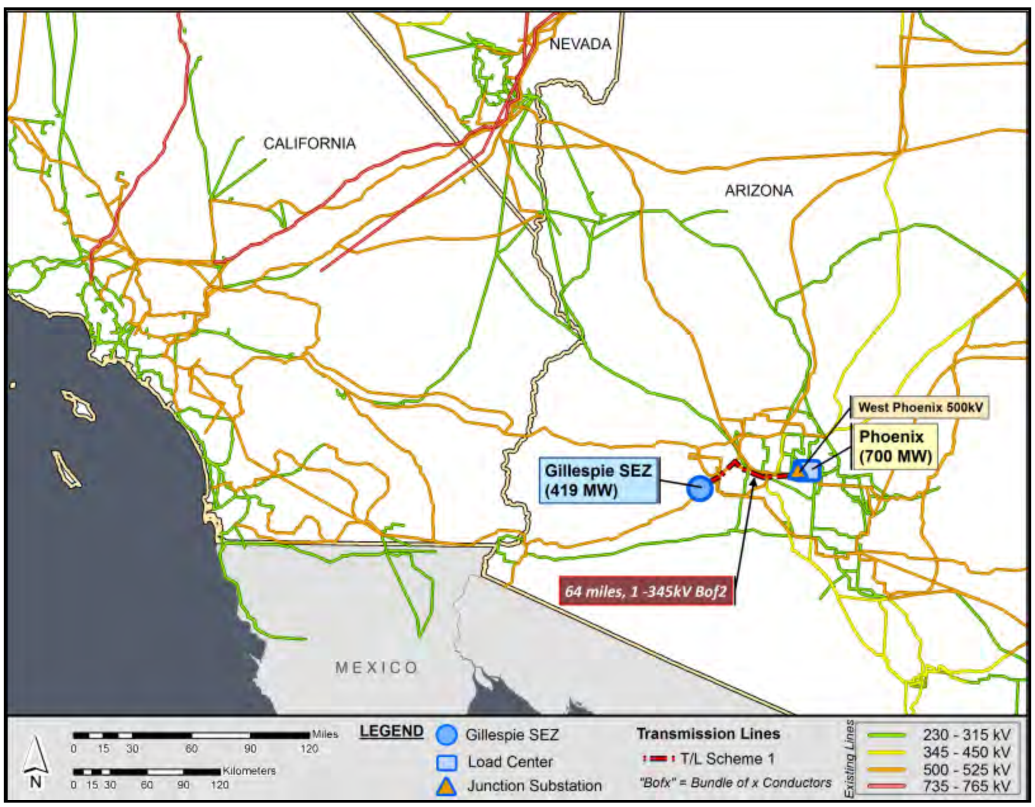

FIGURE 8.3.23.1-2 Transmission Scheme 1 for the Proposed Gillespie SEZ (Source for background map: Platts 2011)

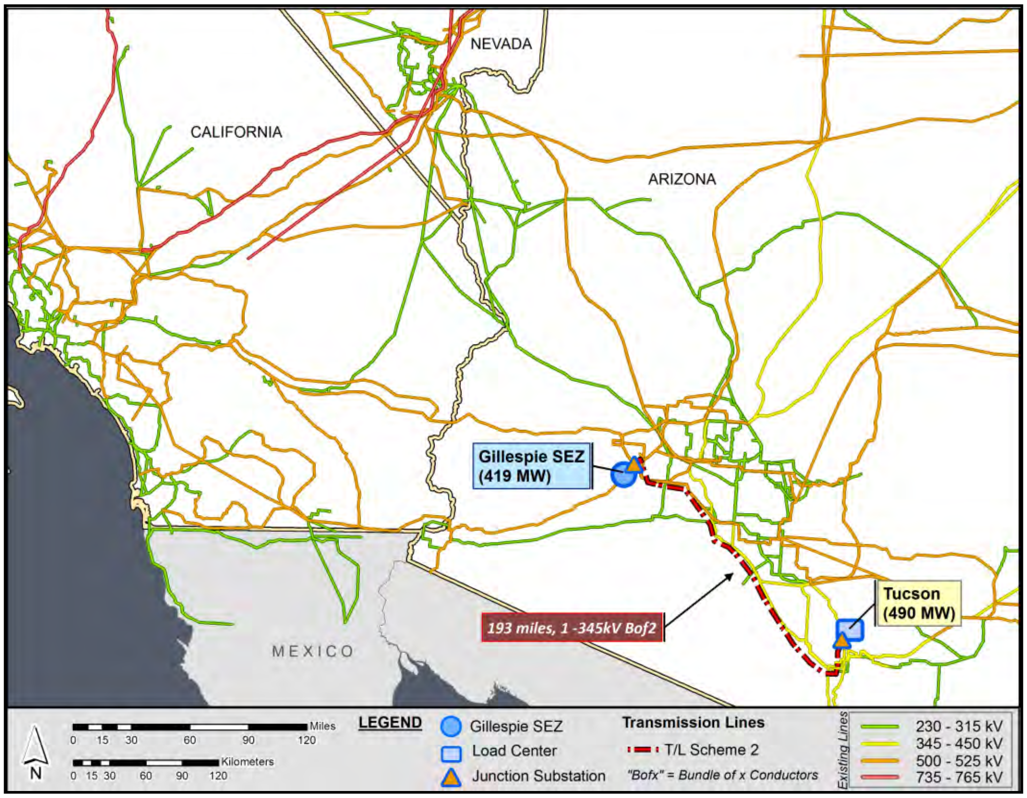

FIGURE 8.3.23.1-3 Transmission Scheme 2 for the Proposed Gillespie SEZ (Source for background map: Platts 2011)

TABLE 8.3.23.1-1 Candidate Load Area Characteristics for the Proposed Gillespie 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	Phoenix, Arizona[a]	East	1,400,000	3,614	700
2	Tucson, Arizona[b]	East	980,000	2,450	490

[a] The load area represents the city named.

[b] The load area represents the metropolitan area of Tucson (i.e., the city plus adjacent communities).

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

8.3.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the Gillespie SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The new transmission lines(s) would directly convey the 419-MW output of the Gillespie SEZ to the prospective load areas for each possible transmission scheme. The approach also assumes that all existing transmission lines in the 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 8.3.23.1-2 and 8.3.23.1-3 display the pathways that new dedicated lines might follow to distribute solar power generated at the Gillespie SEZ via the two identified transmission schemes described in Table 8.3.23.1-1. 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.

For transmission scheme 1, a new line would be constructed to connect with Phoenix (700 MW) so that the 419-MW output of the Gillespie SEZ could be fully utilized. This particular scheme has one 64-mi (103-km) segment. The configuration of this segment would be a single-circuit 345-kV (1-345 kV) line employing conductors in a bundle of two (Bof2). The transmission configuration options were determined by using the line "loadability" curve 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.

Transmission scheme 2 targets Tucson as the primary market. This scheme also has one segment. The segment runs from the SEZ directly to Tucson over a total distance of approximately 193 mi (311 km). Again, the transmission configuration for the segment was determined by using the line "loadability" curve in American Electric Power's *Transmission Facts* (AEP 2010), with the constraint that the full output of the SEZ (419 MW) would be completely marketed.

Table 8.3.23.2-1 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. 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. 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. The originating substation would have a combined substation rating of at least 419 MW (to match the plant's output), while the combined load substations would have a similar total rating of 419 MW.

TABLE 8.3.23.2-1 Potential Transmission Schemes, Estimated Solar Markets, and Distances to Load Areas for the Proposed Gillespie SEZ

Transmission Scheme	City/Load Area Name	Estimated Peak Solar Market (MW)[c]	Total Solar Market (MW)	Sequential Distance (mi)[d]	Total Distance (mi)[d]	Line Voltage (kV)	No. of Substations
1	Phoenix, Arizona[a]	700	700	64	64	345	2
2	Tucson, Arizona[b]	490	490	193	193	345	2

[a] The load area represents the city named.

[b] The load area represents the metropolitan area of Tucson (i.e., the city plus adjacent communities).

[c] From Table 8.3.23.1-1.

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

Table 8.3.23.2-2 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 the costs and area disturbed would be scheme 1, which would serve the Phoenix market and for which the construction of new transmission lines and substations is estimated to disturb about 1,368 acres (9.1 km^2) of land. The less favorable transmission scheme with respect to minimizing the costs and area disturbed would be scheme 2 (serving Tucson). For scheme 2, the construction of new transmission lines and substations is estimated to disturb a land area on the order of 4,104 acres (16.6 km^2).

Table 8.3.23.2-3 shows the estimated 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 revenues more than offset 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 Phoenix. 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 Tucson.

Table 8.3.23.2-4 shows the effect of varying the value of the utilization factor on the NPV of the transmission schemes. The table shows that at about 20% utilization, the NPVs for both schemes are positive. 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.

TABLE 8.3.23.2-2 Comparison of the Various Transmission Line Configurations with Respect to Land Use Requirements for the Proposed Gillespie SEZ

				Land Use (acres)[d]		
Transmission Scheme	City/Load Area Name	Total Distance (mi)[c]	No. of Substations	Transmission Line	Substation	Total
1	Phoenix, Arizona[a]	64	2	1,358.0	10.1	1,368.1
2	Tucson, Arizona[b]	193	2	4,094.0	10.1	4,104.1

[a] The load area represents the city named.

[b] The load area represents the metropolitan area of Tucson (i.e., the city plus adjacent communities).

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

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

TABLE 8.3.23.2-3 Comparison of Potential Transmission Lines with Respect to NPV (Base Case) for the Proposed Gillespie 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	Phoenix, Arizona[a]	140.8	27.7	73.4	566.8	398.4
2	Tucson, Arizona[b]	424.6	27.7	73.4	566.8	114.6

[a] The load area represents the city named.

[b] The load area represents the metropolitan area of Tucson (i.e., the city plus adjacent communities).

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

- Transmission scheme 1, which identifies Phoenix as the primary market, represents the most favorable option based on NPV and land use requirements. This scheme would result in new land disturbance of about 1,368 acres (5.5 km^2).

- Transmission scheme 2, which represents an alternative configuration if Phoenix is excluded, serves Tucson. This configuration would result in new land disturbance of about 4,104 acres (16.6 km^2).

TABLE 8.3.23.2-4 Effect of Varying the Utilization Factor on the NPV of the Transmission Schemes for the Proposed Gillespie SEZ

Transmission Scheme	City/Load Area Name	NPV ($ million) at Different Utilization Factors 20%	30%	40%	50%	60%	70%
1	Phoenix, Arizona[a]	398.4	681.8	965.2	1,248.7	1,532.1	1,815.5
2	Tucson, Arizona[b]	114.6	398.0	681.4	964.9	1,248.3	1,531.7

[a] The load area represents the city named.

[b] The load area represents the metropolitan area of Tucson (i.e., the city plus adjacent communities).

- 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 Gillespie 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 proposed Gillespie SEZ indicates no reduction of impacts from increasing the solar-eligible load assumption for either transmission scheme 1, which brings power to Phoenix, or transmission scheme 2, which brings power to Tucson. Increasing the solar-eligible percentage would have no effect, because an adequate load area was identified under the 20% assumption that would accommodate all of the SEZ's capacity. Thus, line distances and voltages would not be affected by increasing the solar-eligible load assumption, and similarly the associated costs and land disturbance would not be affected.

8.3.24 Impacts of the Withdrawal

The BLM is proposing to withdraw 2,618 acres (11 km^2) of public land comprising the proposed Gillespie 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, only mining claims recorded before the current segregation could be developed, if valid. Because the Gillespie SEZ has an active claim, it is possible that some mining-related surface development could occur at the site during the withdrawal period and preclude use of at least a portion of the SEZ for solar energy development. Mining-related surface development includes activities 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.

For the Gillespie SEZ, impacts of the proposed withdrawal on mineral resources and related economic activity and employment are expected to be negligible to minor. Although the area contains one active lode claim (and several closed lode and placer claims), there has been no known production from the lands within the SEZ (BLM 2012a). Since the claim was filed prior to the temporary segregation, it would take precedence over future solar energy development if found to be valid. The site would remain open to mineral leasing, geothermal leasing, and mineral materials laws. Therefore, the BLM could still elect to lease oil, gas, coal, or geothermal resources or to sell common-variety mineral materials, such as sand and gravel, at its discretion. The lands would also remain open to ROW authorizations.

Although the mineral potential of the lands within the Gillespie 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).

8.3.25 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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8.3.26 Errata for the Proposed Gillespie 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 8.3.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

TABLE 8.3.26-1 Errata for the Proposed Gillespie SEZ (Section 8.3 of the Draft Solar PEIS and Section C.1.2 of the Supplement to the Draft Solar PEIS)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
8.3.11.2					All uses of the term "neotropical migrants" in the text and tables of this section should be replaced with the term "passerines."

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9 UPDATE TO AFFECTED ENVIRONMENT AND IMPACT ASSESSMENT FOR PROPOSED SOLAR ENERGY ZONES IN CALIFORNIA

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 California, Imperial East and Riverside East, as well as summaries of the Iron Mountain and Pisgah 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 to 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 Solar PEIS (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 California SEZs presented in the Draft Solar PEIS. As stated previously, the Iron Mountain and Pisgah SEZs were dropped from further consideration through the Supplement to the Draft Solar PEIS. For the remaining two California SEZs, Imperial East and Riverside East, the information presented in this chapter supplements and updates, but does not replace, the information provided in the corresponding Chapter 9 on proposed SEZs in California in the Draft Solar PEIS. Corrections to incorrect information in Sections 9.1 and 9.4 of the Draft Solar PEIS and in Sections C.2.1 and C.2.2 in Appendix C of the Supplement to the Draft are provided in Sections 9.1.26 and 9.4.26 of this Final Solar PEIS.

9.1 IMPERIAL EAST

9.1.1 Background and Summary of Impacts

9.1.1.1 General Information

The proposed Imperial East SEZ is located in Imperial County in southeastern California, near the United States–Mexico border. In 2008, the Imperial County population was 180,493. The nearest town is the community of Holtville, located approximately 10 mi (16 km) northwest of the SEZ. Calexico (38,344) is located about 15 mi (24 km) to the west along State Route 98, and El Centro (40,083) lies 19 mi (31 km) to the west along Interstate 8 (I-8) in Imperial County. I-8 runs east–west along the northeast edge of the proposed SEZ, while State Route 98, a two-lane highway, passes through the southern edge. A branch line of the Union Pacific Railroad (UP) serves Calexico and El Centro. As of October 28, 2011, there was one pending solar project application within the SEZ.

As published in the Draft Solar PEIS, the proposed Imperial East SEZ had a total area of 5,722 acres (23.2 km^2). In the Supplement to the Draft Solar PEIS, no boundary revisions were identified for the proposed SEZ (see Figure 9.1.1.1-1). However, areas specified for non-development mapped where data were available. For the proposed Imperial East SEZ, 5 acres (0.02 km^2) of wetlands along the southern border of the SEZ were identified as non-development areas (see Figure 9.1.1.1-2). The remaining developable area within the SEZ is 5,717 acres (23.1 km^2).

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 Imperial East SEZ as described in the Draft Solar PEIS.

9.1.1.2 Development Assumptions for the Impact Analysis

Maximum development of the proposed Imperial East SEZ was assumed to be 80% of the total developable SEZ area over a period of 20 years, a maximum of 4,574 acres (18.5 km^2) (Table 9.1.1.2-1). Full development of the Imperial East SEZ would allow development of

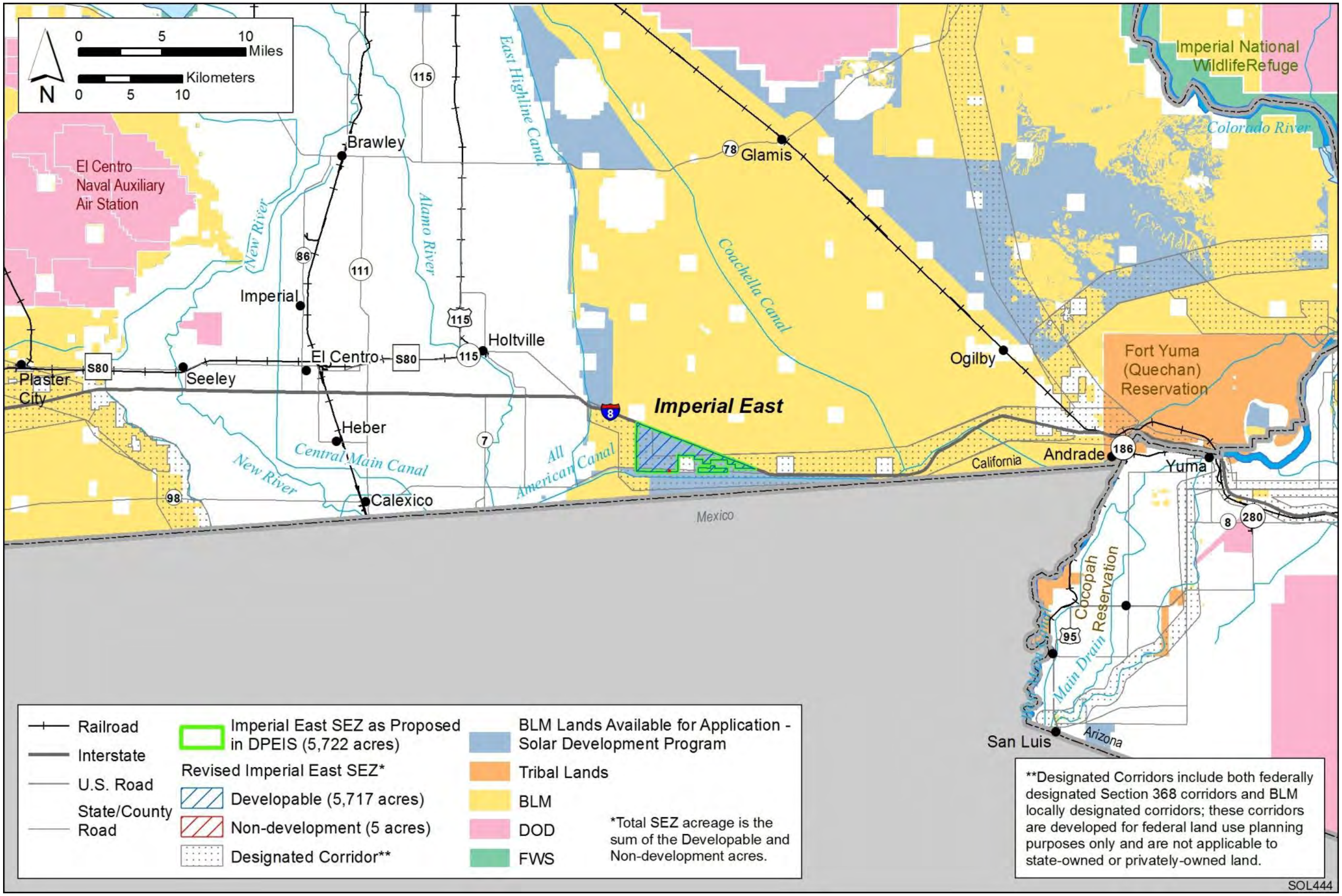

FIGURE 9.1.1.1-1 Proposed Imperial East SEZ as Revised

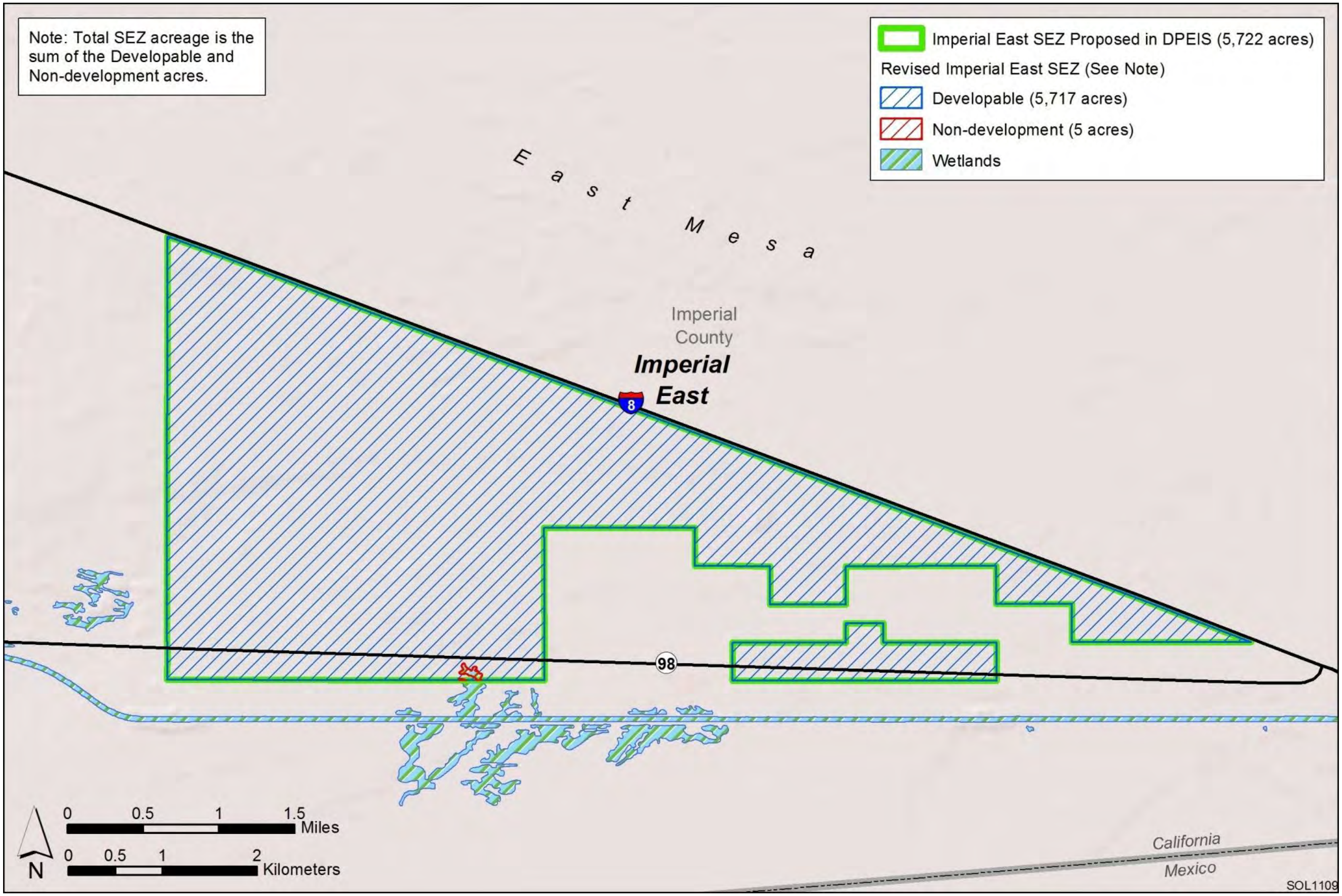

FIGURE 9.1.1.1-2 Developable and Non-development Areas for the Proposed Imperial East SEZ as Revised

TABLE 9.1.1.2-1 Assumed Development Acreages, Solar MW Output, and Nearest Major Road and Transmission Line for the Proposed Imperial East 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[d]
5,717 acres[a] and 4,574 acres	508 MW[b] 915 MW[c]	Adjacent (State Route 98)	Within SEZ and 115 kV	0 acres	Crosses SEZ[e]

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

e A Section 368 federally designated 2-mi (3.2-km) wide energy corridor crosses the SEZ.

facilities with an estimated total of between 508 MW (power tower, dish engine, or photovoltaic [PV] technologies, 9 acres/MW [0.04 km^2/MW]) and 915 MW (solar trough technologies5 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 Imperial East SEZ, the nearest existing transmission line, as identified in the Draft Solar PEIS, is a 115-kV line adjacent to the SEZ. It is possible that the existing line could be used to provide access from the SEZ to the transmission grid, but the 115-kV capacity of the line would be inadequate for the possible 915 MW of new capacity. Therefore, at full build-out capacity, new transmission and/or upgrades of existing transmission lines would be required to bring electricity from the proposed Imperial East SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Imperial East SEZ and a general assessment of the impacts of constructing and operating new transmission facilities to those load centers is provided in Section 9.1.23. Additionally, the generic impacts of transmissions and associated infrastructure construction and of line upgrades for various resources are discussed in Chapter 5 of this 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.

About 80% of the Imperial East SEZ overlaps a designated Section 368 energy corridor.[1] 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 9.1.2.2 on impacts on lands and realty for further discussion.

For the proposed Imperial East SEZ, State Route 98 passes along the southern edge of the SEZ (although I-8 also runs along the northern boundary of the SEZ, no access to the SEZ from the interstate is available). Existing road access to the proposed Imperial East SEZ should be adequate to support construction and operation of solar facilities. No additional road construction outside of the SEZ is assumed to be required to support solar development, as summarized in Table 9.1.1.2-1.

9.1.1.3 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, reduce, 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 9.1.2 through 9.1.22) 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 Imperial East SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Imperial East 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 and Supplement to the Draft Solar PEIS. All applicable SEZ-specific design features identified to date (including those from the Draft Solar PEIS that are still applicable) are presented in Sections 9.1.2 through 9.1.22.

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[1] Section 368 of the Energy Policy Act of 2005 (Public Law [P.L.] 109-58) required federal agencies to engage in transmission corridor planning (see Section 1.6.2.1 of the Draft Solar PEIS). As a result of this mandate, the BLM, U.S. Department of Energy (DOE), U.S. Forest Service (USFS), and U.S. Department of Defense (DoD) prepared a PEIS to evaluate the designation of energy corridors on federal lands in 11 western states, including the 6 states evaluated in this study (DOE and DOI 2008). The BLM and USFS issued Records of Decision (RODs) to amend their respective land use plans to designate numerous corridors, often referred to as Section 368 corridors.

9.1.2 Lands and Realty

9.1.2.1 Affected Environment

The description of the area in the Draft Solar PEIS remains valid. A 2-mi (3-km) wide Section 368 (of the Energy Policy Act of 2005) energy corridor covers about 80% of the SEZ, and there are several existing right-of-way (ROW) authorizations within the SEZ.

9.1.2.2 Impacts

About 80% of the proposed Imperial East SEZ partially overlaps a Section 368 federally designated energy corridor. 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 Imperial East SEZ. Any use of the corridor lands within the Imperial East 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.

9.1.2.3 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 completely mitigate 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 induced land use changes, if any, on nearby or adjacent state and private lands may not be fully mitigated.

No SEZ-specific design features for lands and realty have been identified through this Final Solar PEIS. Some SEZ-specific design features may be established for parcels within the Imperial East SEZ through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.1.3 Specially Designated Areas and Lands with Wilderness Characteristics

9.1.3.1 Affected Environment

As described in the Draft Solar PEIS, the Imperial East SEZ is located within the California Desert Conservation Area (CDCA), and the area is adjacent to several specially designated areas, including three Areas of Critical Environmental Concern (ACECs). The SEZ is near the Imperial Sand Dunes Recreation Area (ISDRA) and the Juan Bautista de Anza National Historic Trail. The major resource values associated with the adjacent ACECs are cultural resources and wildlife habitat. The wildlife habitat area is the East Mesa ACEC is a portion of the larger East Mesa Flat-tailed Horned Lizard Management Area. There is a designated Wilderness Area (WA) near the north end of the ISDRA. The detailed description of the area in the Draft Solar PEIS remains valid.

9.1.3.2 Impacts

The description of potential impacts on specially designated areas from solar development within the proposed Imperial East SEZ remains valid. Areas potentially affected include the CDCA, a portion of the ISDRA, two ACECs, and the Juan Bautista de Anza National Historical Trail. The two ACECs located adjacent to the SEZ could be exposed to additional human traffic, resulting in increased risk of loss of prehistoric resources.

9.1.3.3 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.

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

- Because of the potential increase in human use of the two adjacent ACECs, once solar energy facility construction begins, monitoring of the resources of the ACECs will be used to determine whether additional protection measures are needed to protect existing prehistoric resources.

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.

9.1.4 Rangeland Resources

9.1.4.1 Livestock Grazing

9.1.4.1.1 Affected Environment

There are no grazing allotments on the SEZ, and grazing is not authorized.

9.1.4.1.2 Impacts

There would be no impacts on livestock grazing.

9.1.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Because the SEZ does not contain any active grazing allotments, no SEZ-specific design features to protect livestock grazing have been identified in this Final Solar PEIS.

9.1.4.2 Wild Horses and Burros

9.1.4.2.1 Affected Environment

As presented in Section 9.1.4.2.1 of the Draft Solar PEIS, no wild horse or burro herd management areas (HMAs) occur within the proposed Imperial East SEZ or in close proximity to it.

9.1.4.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Imperial East SEZ would not directly affect wild horses and burros.

9.1.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features to address wild horses and burros are required for the proposed Imperial East SEZ.

9.1.5 Recreation

9.1.5.1 Affected Environment

The recreational value of the area within the SEZ is very low. The description of the area in the Draft Solar PEIS remains valid.

9.1.5.2 Impacts

Impacts on recreational use are anticipated to be minimal, including the use of the auto tour route associated with the Juan Bautista de Anza National Historic Trail. 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 as a part of the environmental analysis of specific solar energy projects.

9.1.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreational resources are described in Section A.2.2 of Appendix A of this Final PEIS (design features for both specially designated areas and visual resources also would address some impacts). Implementing the programmatic design features will provide adequate mitigation for identified impacts.

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features to address recreation impacts have been identified. Some SEZ-specific design features may be established within the Imperial East SEZ through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.1.6 Military and Civilian Aviation

9.1.6.1 Affected Environment

The description of the proposed SEZ in the Draft Solar PEIS remains valid in general. The Draft Solar PEIS indicated that the proposed SEZ was covered by two military training routes (MTRs) and special use airspace (SUA). It is correct that the SEZ is covered by two MTRs; however, there is no SUA designated over the proposed SEZ (there is SUA north and east of the SEZ). The airport in Mexicali, Mexico, is within 5 mi (8 km) of the SEZ.

9.1.6.2 Impacts

Development of solar energy or transmission facilities that encroach into military airspace would interfere with military training activities and could be a safety concern. In rare, inclement weather, tall solar facilities may pose a potential threat to airplanes approaching or leaving the Mexicali Airport.

9.1.6.3 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 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.

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, a proposed SEZ-specific design feature to address impacts on military and civilian aviation near the proposed Imperial East SEZ has been identified:

- If power tower solar facilities are proposed for the SEZ, coordination across the International Border should be required to ensure that there is no airspace management concern associated with the Mexicali Airport.

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..

9.1.7 Geologic Setting and Soil Resources

9.1.7.1 Affected Environment

9.1.7.1.1 Geologic Setting

Data provided in the Draft Solar PEIS remain valid. The boundaries of the proposed SEZ remain the same, but about 5 acres (0.02 km^2) of wetlands along the southern border of the SEZ were identified as non-development areas.

9.1.7.1.2 Soil Resources

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

- Soils within the proposed Imperial East SEZ as revised are predominantly the fine sands and loamy fine sands of the Rositas and Superstition Series, which together make up about 98% of the soil coverage at the site (Table 9.1.7.1-1).

9.1.7.2 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 the developable area of the SEZ has changed by less than 5%, the assessment of impacts provided in the Draft Solar PEIS remains valid, with the following updates:

TABLE 9.1.7.1-1 Summary of Soil Map Units within the Proposed Imperial East SEZ as Revised

Map Unit Symbol[a]	Map Unit Name	Erosion Potential		Description	Area in Acres[d] (percentage of SEZ)
		Water[b]	Wind[c]		
136	Rositas loamy fine sand (0 to 2% slope)	Slight (0.10)	High (WEG 2)[e]	Nearly level soils on the valley floor. Parent material consists of alluvium and eolian deposits derived from mixed sources. Very deep and somewhat excessively drained with low surface runoff potential (high infiltration rate) and rapid permeability; slightly saline. Available water capacity is low. Moderate rutting hazard. Used mainly for grazing, cropland, and wildlife habitat. Crops include citrus fruits, grapes, alfalfa, and truck crops. Farmland of statewide importance.[f]	4,486 (78.4)
132	Rositas fine sand (0 to 2% slopes)	Slight (0.05)	High (WEG 1)	Nearly level soils on the valley floor. Parent material consists of alluvium and eolian deposits derived from mixed sources. Very deep and somewhat excessively drained with low surface runoff potential (high infiltration rate) and rapid permeability; nonsaline to very slightly saline. Available water capacity is low. Moderate rutting hazard. Used mainly for grazing, cropland, and wildlife habitat. Crops include citrus fruits, grapes, alfalfa, and truck crops. Farmland of statewide importance.	663 (11.6)
139	Superstition loamy fine sand	Slight (0.10)	High (WEG 2)	Nearly level to gently sloping soils on alluvial fans. Parent material consists of alluvium derived from mixed sources. Very deep and somewhat excessively drained with low surface runoff potential (high infiltration rate) and rapid permeability; nonsaline. Most areas are without vegetation; provides some cover for wildlife. Available water capacity is low. Moderate rutting hazard. Used mainly for grazing and irrigated cropland. Prime farmland if irrigated.	271 (4.7)
135	Rositas fine sand, wet (0 to 2% slopes)	Slight (0.05)	High (WEG 1)	Nearly level soils on the valley floor. Parent material consists of alluvium and eolian deposits derived from mixed sources. Very deep and moderately well drained with low surface runoff potential (high infiltration rate) and rapid permeability; nonsaline to very slightly saline. Available water capacity is low. Moderate rutting hazard. Used mainly for grazing, cropland, and wildlife habitat. Crops include citrus fruits, grapes, alfalfa, and truck crops. Farmland of statewide importance.	94 (1.6)[g]

TABLE 9.1.7.1-1 (Cont.)

Map Unit Symbol[a]	Map Unit Name	Erosion Potential Water[b]	Erosion Potential Wind[c]	Description	Area in Acres[d] (percentage of SEZ)
111	Holtville Imperial silty clay loam	Moderate (0.32)	Moderate (WEG 4)	Consists of about 50% Holtville silty clay loam and 40% Imperial silty clay loam. Nearly level to gently sloping soils on valley floor (floodplains and old lakebeds). Parent material consists of alluvium derived from mixed sources. Very deep and moderately well to well drained with low runoff potential and very slow permeability; nonsaline to slightly saline. Available water capacity is moderate to high. Severe rutting hazard. Used for native desert plants and irrigated cropland. Used mainly for grazing, cropland, and as wildlife habitat. Crops include cotton, sugar beets, alfalfa, barley, annual ryegrass, sorghums, flax, safflower, carrots, and lettuce. Farmland of statewide importance.	78 (1.4)
133	Rositas fine sand (0 to 9% slopes)	Slight (0.05)	High (WEG 1)	Nearly level to gently sloping soils on alluvial fans and sand sheets. Parent material consists of eolian deposits derived from mixed sources. Very deep and somewhat excessively drained, with low surface runoff potential (high infiltration rate) and rapid permeability; nonsaline to very slightly saline. Available water capacity is low. Moderate rutting hazard. Used mainly for grazing, cropland, and as wildlife habitat. Crops include citrus fruits, grapes, alfalfa, and truck crops. Farmland of statewide importance.	74 (1.3)

[a] Map unit symbols are shown in Figure 9.1.7.1-6 of the Draft Solar PEIS.

[b] Water erosion potential rates the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K (whole soil; does not account for the presence of rock fragments) and represent soil loss caused by sheet or rill erosion where 50 to 75% of the surface has been exposed by ground disturbance. A rating of “slight” indicates that erosion is unlikely under ordinary climatic conditions. A rating of “moderate” indicates that erosion could be expected under ordinary climatic conditions.

[c] 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).

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

Footnotes continued on next page.

1

TABLE 9.1.7.1-1 (Cont.)

[e] 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 1, 220 tons (200 metric tons) per acre (4,000 m^2) per year (average); WEG 2,134 tons (122 metric tons) per acre (4,000 m^2) per year; WEGs 3 and 4 (and 4L), 86 tons (78 metric tons) per acre (4,000 m^2) per year; WEG 5, 56 tons (51 metric tons) per acre (4,000 m^2) per year; WEG 6, 48 tons (44 metric tons) per acre (4,000 m^2) per year; WEG 7, 38 tons (34 metric tons) per acre (4,000 m^2) per year; and WEG 8, 0 tons (0 metric tons) per acre (4,000 m^2) per year .

[f] Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. Farmland of statewide importance includes soils in NRCS's land capability Class II and III that do not meet the criteria for prime farmland, but may produce high yields of crops when treated and managed according to acceptable farming methods.

[g] A total of 5 acres (0.020 km^2) within the Rositas fine sand, wet is currently categorized as a "non-development" area.

Source: NRCS (2010).

- Impacts related to wind erodibility are somewhat reduced because the identification of non-development areas eliminates 5 acres (0.020 km^2) of highly erodible soils from development.

- Soil disturbance of large areas covered by caliche could result in releases of carbon to the atmosphere and damage the carbon-capture potential of area soils.

9.1.7.3 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 and consideration of comments received as applicable, no SEZ-specific design features were identified for soil resources at the proposed Imperial East SEZ. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.1.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Imperial East SEZ has been prepared and reviewed by BLM mineral specialists knowledgeable about the region where the SEZ is located (BLM 2012). 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 9.1.24.

9.1.8.1 Affected Environment

Sixty percent of the proposed Imperial East SEZ is included within a Known Geothermal Resource Area (KGRA), and there is an operating geothermal plant 3 mi (4.8 km) northwest of the SEZ. There are no existing geothermal leases in the area. The description of the area in the Draft Solar PEIS remains valid.

9.1.8.2 Impacts

Surface development of geothermal resources would be foregone on 3,462 acres (14 km^2) of the KGRA. The description of mineral resource impacts in the Draft Solar PEIS remains valid.

9.1.8.3 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 some protection of mineral resources.

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, a proposed SEZ-specific design feature to address impacts on mineral resources in the proposed Imperial East SEZ has been identified:

- To protect the potential for geothermal leasing under solar energy facilities, ROW authorizations for solar facilities should be made subject to future geothermal leasing with no surface occupancy stipulations.

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.

9.1.9 Water Resources

9.1.9.1 Affected Environment

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

The proposed Imperial East SEZ is within the Southern Mojave–Salton Sea subbasin of the California Hydrologic Region. The SEZ is located within the desert regions of Imperial Valley. Precipitation in the valley is less than 3 in./yr (7.6 cm/yr), and evapotranspiration rates are estimated to be between 57 and 75 in./yr (145 and 190 cm/yr). No perennial surface water features or wetlands have been identified within the SEZ. Several small wetlands are located just to the south of the SEZ along the All-American Canal, some of which are newly restored mitigation wetlands developed as a part of the All-American Canal lining project. A total of 5 acres (0.02 km^2) of these wetland areas have been identified as non-development areas. Flood hazards for the vicinity of the SEZ are classified as susceptible to 100- and 500-year floods. Groundwater surrounding the proposed SEZ, located in the Imperial Valley groundwater basin, is mostly confined to two main aquifers composed of silt, sand, and clays, originally from the Colorado River, mixed with local sands and gravels. Groundwater recharge via runoff and infiltration is less than 10,000 ac-ft/yr (12 million m^3/yr), but including irrigation return flows can exceed 250,000 ac-ft/yr (308 million m^3/yr); this is largely composed of imported water from the Colorado River. Groundwater generally flows toward the Salton Sea, which is northwest of the SEZ, and reported well yields range between 45 and 1,550 gal/min (170 and 5,687 L/min). Overall, the groundwater has a high dissolved salt content and a high concentration of agricultural chemical contaminants. Total dissolved solids (TDS) are often measured at levels that exceed the secondary maximum contaminant levels (MCLs), and approximately 20% of the groundwater has temperatures greater than 59°F (15°C).

California uses a "plura" system to manage water resources, where riparian and prior appropriation doctrines are used for surface waters and groundwater is managed primarily through local agencies, ordinances, and adjudications. Groundwater withdrawals in the vicinity of the SEZ would be subject to the rules and permitting processes described in the Imperial County groundwater ordinance. Colorado River water imported via the All-American Canal is managed by the Imperial Irrigation District (IID). Solar developers would have to negotiate with the IID for the potential use of Colorado River water.

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 Imperial East SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 9.1.9.1-1 through 9.1.9.1-7 and in Figures 9.1.9.1-1 and 9.1.9.1-2. Fieldwork and hydrologic analyses needed to determine jurisdictional water bodies would need to be coordinated with appropriate federal, state, and local agencies. Areas within the Imperial East SEZ determined to be jurisdictional will be subject to the permitting process described in the CWA.

9.1.9.2 Impacts

9.1.9.2.1 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 activities could potentially

TABLE 9.1.9.1-1 Watershed and Water Management Basin Information Relevant to the Proposed Imperial East SEZ as Revised

Basin	Name	Area (acres)[b]
Subregion (HUC4)[a]	Southern Mojave–Salton Sea (1810)	10,260,588
Cataloging unit (HUC8)	Salton Sea (18100204)	5,226,421
Groundwater basin	Salton Sea Transboundary Watershed	5,350,400
Groundwater basin	Southern Mojave Watershed	2,880,000
SEZ	Imperial East	5,722

[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.

TABLE 9.1.9.1-2 Climate Station Information Relevant to the Proposed Imperial East 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.)
Calexico, California (041288)	12	18	1904–2010	2.69	0
Gold Rock Ranch, California (043489)	485	21	1964–1996	3.90	0
Imperial, California (044223)	–64	24	1901–2011	2.85	0
Yuma Valley, Arizona (029657)	120	27	1930–1992	2.86	0

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

[b] Surface elevations for the proposed Imperial East SEZ range from 75 to 125 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 9.1.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ Scale Relevant to the Proposed Imperial East SEZ as Revised

Water Feature	Subregion, HUC4 (ft)[a]	Cataloging Unit, HUC8 (ft)	SEZ (ft)
Unclassified streams	0	0	0
Perennial streams	48,188	0	0
Intermittent/ephemeral streams	130,375,835	20,213,660	0
Canals	17,608,394	16,149,337	0

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

Source: USGS (2012a).

affect drainage patterns, along with groundwater recharge and discharge processes. In particular, land disturbance impacts in the vicinity of the Imperial East SEZ could result in increased erosion and sedimentation that could impair the wetland areas adjacent to the All-American Canal.

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

TABLE 9.1.9.1-4 Stream Discharge Information Relevant to the Proposed Imperial East SEZ as Revised

	Station (USGS ID)		
Parameter	Coachella Canal above All-American Canal Div (09527590)	All-American Canal below Drop 1 Power Plant near Calexico, California (09527600)	New River at International Boundary at Calexico, California (10254970)
Period of record	2003–2012	2004–2011	1983–2012
No. of observations	155	67	172
Discharge, median (ft^3/s)[a]	462	4010	178.5
Discharge, range (ft^3/s)	2.15–886	745–5,710	70.4–830
Discharge, most recent observation (ft^3/s)	526	2,980	95.5
Distance to SEZ (mi)[b]	14	12	19

[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).

TABLE 9.1.9.1-5 Surface Water Quality Data Relevant to the Proposed Imperial East SEZ as Revised

	Station (USGS ID)[a]	
Parameter	09527600	10254970
Period of record	1975–1979	1961–2007
No. of records	43	848
Temperature (°C)[b]	22 (11–30.5)	21.3
Total dissolved solids (mg/L)	840 (728–1,080)	4,350 (408–7,160)
Dissolved oxygen (mg/L)	NA[c]	1.9 (0–8.4)
pH	8.15 (7.6–8.6)	7.6 (6.6–8.8)
Total nitrogen (mg/L)	0.74 (0.65–1.8)	3.8 (2.3–9.2)
Phosphorus (mg/L as P)	0.02 (0.01–0.19)	0.49 (0.1–2.8)
Organic carbon (mg/L)	NA	23 (0–161)
Calcium (mg/L)	92.5 (79–100)	250 (150–340)
Magnesium (mg/L)	33 (29–42)	121 (34–183)
Sodium (mg/L)	140 (120–210)	1,100 (460–1,700)
Chloride (mg/L)	130 (100–190)	1,800 (3.5–3,590)
Sulfate (mg/L)	340 (280–410)	770 (460–1,100)
Arsenic (μg/L)	NA	18 (3–66)

[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).

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 Imperial East SEZ is a subset of the Salton Sea watershed (HUC8), for which information regarding stream channels is presented in Tables 9.1.9.1-3 and 9.1.9.1-4 in this Final Solar PEIS. The evaluation categorized flow lines from the National Hydrography Dataset (USGS 2012a) as having low, moderate, and high sensitivity to land disturbance. No flow lines were identified within the SEZ or the study region (Figure 9.1.9.2-1). Any alterations to drainage patterns near the wetlands along the All American Canal would be subject to review by the California Department of Fish and Game (CDFG) under its Lake and Streambed Alteration Program.

9.1.9.2.2 Water Use Requirements for Solar Energy Technologies

The water use requirements for full build-out scenarios of the Imperial East SEZ have not changed from the values presented in the Draft Solar PEIS (see Tables 9.1.9.2-1 and 9.1.9.2-2 of

TABLE 9.1.9.1-6 Water Quality Data from Groundwater Samples Relevant to the Proposed Imperial East SEZ as Revised

	Station (USGS ID)[a]			
Parameter	325354115310001	325354115310002	325354115310003	331128115334402
Period of record	1989–1997	1989–1997	1989–1997	1989
No. of records	8	8	9	3
Temperature (°C)[b]	NA[c]	NA	NA	31.5
Total dissolved solids (mg/L)	36,600	41,900	46,800	27,900
Dissolved oxygen (mg/L)	NA	NA	NA	NA
pH	7.2	7.4	7.3	6.6
Nitrate + nitrite (mg/L as N)	1.05 (0.053–130)	26 (7.72–34)	90 (<0.050–120)	<0.100
Phosphate (mg/L)	NA	NA	NA	NA
Organic carbon (mg/L)	NA	NA	NA	NA
Calcium (mg/L)	3,100	3,000	3,300	850
Magnesium (mg/L)	2,400	2,400	2,200	1,700
Sodium (mg/L)	7,300	8,500	10,000	6,800
Chloride (mg/L)	20,500 (20,000–21,000)	24,000 (23,000–25,000)	27,500 (27,000–28,000)	11,000
Sulfate (mg/L)	2,500	2,530	2,500	6,800
Arsenic (µg/L)	6	5	2	91

[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).

TABLE 9.1.9.1-7 Groundwater Surface Elevations Relevant to the Proposed Imperial East SEZ as Revised

Parameter	Station (USGS ID) 324242115073501	324340115073401	324632115011001
Period of record	1964–2011	1961–2010	1964–2011
No. of observations	18	6	11
Surface elevation (ft)[a]	118.5	121.4	143.4
Well depth (ft)	815	157	136.5
Depth to water, median (ft)	28.23	31.09	47.32
Depth to water, range (ft)	23.19–31.02	30.81–34.1	43.5–50.11
Depth to water, most recent observation (ft)	31.02	31.11	50.11
Distance to SEZ (mi)[b]	3.7	3.1	10

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

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

Sources: USGS (2012b).

the Draft Solar PEIS). This section presents additional analyses of groundwater, which includes a basin-scale groundwater budget and a simplified, one-dimensional groundwater model to asses groundwater drawdown for various development scenarios. 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.

The Imperial East SEZ is located in the Imperial Valley, which supports more than 450,000 acres (1,821 km^2) of farmland primarily irrigated by imported water from the Colorado River via the All-American Canal. Imported Colorado River water is distributed through a series of canals, some of which are unlined, thus allowing for substantial seepage to occur. The groundwater budget presented in Table 9.1.9.2-1 does not consider imported Colorado River water (except for seepage losses) or evapotranspiration, as these are primarily balancing surface water inputs and outputs to the basin.

The estimated total water use requirements during the peak construction year are as high as 2,074 ac-ft/yr (2.6 million m^3/yr), which does not constitute a significant amount given the short duration of this water demand relative to the water resources in the region. The long duration of groundwater pumping during operations (20 years) poses a greater threat to groundwater resources. This analysis considered 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 solar facility types on the basis of operations estimated for proposed utility-scale solar energy facilities). The low, medium, and high pumping scenarios result in groundwater withdrawals that range from 26 to 4,591 ac-ft/yr (32,100 to 5.7 million m^3/yr), or 520 to 91,820 ac-ft (641,400 to 113 million m^3) over the 20-year operational period. From a groundwater budgeting perspective,

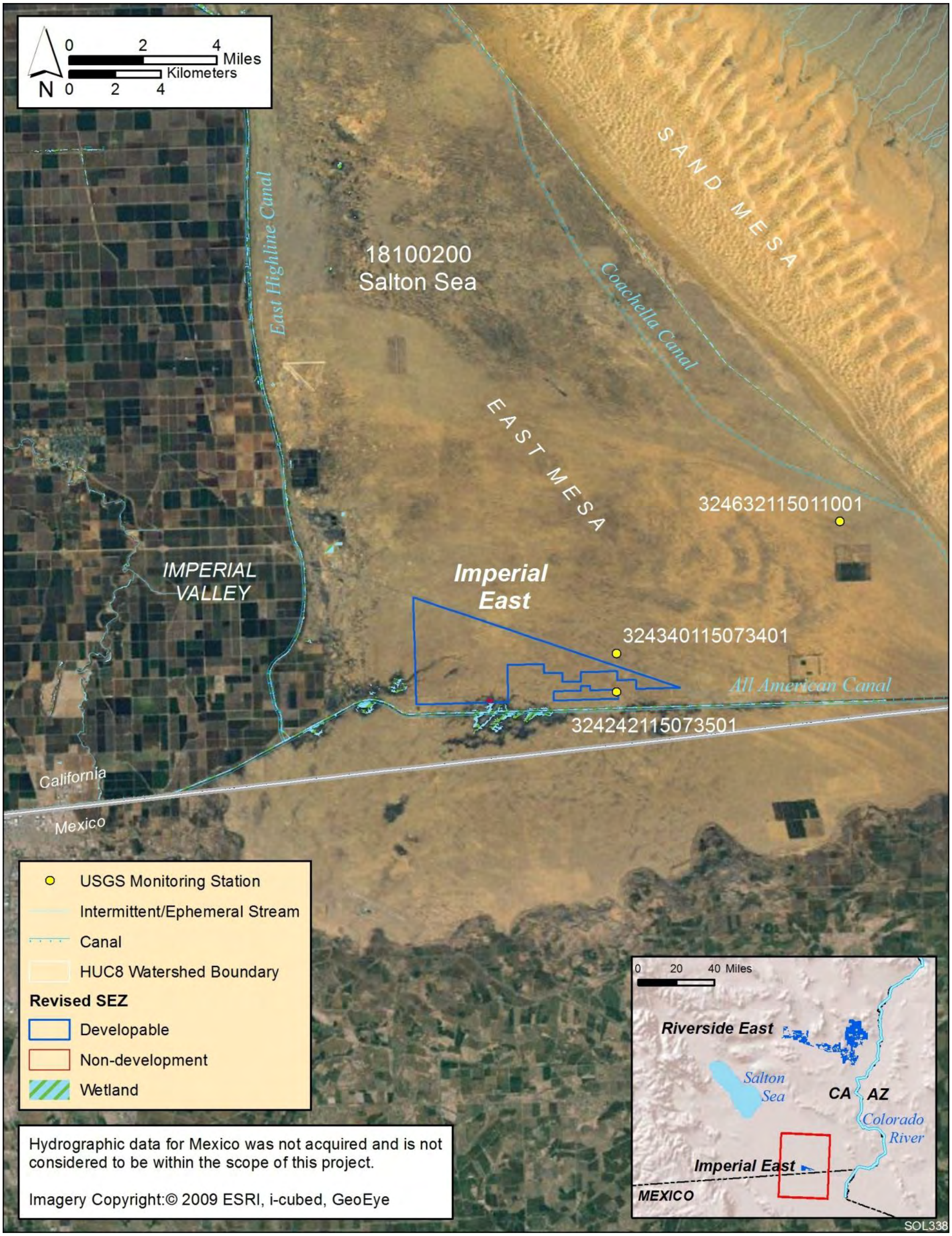

FIGURE 9.1.9.1-1 Water Features near the Proposed Imperial East SEZ as Revised

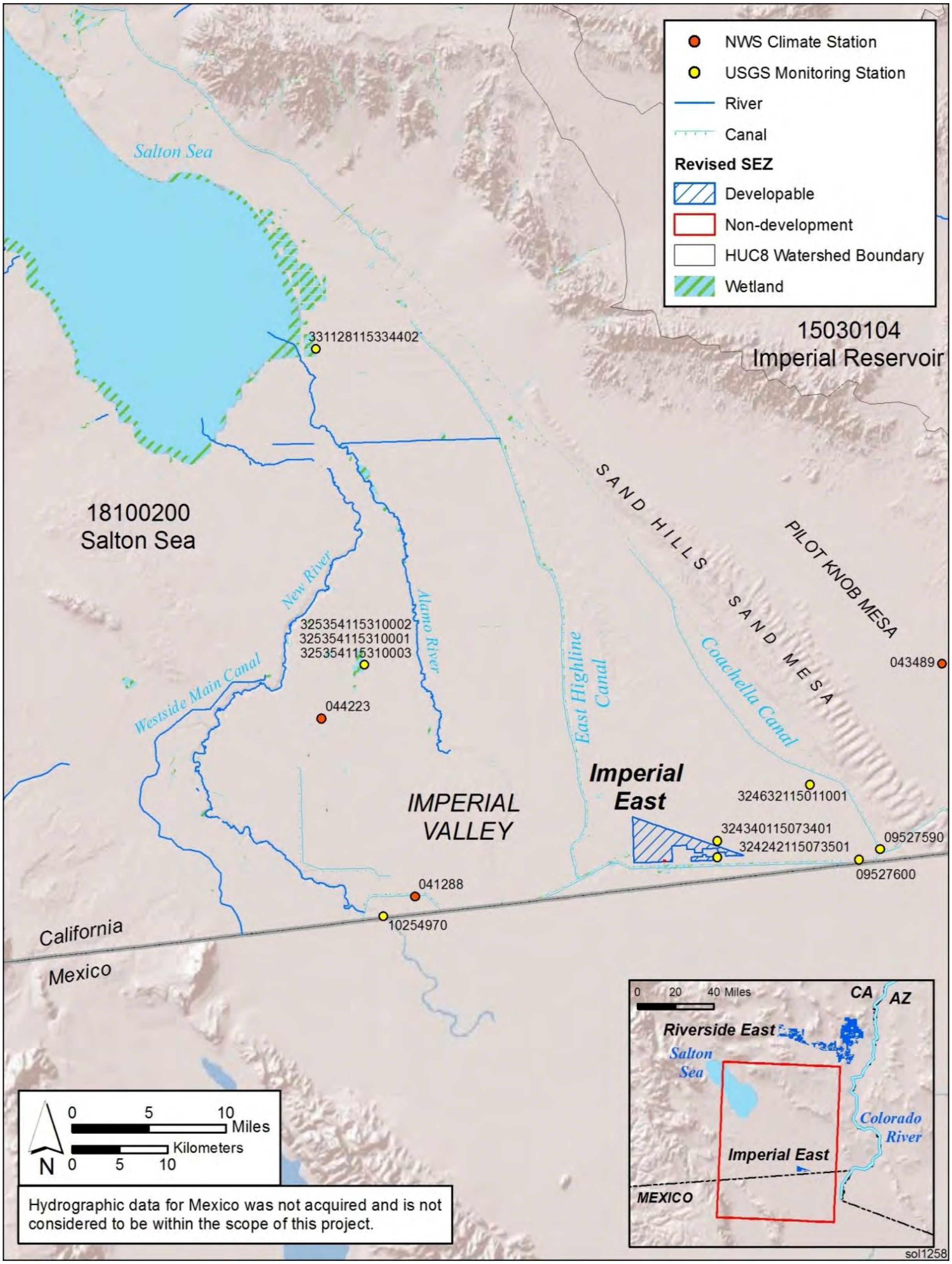

FIGURE 9.1.9.1-2 Water Features within the Salton Sea Watershed, Which Includes the Proposed Imperial East SEZ as Revised

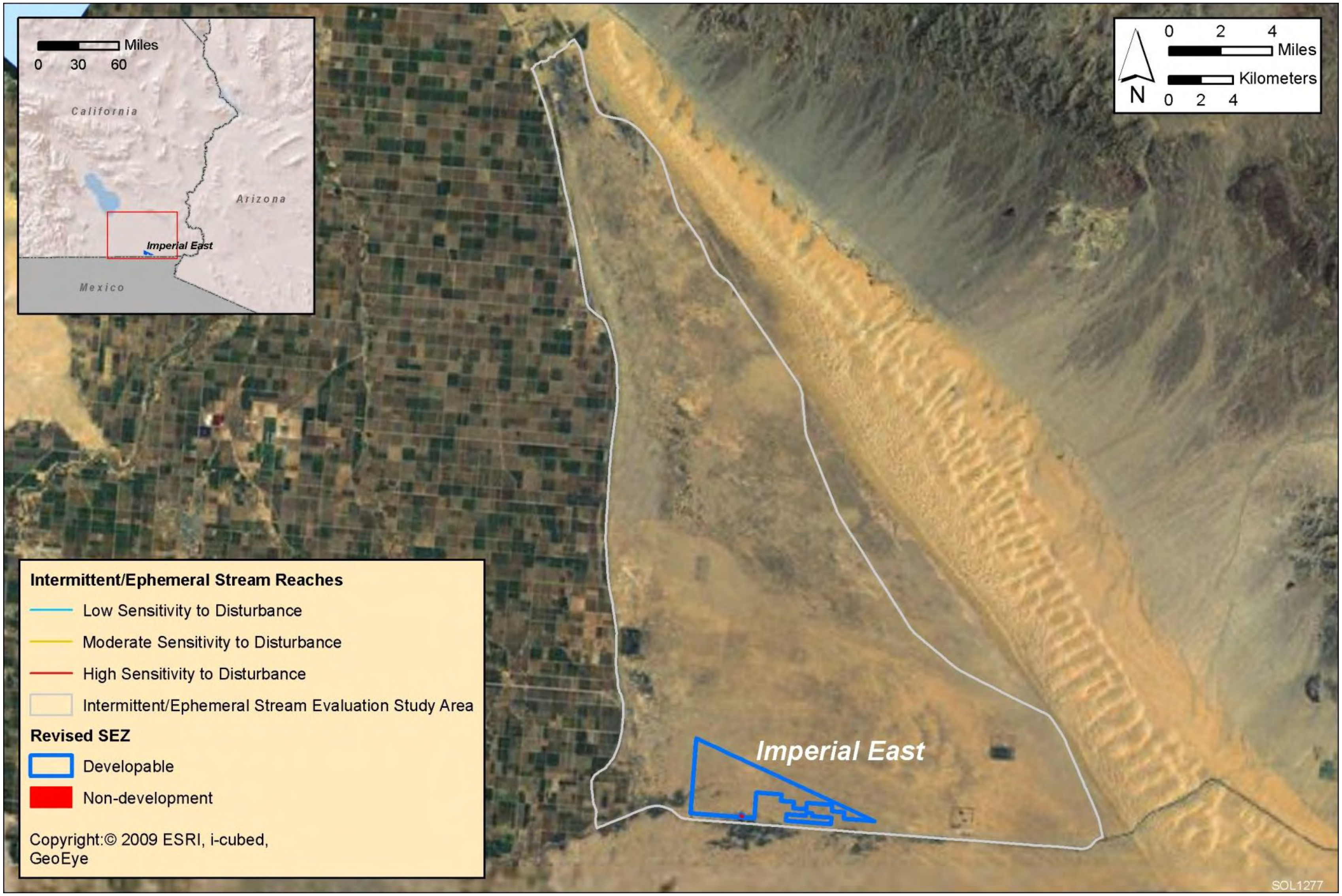

FIGURE 9.1.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Proposed Imperial East SEZ as Revised

TABLE 9.1.9.2-1 Groundwater Budget for the Imperial Valley Groundwater Basin, Which Includes the Proposed Imperial East SEZ as Revised

Process	Amount
Inputs	
Canal seepage (ac-ft/yr)[a]	250,000
Irrigation return flows (ac-ft/yr)	173,000
Outputs	
Groundwater under flow to Salton Sea (ac-ft/yr)	270,000
Discharge to streams (ac-ft/yr)	169,324
Groundwater withdrawals (ac-ft/yr)	25,600
Storage	
Storage (ac-ft)	14,000,000

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

Sources: Tompson et al. (2008); CDWR (2004); Loeltz et al. (1975).

the high pumping scenario over the 20-year analysis period represents less than 1% of the estimated groundwater storage and of the total groundwater inputs on an annual basis. However, the high pumping scenario also represents 18% of the current groundwater withdrawals in the 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. The specifics of the groundwater modeling analysis are presented in Appendix O. It should be noted, however, that the aquifer parameters used for the one-dimensional groundwater model (Table 9.1.9.2-2) represent available literature data, and that the model aggregates these value ranges into a simplistic representation of the aquifer. The available information regarding groundwater in the Imperial Valley was taken from the studies of Loeltz et al. (1975), the California Department of Water Resources (CDWR) (2004), and Tompson et al. (2008), which describe an unconfined aquifer near the surface with confined conditions existing at greater depths, typically starting at depths on the order of 300 ft (91 m) below the surface. The one-dimensional modeling analysis considered groundwater withdrawals from the upper unconfined and lower confined aquifer separately.

TABLE 9.1.9.2-2 Aquifer Characteristics and Assumptions Used in the One-Dimensional Groundwater Model for the Proposed Imperial East SEZ as Revised

Parameter	Value[a]
Upper, unconfined aquifer	
Aquifer type/conditions	Unconfined/basin fill
Aquifer thickness (ft)[b]	200
Hydraulic conductivity (ft/day)	0.6–345 (345)
Transmissivity (ft^2/day)	6,280–118,000 (69,000)
Specific yield	0.1–0.2[c] (0.2)
Lower, confined aquifer	
Aquifer type/conditions	Confined/basin fill
Aquifer thickness (ft)	380
Hydraulic conductivity (ft/day)	0.6–100 (100)
Transmissivity (ft^2/day)	6,280–118,000 (38,000)
Upper and lower aquifer	
Analysis period (yr)	20
High pumping scenario (ac-ft/yr)[d]	4,591
Medium pumping scenario (ac-ft/yr)	654
Low pumping scenario (ac-ft/yr)	26

[a] Values used for model in parentheses.

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

[c] Dutcher (1972).

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

Sources: Tompson et al. (2008); CDWR (2004); Loeltz et al. (1975).

Currently, depth to groundwater ranges from 23 to 47 ft (7 to 14 m) in the vicinity of the SEZ. The 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 10 ft (3 m) for the high pumping scenario, less than 5 ft (1.5 m) for the medium pumping scenario, and less than 1 ft (0.3 m) for the low pumping scenario for withdrawals from the upper, unconfined aquifer (Figure 9.1.9.2-2). Groundwater drawdown is greater in the lower confined aquifer and ranges up to 23 ft (7 m) for the high pumping scenario, 5 ft (1.5 m) for the medium pumping scenario, and less than 1 ft (0.3 m) for the low pumping scenario (Figure 9.1.9.2-2). Groundwater drawdown is primarily limited to the SEZ under the low and medium pumping scenarios for both the upper unconfined and lower

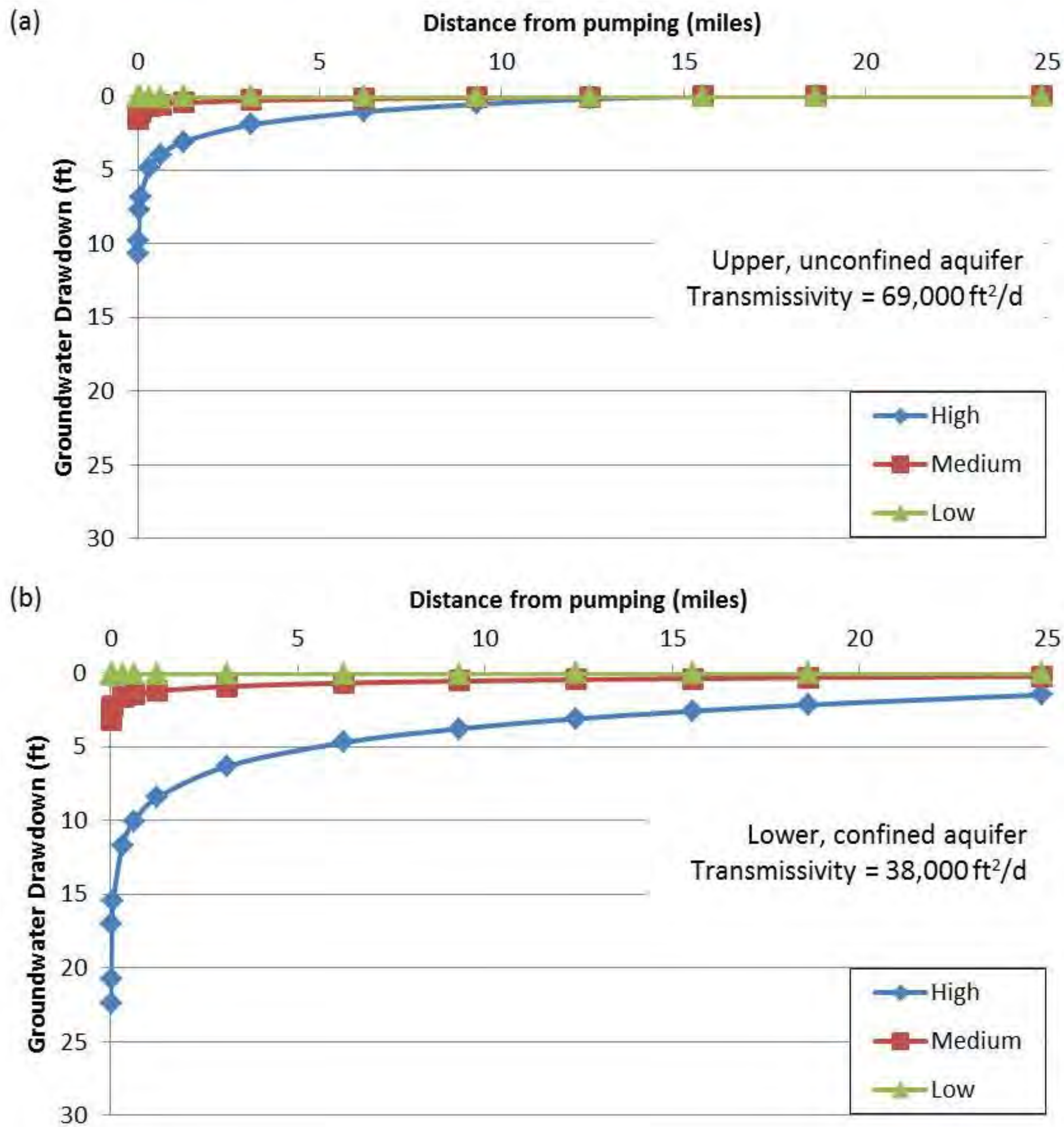

FIGURE 9.1.9.2-2 Estimated One-Dimensional Groundwater Drawdown in the (a) Upper Unconfined Aquifer and (b) Lower Confined Aquifer Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Imperial East SEZ as Revised

confined aquifers. Under the high pumping scenario, groundwater drawdown extends out to 6 mi (10 km) from the SEZ if pumped from the unconfined aquifer and up to 25 mi (40 km) from the SEZ if pumped from the confined aquifer.

9.1.9.2.3 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.

9.1.9.2.4 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, which indicates that the proposed Imperial East SEZ is located in an arid desert valley that receives a substantial amount of imported Colorado River water for irrigation via the All-American Canal. Any use of Colorado River water for solar energy facilities would have to be negotiated with the IID.

The intermittent/ephemeral stream analysis did not identify any reaches within the study area; however, this analysis is limited to the resolution of the NHD dataset (USGS 2012a); thus further site characterization would be needed to ensure that impacts on any existing intermittent/ephemeral streams would be minimized. The primary concern of land disturbance activities is potential sedimentation to the wetlands along the All-American Canal just to the south of the SEZ, which would be minimized through implementation of several of the programmatic design features described in Appendix A of this Final Solar PEIS. The proposed water use for full build-out scenarios (i.e., 80% of the area developed) at the Imperial East SEZ indicated that the low and medium pumping scenarios are preferred, as they are associated with minimal groundwater drawdown. Groundwater withdrawal at the level of the high pumping scenario has the potential for groundwater drawdown effects that extend out to 25 mi (40 km) from the SEZ if pumping occurs in the lower confined aquifer.

Predicting impacts associated with groundwater withdrawals in desert regions 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 to protect water resources is the implementation of long-term monitoring and adaptive management (see Section A.2.4 of Appendix A). 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 the development of a more detailed numerical groundwater model for the Imperial East SEZ that would more accurately predict potential impacts on surface water features and groundwater drawdown. When the detailed model is completed, it will be made available through the project Web site (http://solareis.anl.gov) for use by applicants, the BLM, and other stakeholders.

Initial efforts are focused on modifying the numerical modeling framework developed by Tompson et al. (2008) for the Salton Sea basin for more detailed examination of the Imperial East SEZ. This modeling framework can also be used to interpret groundwater monitoring data and guide adaptive management plans.

9.1.9.3 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-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.

9.1.10 Vegetation

9.1.10.1 Affected Environment

One wetland area was mapped by the National Wetlands Inventory (NWI) within the south-central portion of the proposed Imperial East SEZ, with a total of about 5 acres (0.02 km^2); these wetlands were identified as a non-development area for the SEZ.

As presented in Section 9.1.10.1 of the Draft Solar PEIS, 9 cover types were identified within the area of the proposed Imperial East SEZ, while 16 cover types were identified within 5 mi (8 km) of the SEZ boundary (the indirect impact area). Sensitive habitats on the SEZ include stabilized dunes, wetlands, desert dry washes, and riparian areas. A characteristic Sonoran Desert species observed on the SEZ is western honey mesquite. Although there are changes to the SEZ developable area, there are no changes to the land cover types in the affected area. Figure 9.1.10.1-1 shows the cover types within the affected area of the Imperial East SEZ as revised. Additional information was received regarding rare plants and plant associations on

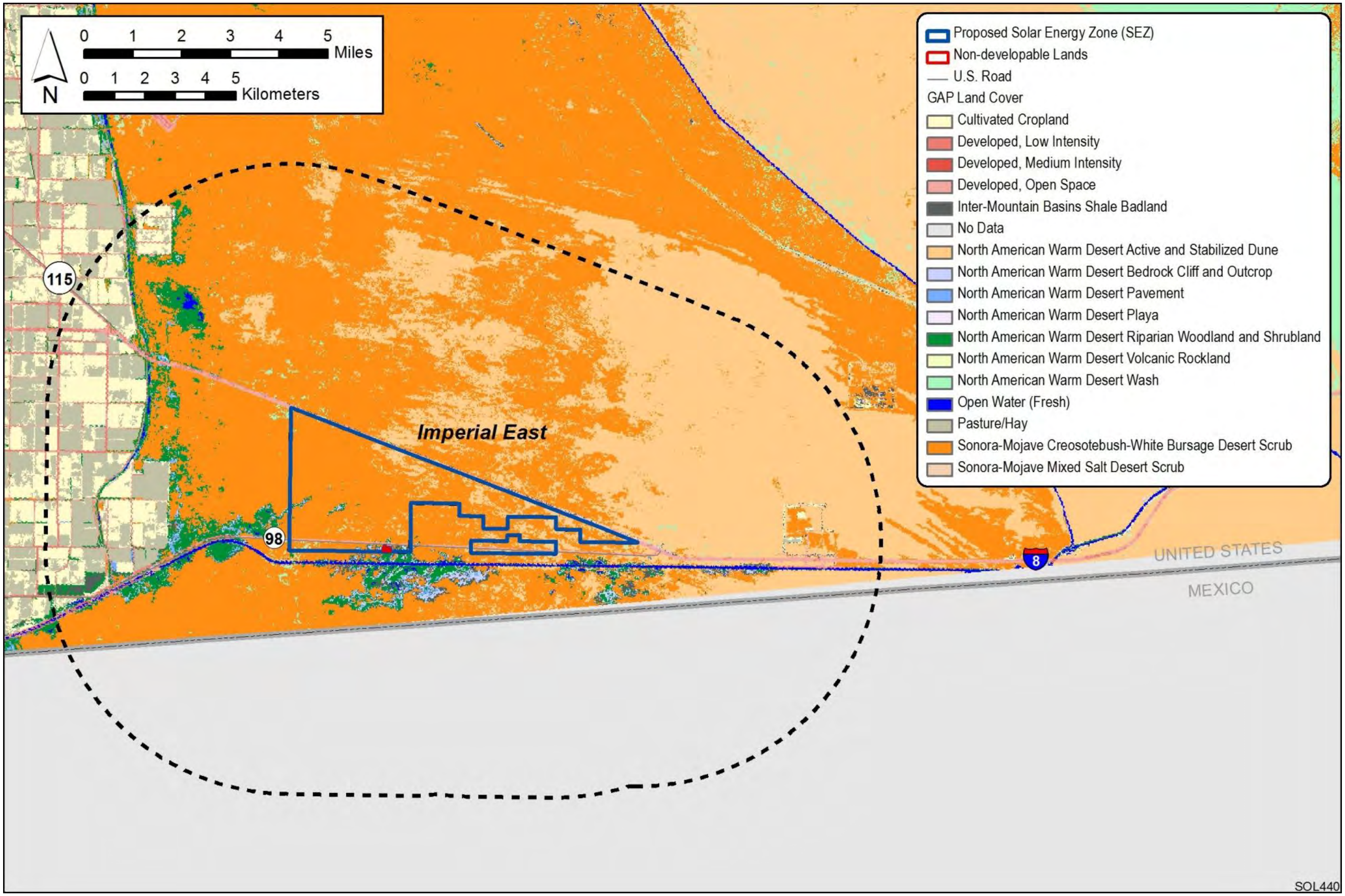

FIGURE 9.1.10.1-1 Land Cover Types within the Proposed Imperial East SEZ as Revised

or in the vicinity of the Imperial East SEZ (Suba 2012). A number of rare plant associations are known from the SEZ and vicinity (Table 9.1.10.1-1). Stands of creosote, ephedra, and narrow leafed goldenbush in the southwestern portion of the SEZ may be previously undocumented vegetation associations (Suba 2012).

9.1.10.2 Impacts

As presented in the Draft Solar PEIS, the construction of solar energy facilities within the proposed Imperial East SEZ would result in direct impacts on plant communities because of 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 exclusion area, approximately 4,574 acres (18.51 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

TABLE 9.1.10.1-1 Vegetation Types Known or Likely to Occur in the Proposed Imperial East SEZ as Revised

Vegetation Type	Species Alliance	Species Association
Tree Dominated Types	*Prosopis glandulosa* Shrubland Alliance[a]	*Prosopis glandulosa/Pluchea sericea – Atriplex canescens*[a]
Shrub Dominated Types	*Ambrosia dumosa* Shrubland Alliance	*Ambrosia dumosa – Ericameria linearifolia* (provisional type based on observation)
	Larrea tridentata Shrubland Alliance	*Larrea tridentata*
		Larrea tridentata – Ericameria linearifolia (provisional type based on observation)
	Larrea tridentata–Ambrosia dumosa Shrubland Alliance	*Larrea tridentata – Ambrosia dumosa*
		Larrea tridentata – Ambrosia dumosa-Ephedra (*californica*)[a]
		Larrea tridentata – Ambrosia dumosa/Pleuraphis rigida[a]
	Pluchea sericea Shrubland Alliance[a]	

[a] Considered as statewide rare or of high priority for inventory.

Source: Suba (2012).

lost; (2) *moderate*: an intermediate proportion (>1 but ≤10%) of a cover type would be lost; (3) *large*: >10% of a cover type would be lost.

9.1.10.2.1 Impacts on Native Species

The analysis presented in the Draft Solar PEIS indicated that development would result in a small impact on all land cover types occurring within the SEZ (Table 9.1.10.1-1 in the Draft Solar PEIS). Development within the Imperial East SEZ could still directly affect all of the cover types evaluated in the Draft Solar PEIS; the small reduction in the developable area from removal of 5 acres (0.02 km^2) of wetlands would result in reduced (and still small) impact levels on the cover types in the affected area, compared to original estimates in the Draft Solar PEIS.

Direct impacts on the NWI-mapped wetland area that occurs within the non-developable portion of the SEZ would not occur. However, direct impacts on unmapped wetlands within the remaining developable areas of the SEZ, stabilized dunes, desert dry washes, and riparian areas could still occur. In addition, indirect impacts on wetlands within or near the SEZ, as described in the Draft Solar PEIS, could occur. Indirect impacts from groundwater use on wetlands and habitats such as microphyll (palo verde/ironwood) woodland communities (including ironwood and palo verde located outside of washes), dry wash scrub, mesquite, and arrow weed communities, and communities located around dry lakes and playas in the region could also occur. Direct or indirect impacts on any of the rare plant associations listed in Table 9.1.10.1-1 could occur as a result of development within the SEZ. Impacts would depend on specific locations of project components.

9.1.10.2.2 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 Imperial East SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 9.1.10.1 of the Draft Solar PEIS. Impacts, such as reduced restoration success and possible widespread habitat degradation, could still occur; however, a slight reduction in the potential for such impacts would result from the reduced developable area of the SEZ.

9.1.10.3 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:

- Wetlands, riparian habitats, and desert dry washes, which occur primarily within the western and southern portions of the SEZ, and sand dune habitats and sand transport areas, primarily in the northern and eastern portions of the

SEZ, shall be avoided to the extent practicable, and any impacts minimized and/or mitigated in consultation with appropriate agencies. A buffer area should be maintained around wetlands, riparian areas, and dry washes to reduce the potential for impacts on wetlands on or near the SEZ. Appropriate engineering controls shall be used to minimize impacts on these areas resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls would be determined through agency consultation.

- An appropriate buffer shall be maintained between project impacts and the wetland south of the Imperial East SEZ to ensure that all impacts from construction, operations, and maintenance of solar facilities do not impair the current functions and values associated with wetland resources, including habitat support for sensitive species.

- Groundwater withdrawals shall be limited to reduce the potential for indirect impacts on wetland habitats associated with groundwater discharge, such as the wetlands near the All-American Canal and East Highline Canal, as well as other groundwater-dependent habitats in the region such as microphyll (palo verde/ironwood) woodland communities (including ironwood and palo verde located outside of washes), dry wash scrub, mesquite, and arrow weed communities, and communities located around dry lakes and playas.

It is anticipated that implementation of these programmatic design features will reduce a high potential for impacts from invasive species and impacts on wetlands, sand dunes, dry washes, and riparian habitats to a minimal potential for impact. Residual impacts on wetlands and other groundwater dependent habitats could result from limited 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 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.

9.1.11 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.

9.1.11.1 Amphibians and Reptiles

9.1.11.1.1 Affected Environment

As presented in Section 9.1.11.1 of the Draft Solar PEIS, representative amphibian species expected to occur within the Imperial East SEZ include the red-spotted toad (*Bufo punctatus*) and, possibly, the Couch's spadefoot (*Scaphiopus couchii*). The more common reptile species expected to occur within the SEZ include the Colorado fringe-toed lizard (*Uma notata*), desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard (*Gambelia wislizenii*), side-blotched lizard (*Uta stansburiana*), western banded gecko (*Coleonyx variegatus*), zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), groundsnake (*Sonora semiannulata*), and long-nosed snake (*Rhinocheilus lecontei*). The Mojave rattlesnake (*Crotalus scutulatus*) and sidewinder (*C. cerastes*) would be the most common poisonous snake species expected to occur within the SEZ.

9.1.11.1.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Imperial East SEZ could affect potentially suitable habitats for the representative amphibian and reptile species. The analysis presented in the Draft Solar PEIS for the Imperial East SEZ indicated that development would result in a small overall impact on all representative amphibian and reptile species (Table 9.1.11.1-1 in the Draft Solar PEIS). The reduction in the developable area of the Imperial East SEZ would result in reduced habitat impacts for all representative amphibian and reptile species; the resultant impact levels for all the representative species would still be small.

9.1.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, the following SEZ-specific design features to address impacts on amphibians and reptiles have been identified:

- The potential for indirect impacts on several amphibian species should be reduced by maximizing the distance between solar energy development and the All-American Canal.

- Wetlands located along the southern boundary of the SEZ, including those that are to be created or enhanced in the area, should be avoided (Section 9.1.9.1.1). The wetlands along the southern boundary of the SEZ have been designated as non-development areas, but other wetland areas may exist within the SEZ.

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.

9.1.11.2 Birds

9.1.11.2.1 Affected Environment

As presented in Section 9.1.11.2.1 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 Imperial East SEZ. Representative bird species identified in the Draft Solar PEIS included (1) shorebirds: killdeer (*Charadrius vociferus*) and least sandpiper (*Calidris minutilla*); (2) passerines: the ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), Brewer's sparrow (*Spizella breweri*), cactus wren (*Campylorhynchus brunneicapillus*), common poorwill (*Phalaenoptilus nuttallii*), common raven (*Corvus corax*), Costa's hummingbird (*Calypte costae*), crissal thrasher (*Toxostoma crissale*), greater roadrunner (*Geococcyx californianus*), green-tailed towhee (*Pipilo chlorurus*), horned lark (*Eremophila alpestris*), house finch (*Carpodacus mexicanus*), ladder-backed woodpecker (*Picoides scalaris*), Le Conte's thrasher (*Toxostoma lecontei*), loggerhead shrike (*Lanius ludovicianus*), phainopepla (*Phainopepla nitens*), sage sparrow (*Amphispiza belli*), lesser nighthawk (*Chordeiles acutipennis*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), and white-throated swift (*Aeronautes saxatalis*); (3) raptors: American kestrel (*Falco sparverius*, yearlong), burrowing owl (*Athene cunicularia*, yearlong), ferruginous hawk (*Buteo regalis*, winter), golden eagle (*Aquila chrysaetos*, winter), prairie falcon (*Falco mexicanus*, yearlong), red-tailed hawk (*Buteo jamaicensis*, yearlong), and turkey vulture (*Cathartes aura*, summer); and (4) upland gamebirds: Gambel's quail (*Callipepla gambelii*, yearlong), mourning dove (*Zenaida macroura*, yearlong), and white-winged dove (*Zenaida asiatica*, summer).

9.1.11.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Imperial East SEZ could affect potentially suitable bird habitats. The analysis presented in the Draft Solar PEIS indicated that development would result in a small overall impact on all representative bird species (Table 9.1.11.2-1 in the Draft Solar PEIS). The reduction in the developable area of the Imperial East SEZ would result in reduced habitat impacts for all representative bird species; however, the resultant impact levels for all of the representative bird species would still be small.

9.1.11.2.3 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. SEZ-specific conditions will be considered when programmatic design features are applied, for example:

- Pre-disturbance surveys shall be conducted within the SEZ for the following desert bird focal species (CalPIF 2009): ash-throated flycatcher, black-tailed gnatcatcher, black-throated sparrow, burrowing owl, common raven, Costa's hummingbird, crissal thrasher, ladder-backed woodpecker, Le Conte's thrasher, phainopepla, and verdin. Impacts on potential nesting habitat of these species should be avoided.

- Plant species that positively influence the presence and abundance of the desert bird focal species be avoided to the extent practicable. These species include Goodding's willow (*Salix* gooddingii), Joshua tree (*Yucca brevifolia*), honey mesquite (*Prosopis glandulosa*), screwbean mesquite (*P. pubescens*), Colorado desert mistletoe (*Phoradendron macrophyllum*), quailbush (*Atriplex lentiformis*), and catclaw acacia (*Acacia greggii*) (CalPIF 2009).

With the implementation of required programmatic design features, impacts on bird species will be reduced.

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

- Wetland habitats along the southern boundary of the SEZ boundary shall be avoided to the extent practicable. The wetlands along the southern boundary of the SEZ have been designated as undevelopable, but other wetland areas may exist within the SEZ.

If SEZ-specific design features are implemented in addition to required programmatic design features, impacts on bird species would be small. 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.

9.1.11.3 Mammals

9.1.11.3.1 Affected Environment

As presented in Section 9.1.11.3.1 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 Imperial East SEZ. Representative mammal species identified in the Draft Solar PEIS included (1) big game species: desert bighorn sheep (*Ovis canadensis nelsoni*, a BLM sensitive species addressed in Section 9.1.12) and mule deer (*Odocoileus hemionus*); (2) furbearers and small game species: the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus*), and white-tailed antelope squirrel (*Ammospermophilus leucurus*); and (3) small nongame species: the cactus mouse (*Peromyscus eremicus*), canyon deermouse (*P. crinitus*), 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 kangaroo rat (*Dipodomys merriami*), and southern grasshopper mouse (*Onychomys torridus*). The ranges of nine bat species encompass the SEZ: big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Californian leaf-nosed bat (*Macrotus californicus*), California mastiff bat (*Eumops perotis californicus*), California myotis (*Myotis californicus*), pallid bat (*Antrozous pallidus*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western pipistrelle (*Parastrellus hesperus*). Most bat species would only utilize the SEZ during foraging. Roost sites for the species (e.g., caves, hollow trees, rock crevices, or buildings) are absent to scarce on or in the affected area of the SEZ.

9.1.11.3.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Imperial East SEZ could affect potentially suitable habitats of mammal species. The analysis presented in the Draft Solar PEIS based on the Imperial East SEZ boundaries indicated that development would result in a small overall impact on all representative mammal species analyzed (Table 9.1.11.3-1 in the Draft Solar PEIS). The reduction in the developable area of the Imperial East SEZ would result in reduced habitat impacts for all representative mammal species; resultant impact levels for all of the representative mammal species would still be small.

9.1.11.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

- Solar project development shall not prevent mule deer free access to the unlined section of the All-American Canal.

If SEZ-specific design features are implemented in addition to required programmatic design features, impacts on mammal species would be small. 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.

9.1.11.4 Aquatic Biota

9.1.11.4.1 Affected Environment

There are no permanent water bodies or perennial streams within the boundaries of the Imperial East SEZ. An update to the Draft Solar PEIS is as follows:

- The approximately 5 acres (0.02 km^2) of palustrine wetlands located along the southern edge of the SEZ have been designated as a non-development area.

9.1.11.4.2 Impacts

The types of impacts on aquatic habitats and biota that could occur from development of utility-scale solar energy facilities are discussed in Section 5.10.3 of the Draft and Final Solar PEIS. Aquatic habitats, including wetland areas, present on or near the Imperial East SEZ 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 palustrine wetlands associated with All-American Canal located along the southern edge of the SEZ have been designated non-development areas; therefore, they would not be directly affected by construction activities. However, as described in the Draft Solar PEIS, the wetlands could be affected indirectly by solar development activities within the SEZ.

9.1.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

- Undisturbed buffer areas and sediment and erosion controls shall be maintained around wetlands located along the southern boundary of the SEZ.

- The use of heavy machinery and pesticides shall be avoided within the immediate catchment basins for the wetlands along the southern boundary of the SEZ.

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

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 Imperial East SEZ would be small.

On the basis of impact analyses conducted for the Draft Solar PEIS 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.

9.1.12 Special Status Species

9.1.12.1 Affected Environment

As presented in Section 9.1.12.1 of the Draft Solar PEIS, 35 special status species were identified that could occur or have potentially suitable habitat within the affected area of the proposed Imperial East SEZ. The Mojave population of the desert tortoise, a species listed as threatened under the Endangered Species Act of 1973 (ESA), is not likely to occur in the affected area of the Imperial East SEZ because the SEZ is not within the known range of the species (Stout 2009) and on the basis of the U.S. Geological Survey (USGS) tortoise habitat suitability model (Nussear et al. 2009). In addition, following the publication of the Draft Solar PEIS, the USFWS determined on March 15, 2011, that listing of the flat-tailed horned lizard (*Phrynosoma mcallii*) under the ESA was no longer warranted and removed the proposed status of this species (USFWS 2011). This species is still considered a BLM-designated sensitive species. The Yuma clapper rail (*Rallus longirostris yumanensis*) is the only ESA-listed species that may occur in the affected area of the Imperial East SEZ. Figure 9.1.12.1-1 shows the known or potential occurrences of species in the affected area of the SEZ that are listed, proposed, or candidates for listing under the ESA.

9.1.12.2 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 Imperial East SEZ could affect potentially suitable habitats of special status species. The analysis presented in the Draft Solar PEIS for the Imperial East SEZ indicated that development would result in no impact or a small overall impact on all special status species (Table 9.1.12.1-1 in the Draft Solar

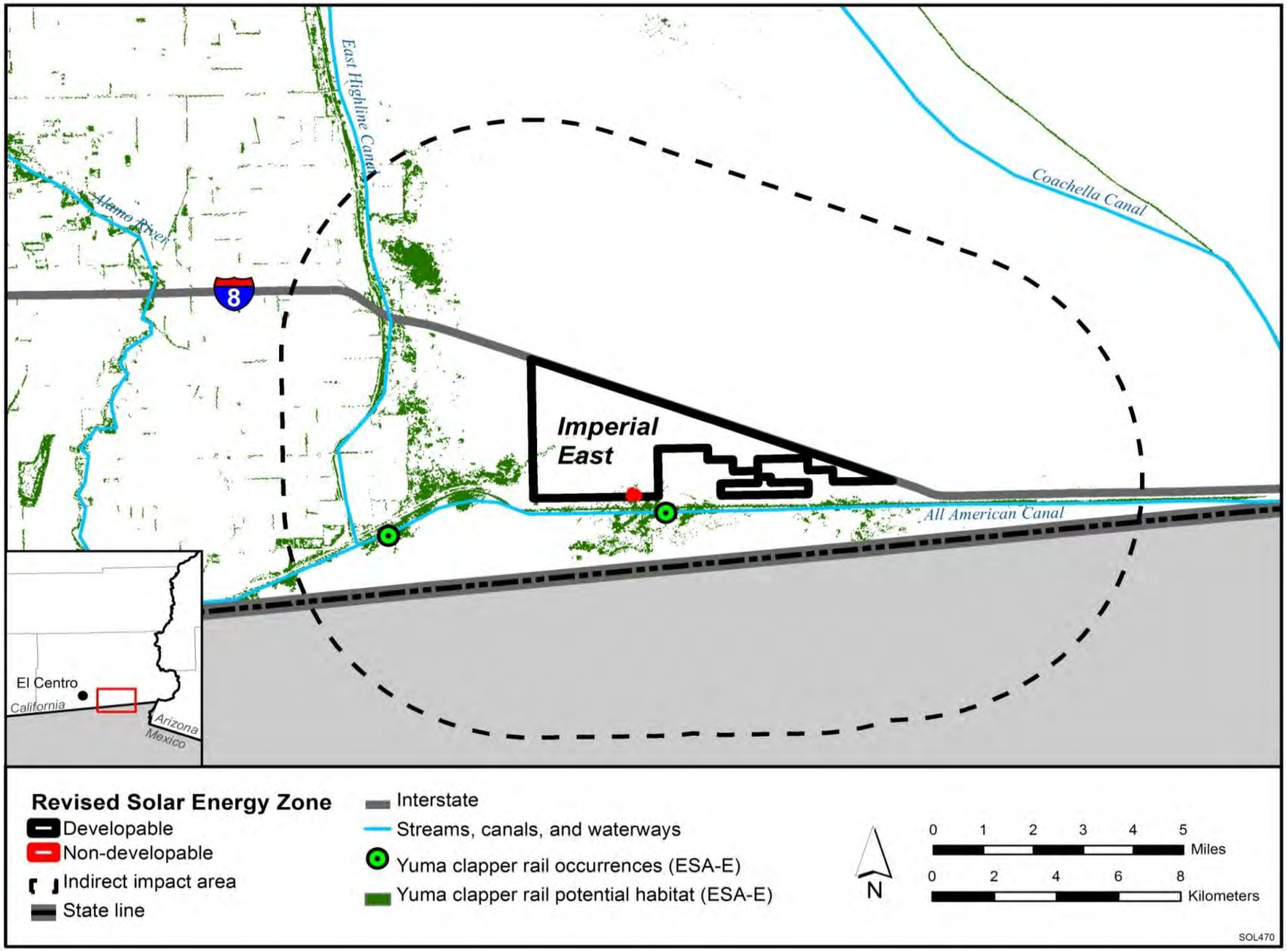

FIGURE 9.1.12.1-1 Proposed Imperial East SEZ as Revised and Distribution of Potentially Suitable Habitat for Species Listed under the Endangered Species Act

PEIS). Development within the Imperial East SEZ could still affect the same 35 species evaluated in the Draft Solar PEIS.

9.1.12.3 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. With implementation of required programmatic design features, impacts on special status and rare species will be reduced.

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

- Occupied habitats for species that are designated as California fully protected species should be completely avoided. Under California Fish and Game Code Sections 3511, 4700, 5050, and 5515, take or possession of these species is prohibited at any time. Minimization and mitigation measures cannot be developed for California fully protected species. This policy applies to the following California fully protected species that may occur in the affected area of the Imperial East SEZ: California black rail and Yuma clapper rail.

If SEZ-specific design features are implemented in addition to required programmatic design features, it is anticipated that the majority of impacts on special status species from habitat disturbance and groundwater use would be small. 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. 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.

9.1.13 Air Quality and Climate

9.1.13.1 Affected Environment

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

9.1.13.1.1 Existing Air Emissions

The Draft Solar PEIS presented 2002 emissions data for Imperial County. More recent data for 2008 (ARB 2012) were reviewed for this Final Solar PEIS. The two emissions inventories are from different sources and assumptions; for example, the 2008 data did not include biogenic volatile organic compound (VOC) emissions. Sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and VOC emissions were lower in the more recent data;

PM_{10} and $PM_{2.5}$ (particulate matter with a diameter of 10 μm or less and 2.5 μm or less, respectively) emissions were lower in the 2002 data. These changes would not affect the modeled air quality impacts presented in this update.

9.1.13.1.2 Air Quality

The calendar quarterly average National Ambient Air Quality Standard (NAAQS) of 1.5 $\mu g/m^3$ for lead (Pb) presented in Table 9.1.13.1-2 of the Draft Solar PEIS has been replaced by the rolling 3-month standard (0.15 $\mu g/m^3$). The federal 24-hour and annual SO_2, 1-hour ozone (O_3), and annual PM_{10} standards have been revoked as well (EPA 2011). These changes would not affect the modeled air quality impacts presented in this update. California State Ambient Air Quality Standards (SAAQS) have not been changed.

9.1.13.2 Impacts

9.1.13.2.1 Construction

Methods and Assumptions

Except as noted below, the methods and modeling assumptions have not changed from those presented in the Draft Solar PEIS.

The developable area of the proposed Imperial East SEZ was reduced by less than 0.1%, from 5,722 acres (23.2 km^2) to 5,717 acres (23.1 km^2), a change too small to affect the estimated air concentrations given in the Draft Solar PEIS. However, in the Draft PEIS, concentrations at possible human receptor locations and cities were estimated indirectly from contours based on modeled concentrations at gridded receptor locations. For this Final Solar PEIS, concentrations were estimated directly at those receptors.

Results

The maximum concentrations from construction fugitive dust presented in Table 9.1.13.2-1 of the Draft Solar PEIS would not change; thus the conclusion that maximum particulate concentrations could exceed standard values remains valid.[2] At possible human

[2] 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 impacts cannot be modeled. Therefore, it has been assumed that an area of 3,000 acres (12.14 km^2) would be disturbed continuously, and 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 predicted impacts on ambient air quality for specific projects would be much lower than those in this Final Solar PEIS.

receptor locations, some updated concentrations were higher and some lower than the corresponding predictions in the Draft Solar PEIS. However, none of the changes were large enough to change the conclusion that predicted 24-hour and annual PM_{10} and $PM_{2.5}$ concentration levels could exceed the standard levels at the SEZ boundaries and immediate surrounding areas, including possible human receptor locations, 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.

There was no change in the modeled concentration at the nearest Class I area (Joshua Tree National Park [NP]), and the conclusion in the Draft Solar PEIS that construction activities would result in negligible impacts there remains valid.

Since the developable area of the proposed SEZ has not been reduced appreciably, the conclusion in the Draft Solar PEIS regarding impacts on air quality-related values (AQRVs) in nearby Class I areas from engine exhaust and vehicles remains valid. Emissions from construction-related equipment and vehicles are temporary and would cause some unavoidable but short-term impacts.

9.1.13.2.2 Operations

The reduction in developable area of the proposed Imperial East SEZ by about 0.09% 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. Updated estimates for emissions potentially displaced by a solar facility can be obtained from the table in the Draft Solar PEIS by reducing the tabulated emissions by about 0.09%. Maximum reductions are 1 ton/yr for SO_2, 2 tons/yr for NO_x, and 1,000 tons/yr for carbon dioxide (CO_2). Other reductions are smaller. These small reductions would not affect the analysis presented in the Draft Solar PEIS, and the conclusion presented therein that solar facilities built in the proposed Imperial East SEZ could considerably reduce fuel-combustion-related emissions in California but relatively less so than those built in other states with higher fossil use rates remains valid.

9.1.13.2.3 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 would be moderate and temporary.

9.1.13.3 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 BLM's 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 and consideration of comments received, as applicable, no SEZ-specific design features for air quality 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.

9.1.14 Visual Resources

9.1.14.1 Affected Environment

The proposed Imperial East SEZ is located approximately 1.2 mi (1.9 km) north of the United States–Mexico border in the Sonoran Desert, within the CDCA in Imperial County in southern California. No boundary revisions were identified for the proposed Imperial East SEZ; however, 5 acres (0.02 km^2) of wetlands along the southern border of the SEZ were identified as non-development areas. The remaining developable area within the SEZ is 5,717 acres (23.1 km^2).

An updated Visual Resources Inventory (VRI) map for the SEZ and surrounding lands is shown in Figure 9.1.14.1-1; it provides information from the BLM's September 2010 VRI, which was finalized in October 2011 (BLM 2011f). As shown, the VRI values for the SEZ are VRI Class IV, indicating low relative visual values; its surroundings consist of lands rated as both VRI Class III and VRI Class IV. The inventory indicates moderate levels of sensitivity within the SEZ and low scenic quality for the SEZ and its immediate surroundings, based in part on the lack of visual variety and notable features and on the relative commonness of the landscape type within the region.

Within the El Centro Field Office, lands within the 25-mi (40-km), 650-ft (198-m) viewshed of the SEZ contain 737 acres (3.0 km^2) of VRI Class I lands, 3,674 acres (14.9 km^2) of VRI Class II lands, 12,615 acres (51.1 km^2) of VRI Class III lands, and 16,614 acres (67.2 km^2) of VRI Class IV lands.

9.1.14.2 Impacts

The summary of impacts provided in the Draft Solar PEIS remains valid, as follows. The Imperial East SEZ is in an area of low scenic quality, with numerous cultural disturbances already present. Residents, workers, and visitors may experience visual impacts from solar energy facilities located within the SEZ (as well as any associated access roads and transmission lines) as they travel area roads. The residents nearest to the SEZ could be subjected to large visual impacts from solar energy development within the SEZ.

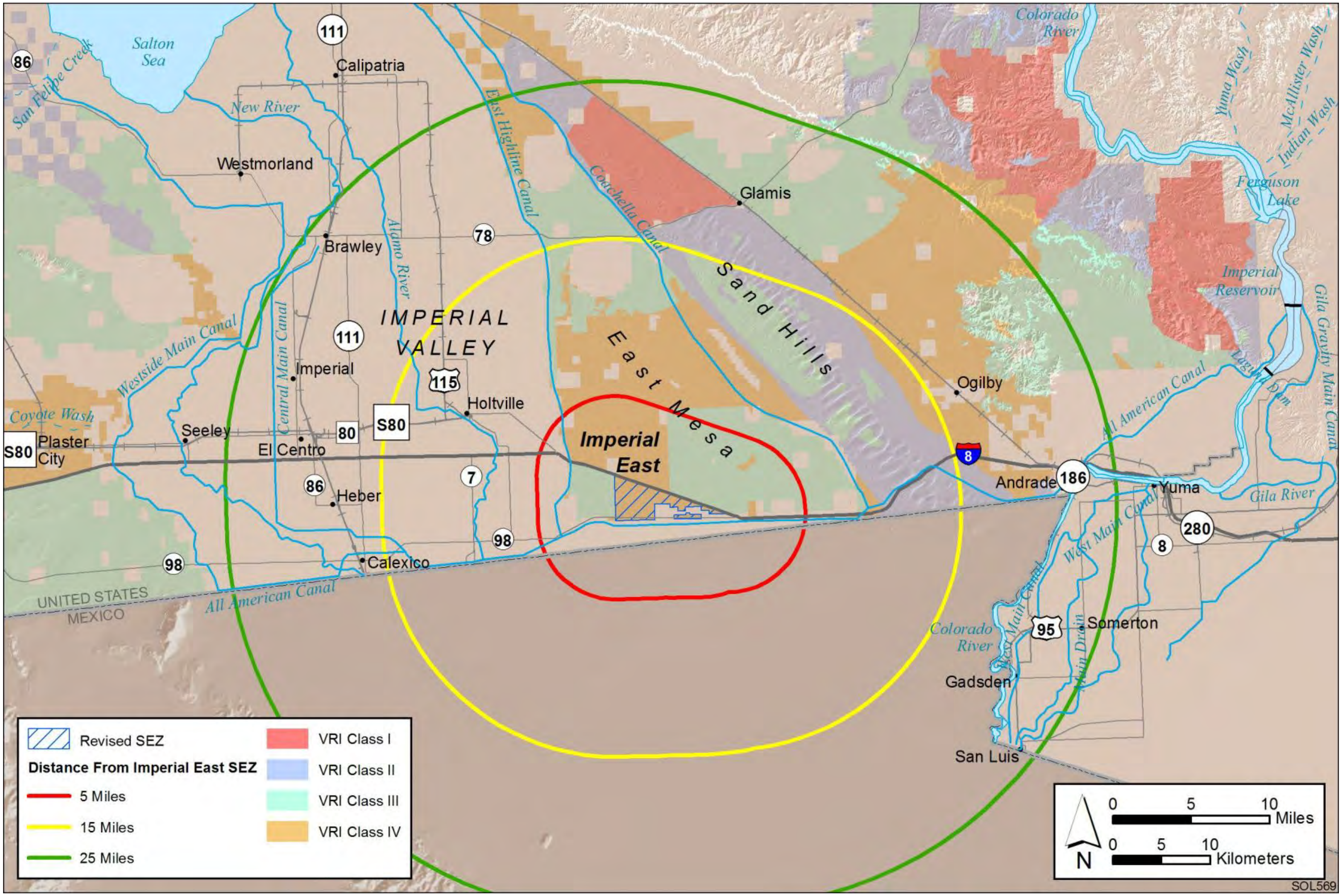

FIGURE 9.1.14.1-1 Visual Resource Inventory Values for the Proposed Imperial East SEZ as Revised

Utility-scale solar energy development within the proposed Imperial East SEZ is unlikely to cause even moderate visual impacts on highly sensitive visual resource areas, the closest of which is more than 15 mi (24 km) from the SEZ. The closest community is beyond 10 mi (16 km) from the SEZ and is likely to experience minimal visual impacts from solar development within the SEZ.

9.1.14.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce visual impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. While application of the programmatic design features would 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 and consideration of comments received as applicable, no SEZ-specific design features for visual resources have been identified. Some SEZ-specific design features may be established through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.1.15 Acoustic Environment

9.1.15.1 Affected Environment

The developable area of the proposed Imperial East SEZ was reduced by 0.09% from 5,722 acres (23.2 km^2) to 5,717 acres (23.1 km^2). The boundaries of the SEZ were not changed, and thus the information for acoustic environment remains the same as presented in the Draft Solar PEIS.

9.1.15.2 Impacts

Given the small reduction in the developable area of the Imperial East SEZ and the lack of change in the boundaries, the conclusions presented in the Draft Solar PEIS remain valid, except for construction and operations impacts on specially designated areas and impacts from operating dish engine facilities.

9.1.15.2.1 Construction

Except for the impacts on the East Mesa ACEC, the results and conclusions presented in the Draft Solar PEIS remain valid. Construction would cause some unavoidable but localized short-term impacts on neighboring residences, particularly activities occurring near the southwestern boundary of the proposed SEZ, close to the nearby residences.

The East Mesa ACEC, protected for both wildlife and cultural resources, is located as close as about 400 ft (120 m) from the northeastern SEZ boundary across I-8. The Draft Solar PEIS did not address noise impacts in this ACEC because it was incorrectly assumed that only cultural resources were of concern. For this Final Solar PEIS, modeling of potential noise levels at the southwestern boundary of the East Mesa ACEC was added. The predicted noise level at the southwestern boundary of the East Mesa ACEC would be about 71 dBA if construction occurred near the northeastern boundary of the SEZ. This construction noise level at the boundary of the East Mesa ACEC would be comparable to or slightly higher than traffic noise from I-8, so that construction noise from the Imperial East SEZ would be expected to have minor incremental impacts on wildlife at the East Mesa ACEC unless construction would occur near the East Mesa ACEC. However, on the basis of comments received and recent references as applicable, this Final Solar PEIS also evaluated noise impacts on wildlife in areas of special concern in comparison with an updated approximate significance threshold of 55 dBA, corresponding to the onset of adverse physiological impacts (Barber et al. 2010). Potential impacts on wildlife from noise exceeding this threshold are discussed in Section 5.10.2 of this Final Solar PEIS. In addition, Section 5.10.2 discusses data that indicate there is the potential for other effects to occur at lower noise levels (Barber et al. 2011). Because of the potential for impacts from construction at the Imperial East SEZ, impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. For the proposed Imperial East SEZ, these considerations must take into account the noise associated with traffic on I-8.

No adverse vibration impacts from construction activities are anticipated, including from pile driving for dish engines.

9.1.15.2.2 Operations

Because the boundaries of the proposed Imperial East SEZ have not changed, the updated noise impact assessment in this Final Solar PEIS is the same as that in the Draft Solar PEIS, except as noted below for impacts from thermal energy storage (TES) and dish engine facilities near residences or specially designated areas.

Parabolic Trough and Power Tower

Operation of parabolic trough and power tower technologies located near the southwestern SEZ boundary could adversely affect the nearby residences to the southwest of the proposed SEZ if TES were used. In the permitting process, refined noise propagation modeling would be warranted, along with measurement of background sound levels.

As stated above under construction impacts, for this Final Solar PEIS an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. For this Final Solar PEIS, predicted noise levels were modeled at the southwestern boundary of the East Mesa ACEC. For parabolic trough or power tower facilities, noise levels at the southwestern boundary of the East Mesa ACEC would be about 50 dBA. During daytime hours, these levels are well below the traffic noise from I-8; thus operation noise from parabolic trough or power tower facilities would have a negligible incremental impact on wildlife at the East Mesa ACEC. However, downward bending of noise due to temperature inversion could have some impacts on wildlife at the southwestern portions of the East Mesa ACEC if solar facilities with TES operated at night. In addition, as discussed in Section 5.10.2 of this Final Solar PEIS, there is the potential for other effects to occur at lower noise levels (Barber et al. 2011). With the approximate significance threshold of 55 dBA and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from a parabolic trough or power tower facility equipped with TES would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern.

Dish Engines

Noise from dish engines could adversely affect the nearest residences, depending on background noise levels and meteorological conditions, making consideration of minimizing noise impacts important during the siting of dish engine facilities.

For a dish engine facility, noise levels at the southwestern boundary of the East Mesa ACEC would be about 57 dBA, exceeding the updated approximate significance threshold of 55 dBA. However, this level is well below the traffic noise from I-8; thus dish engine noise, which would occur only during daytime hours, would have a minor incremental impact on wildlife at the East Mesa ACEC. Nonetheless, the possibility of effects on wildlife at even lower noise levels is also acknowledged. Noise impacts on terrestrial wildlife from dish engine facilities would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. For the proposed Imperial East SEZ, these considerations must take into account the noise associated with traffic on I-8.

Changes in the area of the proposed 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.

9.1.15.2.3 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 and vibration impacts would be minor and temporary.

9.1.15.3 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 and consideration of comments received as applicable, the following SEZ-specific design feature has been identified:

- Because of the proximity of the proposed Imperial East SEZ to nearby residences and the East Mesa ACEC, and relatively high noise levels around the SEZ due to I-8 and State Route 98, refined modeling, along with background noise measurements, should be conducted in conjunction with project-specific analyses.

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.

9.1.16 Paleontological Resources

9.1.16.1 Affected Environment

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

- 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 3b as used in the Draft Solar PEIS.

- The San Bernardino County Museum paleontologist also may have additional information regarding the potential of paleontological resources in the vicinity of the SEZ.

9.1.16.2 Impacts

The assessment provided in the Draft Solar PEIS remains valid. However, a more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted.

9.1.16.3 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 and consideration of public comments received as applicable, no SEZ-specific design features for paleontological resources have been identified. Because the PFYC of the proposed Imperial East SEZ is Class 3b (unknown potential), paleontological surveys would be needed to identify those areas that may have significant paleontological resources; therefore, the need for and nature of any SEZ-specific design features will depend on the findings 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.

9.1.17 Cultural Resources

9.1.17.1 Affected Environment

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

- A Class I literature search review was completed by SWCA Environmental Consultants (SWCA and University of Arizona 2011). The results of that search identified:
  - Three cultural resources located within the proposed SEZ: one prehistoric lithic scatter, one multicomponent prehistoric lithic scatter and historic trash scatter, and one prehistoric trail segment with a lithic scatter.
  - One prehistoric resource, a pot drop, located adjacent to the proposed SEZ.

– A total of 47 sites located within a 1-mi (1.6-km) buffer of the SEZ; 36 prehistoric sites, 10 historic sites, and 1 of unknown temporal origin. All of these documented sites are located to the west and south of the SEZ.
– A total of seven surveys conducted in portions of the SEZ between 1974 and 2003, with only three of those surveys conducted within the last 10 years. However, survey coverage of the SEZ is inadequate in its ability to assist in the determination of site distribution throughout the proposed SEZ.

- 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 II reconnaissance-level stratified random sample survey of 286 acres (1.2 km^2) or roughly 5% of the SEZ. Areas of interest, as determined through the Class I review, have been incorporated in the survey design and sampling strategy. 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. If appropriate, some subsurface testing of dune and/or colluvium areas should be considered in sampling strategies for future surveys.
  - The four previously recorded resources found within and adjacent to the SEZ should be located and the records describing them updated. A *National Register of Historic Places* (NRHP) evaluation should be completed for these resources and any newly discovered sites as well.
  - 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 2011g), including follow-up to recent ethnographic studies with tribes not included in the original studies to determine whether those tribes have similar concerns.

9.1.17.2 Impacts

As stated in the Draft Solar PEIS, direct impacts on significant cultural resources could occur in the proposed Imperial East SEZ; however, further investigation is needed. The following update is based on the new information provided in SWCA and University of Arizona 2011:

- Four cultural resource sites are located in or adjacent to the proposed Imperial East SEZ and could be affected by development. The eligibility of these sites for listing in the NRHP is unknown at this time; thus the magnitude of impact (i.e., whether it constitutes an adverse effect) cannot be determined until an eligibility determination is made and the California State Historic Preservation Office (SHPO) concurs with that determination.

9.1.17.3 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 evaluations, surveys, and consultations will occur. If the four sites located in or adjacent to the proposed SEZ are found to meet the eligibility criteria for listing in the NRHP, they will be subject to the programmatic design features regarding eligible sites as described in Section A.2.2 of Appendix A.

On the basis of impact analyses completed for the Draft Solar PEIS and consideration of applicable public comments, the following SEZ-specific design feature has been identified:

- Consultation efforts should include discussions on significant archaeological sites and traditional cultural properties and on sacred sites and trails with views of the proposed SEZ. The possibility for discovering human burials in the vicinity of the proposed Imperial East SEZ and its location along the Yuma–San Diego Trail interconnecting a sacred landscape and its associated sites should also be discussed. Tribal participation in the Section 106 process will take place according to the Solar Programmatic Agreement (PA), including opportunities for tribal input regarding inventory design and treatment decisions and procedures for inadvertent discoveries during construction and operations.

Additional SEZ-specific design features would be determined in consultation with the California SHPO, local BLM offices, and affected tribes, and would depend on the findings of future investigations. Some SEZ-specific design features may be established through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.1.18 Native American Concerns

9.1.18.1 Affected Environment

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

- No new affected tribal cultural properties or landscapes were identified in the Class I literature review (SWCA and University of Arizona 2011). However, it should be noted that members of the Quechan Tribe, although generally supportive of the SEZ alternative, do not support the designation of the lands within the proposed Imperial East SEZ as suitable for development. They are opposed to the proposed Imperial East SEZ because the land falls within the Quechan traditional area. The Quechan Tribe is concerned about impacts on cultural sites and the remains of Quechan ancestors that may be present in this area.

9.1.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. The impacts expected on resources important to Native Americans from solar energy development within the Imperial East SEZ fall into two major categories: impacts on the landscape and impacts on discrete localized resources. As consultation with the tribes continues and project-specific analyses are undertaken, it is possible that Native Americans will express concerns over potential visual and other effects of solar energy development within the SEZ on a culturally important landscape, including features such as Pilot Knob and Picacho Peak, and on shrines and sacred places (see also Section 9.1.17 of the Draft Solar PEIS); however, known features of this type are 20 to 35 mi (32 to 56 km) away from the SEZ. Regarding localized effects, since solar energy facilities cover large tracts of ground, even taking into account the implementation of design features, it is unlikely that avoidance of all resources would be possible. However, as discussed in Sections 9.1.10 and 9.1.11 of this Final Solar PEIS, impacts on plant and animal resources are expected to be small since there is an abundance of similar plant and animal habitat in the area. As discussed in Section 9.1.17.2, potential impacts are possible on cultural resources if those present (or identified in the future) are determined eligible for listing in the NRHP.

9.1.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

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 immediately contacted upon the discovery of Native American human remains and associated cultural items.

On the basis of impact analyses conducted for the Draft Solar PEIS 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. Potentially significant sites and landscapes in the vicinity of the SEZ are associated with the Indian Pass, Xam Kwatcan Trail, Pilot Knob, Picacho Peak, Yuha Basin, Yuma–San Diego Trail, and Lake Cahuilla ACEC Areas C and D. These areas should be considered during government-to-government consultation with Native American tribes regarding the proposed Imperial East SEZ. Known burial sites as identified in the Native American Heritage

Commission (NAHC) database and important plant and animal resources present within and adjacent to the proposed SEZ should also be considered and discussed during consultation.

9.1.19 Socioeconomics

9.1.19.1 Affected Environment

The developable area of the proposed Imperial East SEZ has changed by less than 1%. 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 updates to the affected environment information presented in the Draft Solar PEIS are required.

9.1.19.2 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 the BLM, the in-migration of solar facility workers and their families, and impacts on local housing markets and on local community service employment. Since the boundaries of the proposed Imperial East SEZ remain unchanged and the reduction of the developable area was small (less than 1%), the impacts for full build-out of the SEZ estimated in the Draft Solar PEIS remain essentially unchanged. During construction, between 209 and 2,769 jobs and between about $12 million and $160 million in income could be associated with solar development in the SEZ. During operations at full build-out, between 13 and 288 jobs and between about $0.4 million and $10 million in income could be produced. In-migration of workers and their families would mean between 35 and 458 rental housing units would be needed during construction, and between 2 and 41 owner-occupied units would be needed during operations.

9.1.19.3 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 and consideration of comments received as applicable, no SEZ-specific design features to address socioeconomic impacts 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.

9.1.20 Environmental Justice

9.1.20.1 Affected Environment

The data presented in the Draft Solar PEIS for the proposed Imperial East SEZ have not changed substantially. There are minority populations in both the Arizona and California portions of the 50-mi (80-km) radius of the SEZ. In California, there are block groups with minority populations more than 20 percentage points higher than the state average located to the west of the SEZ in the cities of Mexicali, El Centro, Holtville, Brawley, Westmoreland, and Calipatria, and in the Fort Yuma Indian Reservation. Census block groups within the 50-mi (80-km) radius where the low-income population is more than 20 percentage points higher than the state average are located in the City of Las Vegas, in the downtown area. In Arizona, there are block groups with minority populations more than 20 percentage points higher than the state average located in the City of Yuma, to the immediate east and to the southwest of the city. Low-income populations in the 50-mi (80-km) radius are limited to block groups in the City of El Centro, around the City of Holtville, and in the Fort Yuma Indian Reservation.

9.1.20.2 Impacts

Potential impacts (e.g., from noise and dust during construction and operations, visual impacts, cultural impacts, and effects on property values) 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. Although impacts are likely to be small, there are minority populations defined by Council on Environmental Quality (CEQ) guidelines (CEQ 1997) and low-income populations (see Section 9.1.20.1 of the Draft Solar PEIS) within the 50-mi (80-km) radius around the boundary of the SEZ. This means that any adverse impacts of solar projects could disproportionately affect minority and/or low-income populations.

9.1.20.3 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 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.

9.1.21 Transportation

9.1.21.1 Affected Environment

The reduction in the developable area of the proposed Imperial Eat SEZ of less than 1% does not change the information on affected environment for transportation provided in the Draft Solar PEIS.

9.1.21.2 Impacts

As stated in the Draft Solar PEIS, the primary transportation impacts are anticipated to be from commuting worker traffic. State Route 98 provides a regional traffic corridor that could experience moderate impacts for single projects that may have up to 1,000 daily workers, with an additional 2,000 vehicle trips per day (maximum). This would represent an increase in traffic of a factor of about two for State Route 98 in the vicinity of the SEZ. For I-8, the exits at State Route 98 might experience some congestion as well. Local road improvements would be necessary in any portion of the SEZ along State Route 98 that might be developed so as not to overwhelm the local roads near any site access point(s).

Solar development within the SEZ would affect public access along off-highway vehicle (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.

9.1.21.3 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 and consideration of comments received as applicable, no SEZ-specific design features to address transportation impacts 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.

9.1.22 Cumulative Impacts

The analysis of potential impacts in the vicinity of the proposed Imperial East SEZ presented in the Draft Solar PEIS is still generally applicable for this Final Solar PEIS. The developable area of the proposed SEZ has been reduced from to 5,722 acres (23.2 km^2) to 5,717 acres (23.1 km^2) by the identification of 5 acres (0.02 km^2) of wetlands as non-development areas. Also, some additional projects within 50 mi (80 km) of the proposed Imperial East SEZ have now been added. The following sections include an update to the information presented in the Draft Solar PEIS regarding cumulative effects for the proposed Imperial East SEZ.

9.1.22.1 Geographic Extent of the Cumulative Impact Analysis

The geographic extent of the cumulative impact analysis has not changed. The extent varies based on 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 impacts on visual resources). Most of the lands around the Imperial East SEZ are administered by the BLM, the DoD, or the City of El Centro; the BLM administers approximately 23% of the lands within a 50-mi (80-km) radius of the SEZ.

9.1.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The Draft Solar PEIS included three other proposed SEZs in southern California. Two of these, Iron Mountain and Pisgah, have been removed from consideration.

One project (the Imperial Valley Solar Project), located about 35 mi (56 km) west of the Imperial East SEZ, has received BLM ROW authorization; however, this application will require additional case processing and environmental review to consider a post-authorization request to change technology to PV. In addition, there are five pending ROW applications for solar facilities within 50 mi (80 km) of the Imperial East SEZ (including one pending application within the SEZ) that could generate up to about 1,214 MW on public lands in California (see the list in Appendix B of this Final Solar PEIS). However, these applications are in various stages of approval and for three, environmental assessments have not been completed. One project, Ocotillo Sol, has firm near-term plans and environmental documentation, and is thus considered a reasonably foreseeable action. As of the end of October 2011, the other pending applications were not considered reasonably foreseeable future actions.

The list of reasonably foreseeable future actions near the proposed Imperial East SEZ has been updated and is presented in Table 9.1.22.2-1. These projects are grouped into two categories: (1) actions that relate to energy production and distribution (Section 9.1.22.2.1), and (2) other ongoing and reasonably foreseeable actions, including those related to mining and mineral processing, grazing management, transportation, recreation, water management, and conservation (Section 9.1.22.2.2). Together, these actions have the potential to affect human and environmental receptors within the geographic range of potential impacts over the next 20 years.

TABLE 9.1.22.2-1 Ongoing and Reasonably Foreseeable Future Actions Related to Energy Development and Distribution and Other Major Actions near the Proposed Imperial East SEZ as Revised[a,b]

Description	Status	Resources Affected	Primary Impact Location
Approved and Priority Energy Project on BLM-Administered Land			
Imperial Valley Solar Project (CACA 47740), originally planned as 709-MW dish engine, 6,500 acres[c]; converting to 350- 400-MW PV, 4,735 total acres	**Commission decision and license for original proposal terminated June 30, 2011** **Plan of Development June 20, 2011[d]**	Land use, visual, terrestrial habitats, wildlife, groundwater	About 35 mi[e] west of Imperial East SEZ
Ocotillo Sol Solar Project (CACA 51625), 14-MW PV, 115 acres	**NOI July 17, 2011**	**Land use, ecological resources, visual**	**About 25 mi west of Imperial East SEZ**
Imperial Solar Energy Center South (CACA 51645/ CACA 52359), 200-MW PV, 947 acres	**ROD July 14, 2011**	**Land use, ecological resources, visual**	**About 25 mi west of Imperial East SEZ**
Centinela Solar Energy Project (CACA 52092), 275-MW PV, 2,067 acres	**ROD December 28, 2011**	**Land use, ecological resources, visual**	**About 25 mi west of Imperial East SEZ**
Imperial Solar Energy Center West (CACA-51644), 250-MW PV, 1,130 acres	**ROD August 23, 2011**	**Land use, ecological resources, visual**	**About 25 mi west of Imperial East SEZ**
Mount Signal Solar Farm Project CACA 52325), 600-MW PV, 4,228 acres	**California Draft Environmental Impact Report (DEIR) November 2011**	**Land use, ecological resources, visual**	**About 22 mi west of Imperial East SEZ**
Ocotillo Express (CACA 51552), 550 MW, 14,961 acres	**DEIR/DEIS July 2011**	**Land use, ecological resources, visual**	**About 45 mi west of Imperial East SEZ**
Orresource Geothermal (CACA 6217, CACA 6218, CACA 17568)	Ongoing	Land use, terrestrial habitats, visual	About 3 mi northwest of Imperial East SEZ, within the East Mesa KGRA

TABLE 9.1.22.2-1 (Cont.)

Description	Status	Resources Affected	Primary Impact Location
Geothermal Power Project (CACA 18092X)	Authorized	Land use, terrestrial habitats, visual	About 5 mi northwest of Imperial East SEZ, within the East Mesa KGRA
Black Rock 1, 2, and 3 Geothermal Power Project, 159 MW, 160 acres	Planned, currently on hold. **Petition to extend the beginning of construction until December 18, 2014**[f]	Land use, terrestrial habitats, visual	Northwest Imperial County near Salton Sea and Sonny Bono Salton Sea National Wildlife Refuge
Black Rock 5 and 6 Geothermal Power Project, 235 MW	Planned	Land use, terrestrial habitats, visual	Northwest Imperial County near Salton Sea and Sonny Bono Salton Sea National Wildlife Refuge
East Brawley Geothermal Plant, 49.9 MW, 3,067 total acres	**DEIR/DEIS March 2011**	**Land use, terrestrial habitats, visual**	**About 25 mi northwest of Imperial East SEZ**
Transmission and Distribution Systems			
Existing Southwest Powerlink 500-kV Transmission Line	Ongoing	Land use, terrestrial habitats, visual	Line runs from the Palo Verde Nuclear Generating Station in Arizona to the San Diego area, passing just to the south of the Imperial East SEZ.
Upgrades to Imperial Irrigation District (IID) 230-kV Transmission Line	Planned	Land use, terrestrial habitats, visual	Line would run from the IID/San Diego Gas & Electric's (SDG&E) Imperial Valley Substation approximately 10 mi southwest of the City of El Centro and terminate at the El Centro Switching Station.

TABLE 9.1.22.2-1 (Cont.)

Description	Status	Resources Affected	Primary Impact Location
Upgrades for Imperial Valley Solar Project Transmission Line	Planned	Land use, terrestrial habitats, wildlife, visual	Construction of a new 230-kV substation approximately in the center of the Imperial Valley Solar Project site and would connect to the SDG&E Imperial Valley Substation via 10.3-mi transmission line.
New Sunrise Powerlink 500-kV Transmission Line	**Construction began September 2010**[g]	Land use, terrestrial habitats, wildlife, visual	Line would run westward 150 mi from the El Centro area in Imperial County to western San Diego County.
Other Projects			
Imperial Irrigation District Hydroelectric Power Plants	Ongoing	Land use, surface water	Power plants are along the All-American Canal in Imperial County, including locations near Imperial East SEZ.
North Baja Pipeline Expansion Project	**Ongoing**	Land use, terrestrial habitats, visual	Gas pipeline would run 80 mi from Ehrenberg, Arizona, through Riverside and Imperial Counties to a connection point located between Yuma, Arizona, and Imperial East SEZ.
Proposed West Chocolate Mountains Renewable Energy Evaluation Area	**DEIS June 2011**[h]	Land use, visual, terrestrial habitats, wildlife, groundwater	About 25 mi north of the Imperial East SEZ
Proposed Desert Renewable Energy Conservation Plan	**NOI July 29, 2011**	**Land use, terrestrial habitats, visual, recreation**	**22,587,000 acres in the Mojave and Colorado Desert Regions of Southern California**

[a] Projects in later stages of agency environmental review and project development.

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

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

[d] Project modified; see AES Solar (2011) for details.

1 **Footnotes continued on next page.**

TABLE 9.1.22.2-1 (Cont.)

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

[f] See CEC (2011) for details.

[g] See PUC (2011) for details.

[h] See BLM (2011a) for details.

9.1.22.2.1 Energy Production and Distribution

Reasonably foreseeable future actions related to energy production and distribution and other major actions within a 50-mi (80-km) radius from the center of the Imperial East SEZ, which includes portions of Imperial and Riverside Counties in California and La Paz and Yuma Counties in Arizona, are identified in Table 9.1.22.2-1. Projects listed in the table are shown in Figure 9.1.22.2-1. Projects not previously described in the Draft Solar PEIS are described in the following sections.

Imperial Valley Solar Project

Imperial Valley Solar LLC, a wholly owned subsidiary of AES Solar Power LLC, proposes to construct and operate a 350- to 400-MW PV solar generation facility (AES Solar 2011). This proposal is a change from the original proposal in the Final Environmental Impact Statement (FEIS) for the project, which was to construct a 709-MW solar dish facility (BLM 2010). The facility will be constructed on a 4,735-acre (19.2-km^2) site, which is composed of 80 acres (0.32 km^2) of private land and the rest BLM-administered land. The site is approximately 35 mi (56 km) west of the Imperial East SEZ.

Ocotillo Sol Solar Project (CACA 51625)

San Diego Gas and Electric (SDG&E) proposes to construct and operate a 14-MW solar PV power plant on a 115-acre (0.4-km^2) site approximately 8 mi (13 km) southwest of El Centro, California, and about 25 mi (40 km) west of the Imperial East SEZ. The project would connect to the existing San Diego Gas and Electric Imperial Valley Substation (BLM 2011b).

Imperial Solar Energy Center South (CACA 51645/52359)

CSOLAR Development, LLC, proposes to construct and operate a 200-MW PV power plant on a 947-acre (3.8-km^2), privately owned site, 8 mi (13 km) west of the City of Calexico, California, and about 25 mi (40 km) west of the Imperial East SEZ. The project also includes construction and operation of 5 mi (8 km) of electrical transmission lines that would connect the

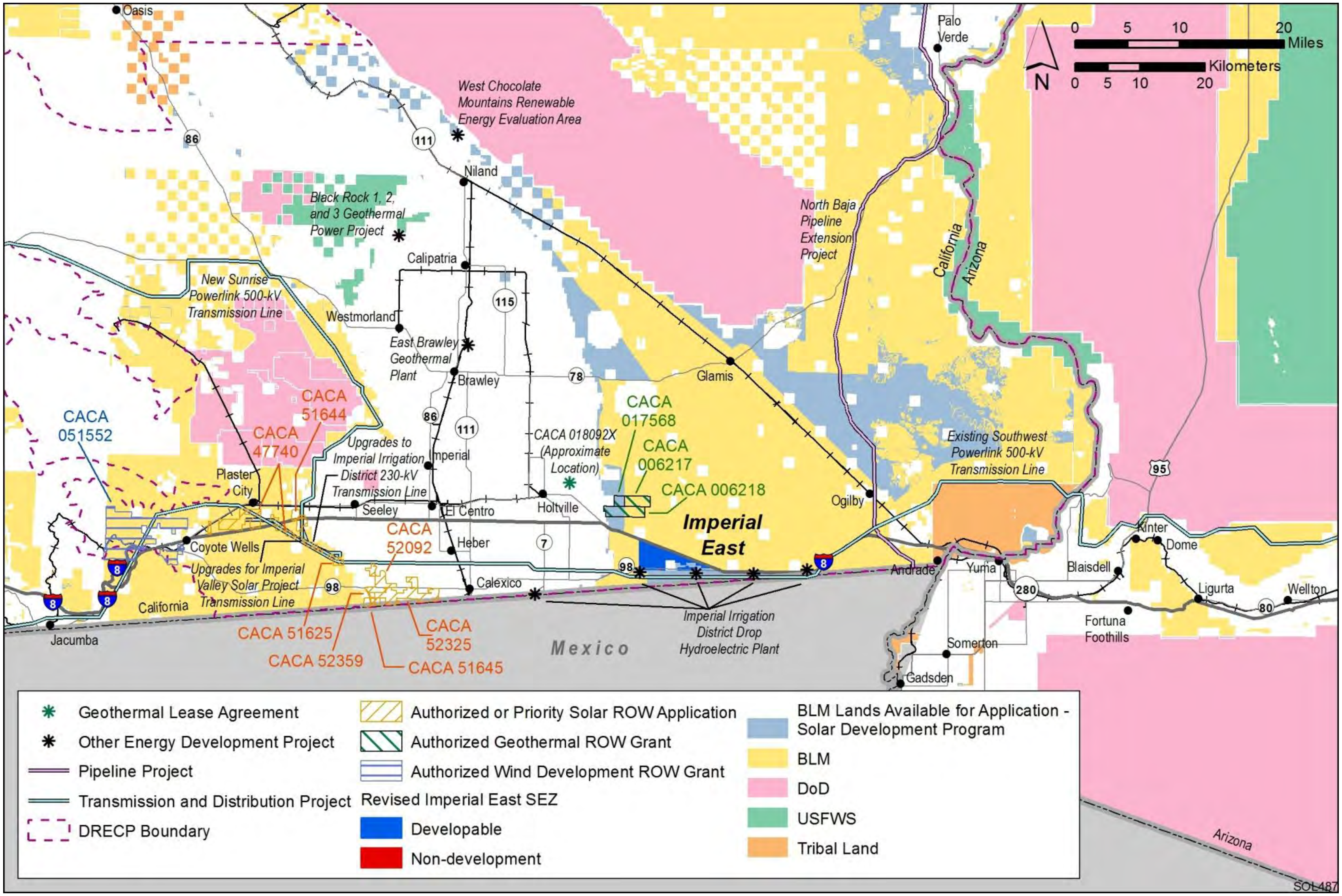

FIGURE 9.1.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Imperial East SEZ as Revised

facility to the existing Imperial Valley Substation via Utility Corridor "N" of BLM's CDCA (BLM 2011c).

The proposed facility would have an estimated requirement of 400 ac-ft (493,000 m^3) of water during the peak 6 months of construction and up to15 ac-ft/yr (18,500 m^3/yr) of water during operation. Water will be drawn from the Westside Main Canal. Construction of the facility will require approximately 250 workers at the peak of construction. Operation of the facility will employ four full-time workers and security guards 24 hours per day. Maintenance workers will be on-site as needed.

Centinela Solar Energy Project (CACA 52092)

Centinela Solar Energy, LLC, proposes to construct and operate a 275-MW PV power plant on a 2,067-acre (8.4-km^2), privately owned site 8 mi (13 km) southwest of the City of El Centro, California, and about 25 mi (40 km) west of the Imperial East SEZ. The facility will be built in two phases: Phase I will be 175 MW, followed by Phase II, the remaining 100 MW. The project also includes construction and operation of electrical transmission lines that would connect the facility to the existing Imperial Valley Substation via Utility Corridor "N" of BLM's CDCA (BLM 2011d).

During operation, about 18 ac-ft/yr (22,000 m^3/yr) of water will be required for washing the PV panels. Construction of the facility will require approximately 360 workers at the peak of construction. Operation of the facility will employ five to seven full-time workers. Maintenance workers will be on-site as needed.

Imperial Solar Energy Center West (CACA 51644)

CSOLAR Development, LLC, proposes to construct and operate a 250-MW PV power plant on a 1,130-acre (4.6-km^2), privately owned site, 8 mi (13 km) west of the City of El Centro, California, and about 25 mi (40 km) west of the Imperial East SEZ. The project also includes construction and operation of 5 mi (8 km) of electrical transmission lines that would connect the facility to the existing Imperial Valley Substation via Utility Corridor "N" of BLM's CDCA (BLM 2011e).

The proposed facility would have an estimated water requirement of 400 ac-ft (493,000 m^3) during the peak 6 months of construction. Water will be drawn from the Westside Main Canal. Water required for PV panel washing is estimated to be 9 ac-ft/yr (11,000 m^3/yr). Construction of the facility will require approximately 285 workers at the peak of construction. Operation of the facility will employ four full-time workers and security guards 24 hours per day. Maintenance workers will be on-site as needed.

Mount Signal Solar Farm

The solar developer 8minutenergy proposes to construct and operate a 600-MW PV power plant on 4,228 acres (17.1 km^2) of privately owned land, approximately 3 mi (5 km) west of the City of Calexico, California, and about 22 mi (35 km) west of the Imperial East SEZ. The project consists of five separate Conditional Use Permit applications: Mount Signal Solar Farm 1, Calexico Solar Farm 1, Phase A; Calexico Solar Farm 1, Phase B; Calexico Solar Farm 2, Phase A; and Calexico Solar Farm 2, Phase B. Each project would have its own operation and maintenance building. The project also includes construction and operation of electrical transmission lines that would connect the facility to the existing Imperial Valley Substation via Utility Corridor "N" of BLM's CDCA (ICPDS 2011a).

The proposed facility would have an estimated peak requirement of 2,415 ac-ft/yr (2,988,000 m^3/yr) of water during construction and an estimated 1,310 ac-ft/yr (1,616,000 m^3/yr) of water during operation. Construction of the facility will require approximately 300 workers at the peak of construction. Operation and maintenance of the facility will employ up to 30 full-time workers.

Ocotillo Express (CACA 51522)

Ocotillo Express, LLC, proposes to construct and operate a 465-MW wind energy facility consisting of 155 wind turbines, each approximately 430 ft (130 m) tall, and associated components on a 12,436-acre (50.3-km^2) site, approximately 22 mi (35 km) west of El Centro, California, and about 45 mi (72 km) west of the Imperial East SEZ. In addition, 487 acres of private and public land outside the project boundaries would be utilized for road access and transmission line ROWs. The facility would connect to the new SDG&E transmission line that will cross the middle of the site (ICPDS 2011b). The proposal combines wind testing authorizations CACA 47518 and CACA 50916.

Water use for the operation and maintenance building is estimated to be 0.19 ac-ft/yr (234 m^3/yr) and will be trucked to the site. Construction of the facility will require approximately 230 workers at the peak of construction. Operation and maintenance of the facility will employ approximately 17 full-time workers.

East Brawley Geothermal Project

Ormat Nevada Inc., LLC, proposes to construct and operate a 49.9-MW geothermal power plant on a parcel consisting of 33.7 acres (0.14 km^2). There are 39 leased parcels encompassing about 3,033 acres (12.3 km^2) that will contain proposed wells (16 production and 16 injection) and pipelines. The total area of disturbance is approximately 188.75 acres (0.76 km^2) and includes two induced draft cooling towers and an operation and maintenance building. The site is just north of the town of Brawley, 40 mi (64 km) northwest of the Imperial East SEZ. The project also includes construction and operation of a 2-mi (3-km) electrical transmission line that would connect the facility to the existing North Brawley 1 substation (ICPDS 2011c).

Cooling tower blowdown will require 5,500 ac-ft/yr (6,780,000 m^3/yr) of water. An expansion of the Brawley Waste Water Treatment Plant to provide tertiary treatment would supply 4,400 ac-ft/yr (5,400,000 m^3/yr), while the remaining 1,100 ac-ft/yr (1,360,000 m^3/yr) would be provided by the Imperial Irrigation District (ICPDS 2011c). Construction of the facility will require approximately 200 workers at the peak of construction. Operation and maintenance of the facility will employ approximately 25 full-time workers.

9.1.22.2.2 Other Actions

There have been no substantive changes to the projects listed in the Draft Solar PEIS.

9.1.22.3 General Trends

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

9.1.22.4 Cumulative Impacts on Resources

Total disturbance in the proposed Imperial East SEZ over 20 years is assumed to be up to about 5,717 acres (23.1 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 Imperial East SEZ may include impacts on water quantity and quality, air quality, ecological resources such as habitat and species, cultural and visual resources, and specially designated lands.

Activities in the region that will contribute to cumulative impacts include five solar projects, one wind project, and one geothermal project within 50 mi (80 km) of the proposed Imperial East SEZ that were not known or considered foreseeable at the time the Draft Solar PEIS was prepared: the Ocotillo Sol Solar Project (14 MW), Imperial Solar Energy Center South (200 MW), Centinela Solar Energy Project (275 MW), Imperial Solar Energy Center West (250 MW), Mount Signal Solar Farm Project (600 MW), Ocotillo Express Wind Project (465 MW), and East Brawley Geothermal Plant (49.9 MW). One reasonably foreseeable project on BLM-administered land (the proposed Imperial Valley Solar Project, about 35 mi (56 km) west of the proposed SEZ) will require additional case processing and environmental review prior to authorization to consider the request to change technology from dish engine to PV. The change in technology for this project will result in lower estimated water use.

In total, the five new solar projects encompass approximately 6,700 acres (27.1 km^2) of additional lands committed to renewable energy development within a 50-mi (80-km) radius of the proposed Imperial East SEZ. The total capacity and land required for all the reasonably foreseeable solar projects listed in Table 9.1.22.2-1 would be about 2,289 MW and 28,183 acres (114.0 km^2), respectively. Thus the cumulative land use impacts have not increased significantly from those presented in the Draft Solar PEIS, and that assessment remains valid for this update.

As stated above, a new wind project and a new geothermal project have also advanced to consideration as reasonably foreseeable since the publication of the Draft Solar PEIS. The new wind project would not affect cumulative water use impacts, but the East Brawley Geothermal Plant represents a potential increase in total water demand of 5,500 ac-ft/yr (6,780,000 m^3/yr). However, this geothermal plant would primarily use treated municipal wastewater from Brawley. In addition, with the change in technology from CSP to PV for the Imperial Valley Solar Project and the elimination of several pending applications, the updated assessment of cumulative impacts from water use would be about the same as that projected in the Draft Solar PEIS, even considering the newly identified projects.

Overall, the incremental cumulative impacts associated with development in the proposed Imperial East SEZ during construction, operation, and decommissioning are expected to be about the same as those analyzed in the Draft Solar PEIS.

9.1.23 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 Imperial East 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 9.1.2 through 9.1.22, this section is not an update of previous analysis for the Imperial East 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 Imperial East SEZ is estimated to have the potential to generate 915 MW of marketable solar power at full build-out.

9.1.23.1 Identification and Characterization of Load Areas

The primary candidates for Imperial East SEZ load areas are the major surrounding cities. Figure 9.1.23.1-1 shows the possible load areas for the Imperial East SEZ and the estimated portion of their market that could be served by solar generation. Possible load areas for the Imperial East SEZ include Yuma and Phoenix, Arizona; Salt Lake City, Utah; Las Vegas and Reno, Nevada; and El Centro, San Diego, Los Angeles, San Jose, San Francisco, Oakland, and Sacramento, California.

FIGURE 9.1.23.1-1 Location of the Proposed Imperial East SEZ and Possible Load Areas (Source for background map: Platts 2011)

The two load area groups examined for the Imperial East SEZ are as follows:

1. Yuma, Arizona; and El Centro, San Diego County, and San Diego, California; and

2. Yuma and Phoenix, Arizona.

Figure 9.1.23.1-2 shows the most economically viable transmission scheme for the Imperial East SEZ (transmission scheme 1), and Figure 9.1.23.1-3 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 915 MW could be fully allocated.

Table 9.1.23.1-1 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.

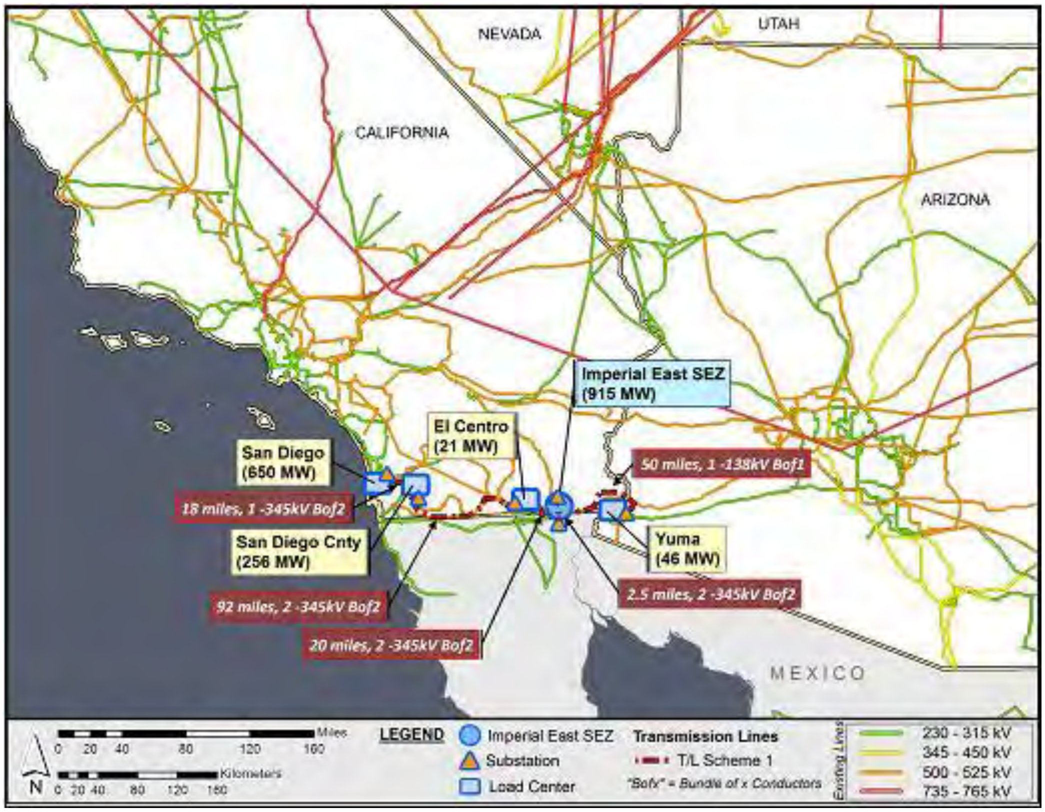

FIGURE 9.1.23.1-2 Transmission Scheme 1 for the Proposed Imperial East SEZ (Source for background map: Platts 2011)

9.1.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the Imperial East SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The new transmission lines(s) would directly convey the 915-MW output of the Imperial East 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 9.1.23.1-2 and 9.1.23.1-3 display the pathways that new dedicated lines might follow to distribute solar power generated at Imperial East SEZ via the two identified transmission schemes described in Table 9.1.23.1-1. 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.

For transmission scheme 1, a new line would be constructed to connect with Yuma (46 MW), El Centro (21 MW), San Diego County (256 MW), and San Diego (625 MW), so that the 915-MW output of the Imperial East SEZ could be fully utilized by these four load centers

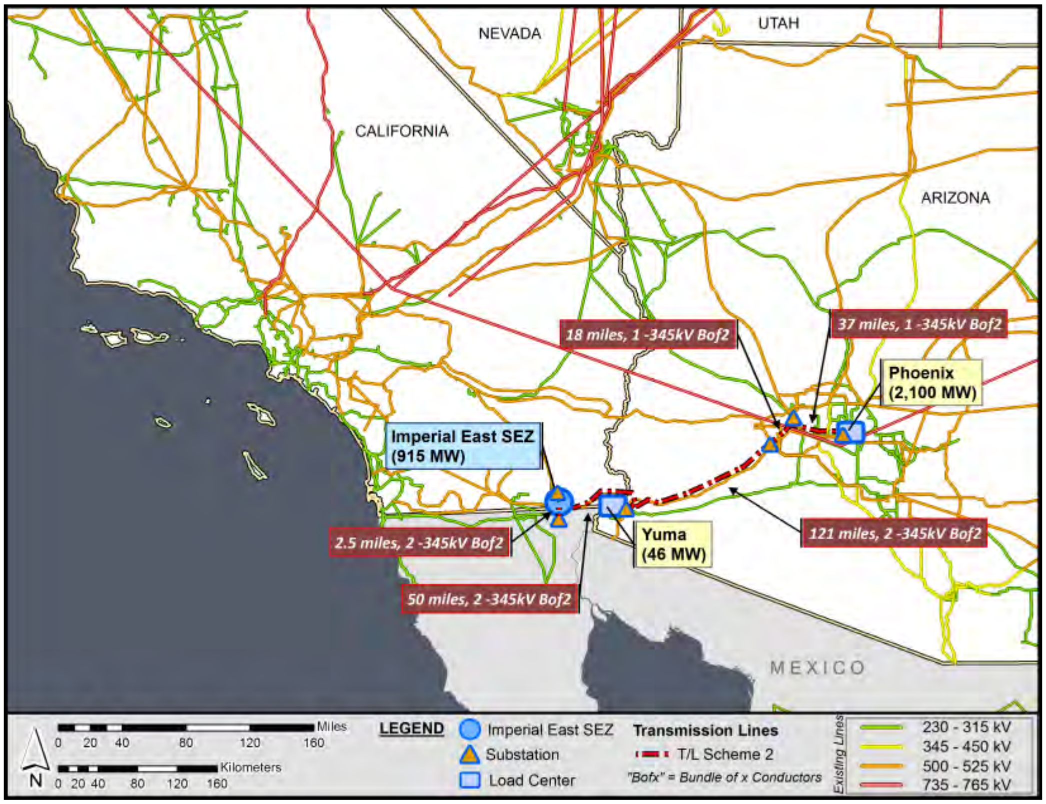

FIGURE 9.1.23.1-3 Transmission Scheme 2 for the Proposed Imperial East SEZ (Source for background map: Platts 2011)

(Figure 9.1.23.1-2). This particular scheme requires four segments. One segment extends to the east from the SEZ to the Yuma area (46 MW) over a distance of about 53 mi (85 km). This segment would require a single-circuit 138-kV bundle of one conductor (Bof1) transmission line design based on engineering and operational considerations. The second segment extends to the west from the Imperial East SEZ to El Centro (21 MW) over a distance of about 23 mi (37 km). This segment would require a double-circuit 345-kV bundle of two conductors transmission line design. The third segment extends to the west from El Centro (21 MW) to the San Diego County area (256 MW) over a distance of about 92 mi (148 km). This segment would require a double-circuit 345-kV bundle of two conductors transmission line design. The fourth segment extends to the west from the San Diego County area (256 MW) to San Diego (625 MW) over a distance of about 18 mi (29 km). This segment would require a single-circuit 345-kV bundle of two conductors transmission line design. In general, the transmission configuration option for each segment was determined by using the line "loadability" curve 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 east, Figure 9.1.23.1-3 shows that new lines would be constructed to connect with Yuma (46 MW) and Phoenix (2,100 MW), so that the 915-MW output of the Imperial East SEZ could be fully utilized by these two load centers. This scheme requires two segments. The first segment extends to the east from the SEZ

TABLE 9.1.23.1-1 Candidate Load Area Characteristics for the Proposed Imperial East SEZ

Transmission Scheme	City/Load Area Name	Position Relative to SEZ	2010 Population[d]	Estimated Total Peak Load (MW)	Estimated Peak Solar Market (MW)
1	Yuma, Arizona[a]	East	92,000	230	46
	El Centro, California[a]	West	42,000	105	21
	San Diego County, California[b]	West	514,000	1,284	256
	San Diego, California[a]	West	1,250,000	3,125	625
2	Yuma, Arizona[a]	East	92,000	230	46
	Phoenix, Arizona[c]	East	4,200,000	10,500	2,100

[a] The load area represents the city named.

[b] The San Diego County load includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[c] The load area represents the metropolitan area of Phoenix (i.e., the city plus adjacent communities).

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

to the Yuma (46 MW) area over a distance of about 53 mi (85 km). This segment would require a double-circuit 345-kV (2-345 kV) bundle of two (Bof2) transmission line design. The second segment runs about 176 mi (283 km) northeast from Yuma to Phoenix (2,100 MW). The second segment requires about 121 mi (195 km) of a double-circuit 345-kV bundle of two transmission line design and about 55 mi (88 km) of a single-circuit 345-kV bundle of two transmission line design.

Table 9.1.23.2-1 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 915 MW (to match the plant's output), while the combined load substations would have a similar total rating of 915 MW. For schemes that require 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 9.1.23.2-1 Potential Transmission Schemes, Estimated Solar Markets, and Distances to Load Areas for the Proposed Imperial East SEZ

Transmission Scheme	City/Load Area Name	Estimated Peak Solar Market (MW)[d]	Total Solar Market (MW)	Sequential Distance (mi)[e]	Total Distance (mi)[e]	Line Voltage (kV)	No. of Substations
1	Yuma, Arizona[a]	46	948	52.5	182.5	138	6
	El Centro, California[a]	21		20		345	
	San Diego County, California[b]	256		92		345	
	San Diego, California[a]	625		18		345	
2	Yuma, Arizona[a]	46	2,146	52.5	228.5	345	6
	Phoenix, Arizona[c]	2,100		176		345	

[a] The load area represents the city named.

[b] The San Diego County load includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[c] The load area represents the metropolitan area of Phoenix (i.e., the city plus adjacent communities).

[d] From Table 9.1.23.1-1.

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

Table 9.1.23.2-2 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 Yuma, El Centro, San Diego County, and San Diego. This scheme is estimated to potentially disturb about 3,317 acres (13.4 km^2) of land. The less favorable transmission scheme with respect to minimizing costs and the area disturbed would be scheme 2, which serves the Yuma 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 4,869 acres (19.7 km^2).

Table 9.1.23.2-3 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 offset 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 Yuma, El Centro, San Diego County, and San Diego. The secondary case (transmission scheme 2), which excludes one or more of the primary pathways used in scheme 1, is less economically attractive and serves the Yuma and Phoenix markets. Note that both schemes exhibit positive NPVs under the current assumption of a 20% utilization factor.

TABLE 9.1.23.2-2 Comparison of the Various Transmission Line Configurations with Respect to Land Use Requirements for the Proposed Imperial East SEZ

Transmission Scheme	City/Load Area Name	Total Distance (mi)[d]	No. of Substations	Land Use (acres)[e] Transmission Line	Substation	Total
1	Yuma, Arizona[a] El Centro, California[a] San Diego County, California[b] San Diego, California[a]	182.5	6	3,295.4	22.0	3,317.4
2	Yuma, Arizona[a] Phoenix, Arizona[c]	228.5	6	4,847.0	22.0	4,869.0

[a] The load area represents the city named.

[b] The San Diego County load includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[c] The load area represents the metropolitan area of Phoenix (i.e., the city plus adjacent communities).

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

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

TABLE 9.1.23.2-3 Comparison of Potential Transmission Lines with Respect to NPV (Base Case) for the Proposed Imperial East 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	Yuma, Arizona[a] El Centro, California[a] San Diego County, California[b] San Diego, California[a]	356.4	60.4	160.3	1,237.9	821.1
2	Yuma, Arizona[a] Phoenix, Arizona[c]	554.8	60.4	160.3	1,237.9	622.7

[a] The load area represents the city named.

[b] The San Diego County load includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[c] The load area represents the metropolitan area of Phoenix (i.e., the city plus adjacent communities).

Table 9.1.23.2-4 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 Imperial East SEZ are as follows:

- Transmission scheme 1, which identifies Yuma, El Centro, San Diego County, and San Diego 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 3,317 acres (13.4 km^2).

- Transmission scheme 2 represents an alternative configuration and serves Yuma and Phoenix. This configuration would result in new land disturbance of about 4,869 acres (19.7 km^2).

- 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 Imperial East SEZ is not sent to either of the two markets identified above, the potential upper-bound impacts in terms of cost would be greater.

TABLE 9.1.23.2-4 Effects of Varying the Utilization Factor on the NPV of the Transmission Schemes for the Proposed Imperial East SEZ

Transmission Scheme	City/Load Area Name	NPV ($ million) at Different Utilization Factors					
		20%	30%	40%	50%	60%	70%
1	Yuma, Arizona[a] El Centro, California[a] San Diego County, California[b] San Diego, California[a]	821	1,440	2,059	2,678	3,297	3,916
2	Yuma, Arizona[a] Phoenix, Arizona[c]	623	1,242	1,861	2,480	3,098	3,717

[a] The load area represents the city named.

[b] The San Diego County load includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[c] The load area represents the metropolitan area of Phoenix (i.e., the city plus adjacent communities).

- The analysis of transmission requirements for the proposed Imperial East SEZ would be expected to show lower costs and less land disturbance if the 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 Imperial East 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.

9.1.24 Impacts of the Withdrawal

The BLM is proposing to withdraw 5,722 acres (23.2 km^2) of public land comprising the proposed Imperial East 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 Imperial East 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 2012). 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 Host 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 Imperial East 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).

9.1.25 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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9.1.26 Errata for the Proposed Imperial East 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 9.1.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

TABLE 9.1.26-1 Errata for the Proposed Imperial East SEZ (Section 9.1 of the Draft Solar PEIS and Section C.2.1 of the Supplement to the Draft Solar PEIS)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
9.1.7.1.2	9.1-52			9.1.7.1-1	The table has been revised to correct soil map areas that were in error in the Draft Solar PEIS (see Table 9.1.7.1-1 in Section 9.1.7 of this Final Solar PEIS).
9.1.11.2					All uses of the term “neotropical migrants” in the text and tables of this section should be replaced with the term “passerines.”

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9.2 IRON MOUNTAIN

As stated at the beginning of this chapter, the Iron Mountain SEZ was dropped from further consideration through the Supplement to the Draft Solar PEIS. This section presents information (with minor updates) provided in Appendix B of the Supplement to the Draft Solar PEIS on the rationale for dropping this SEZ.

9.2.1 Summary of Potential Impacts Identified in the Draft Solar PEIS

The proposed Iron Mountain SEZ, as presented in the Draft Solar PEIS, had a total area of 106,522 acres (431 km^2). It is located in San Bernardino County in southeastern California, about 20 mi (32 km) from the Arizona border (Figure 9.2.1-1). The SEZ is in a mostly undeveloped area, with no population centers within a 20-mi (32-km) radius.

Potential environmental and other impacts identified in the Draft Solar PEIS included the following:

- A potential hazard associated with unexploded military ordnance from past military training activities was identified.

- Wilderness characteristics within the Turtle Mountains, Old Woman Mountains, and Palen-McCoy WAs would be adversely affected by solar development in the SEZ. Scenic resources in the Turtle Mountains ACEC would also be adversely affected. Night-time lighting of solar facility development in the SEZ could adversely affect the quality of the night sky environment as viewed from Joshua Tree NP.

- Recreational users would lose the use of any portions of the SEZ developed for solar energy production. Wilderness recreational use in the Turtle Mountains, Old Woman Mountains, and Palen-McCoy WAs would likely be adversely affected.

- The development of any solar energy facilities that encroach into the airspace of MTRs would create safety issues and would conflict with military training activities.

- Impacts on soil resources (e.g., soil compaction, soil horizon mixing, soil erosion by wind and runoff, sedimentation, and soil contamination) could occur. Danby Lake may not be a suitable location for construction.

- Designation of the SEZ would affect the Danby Lake known sodium leasing area in the northwest corner of the SEZ. Designation of the SEZ could make sand and gravel resources unavailable.

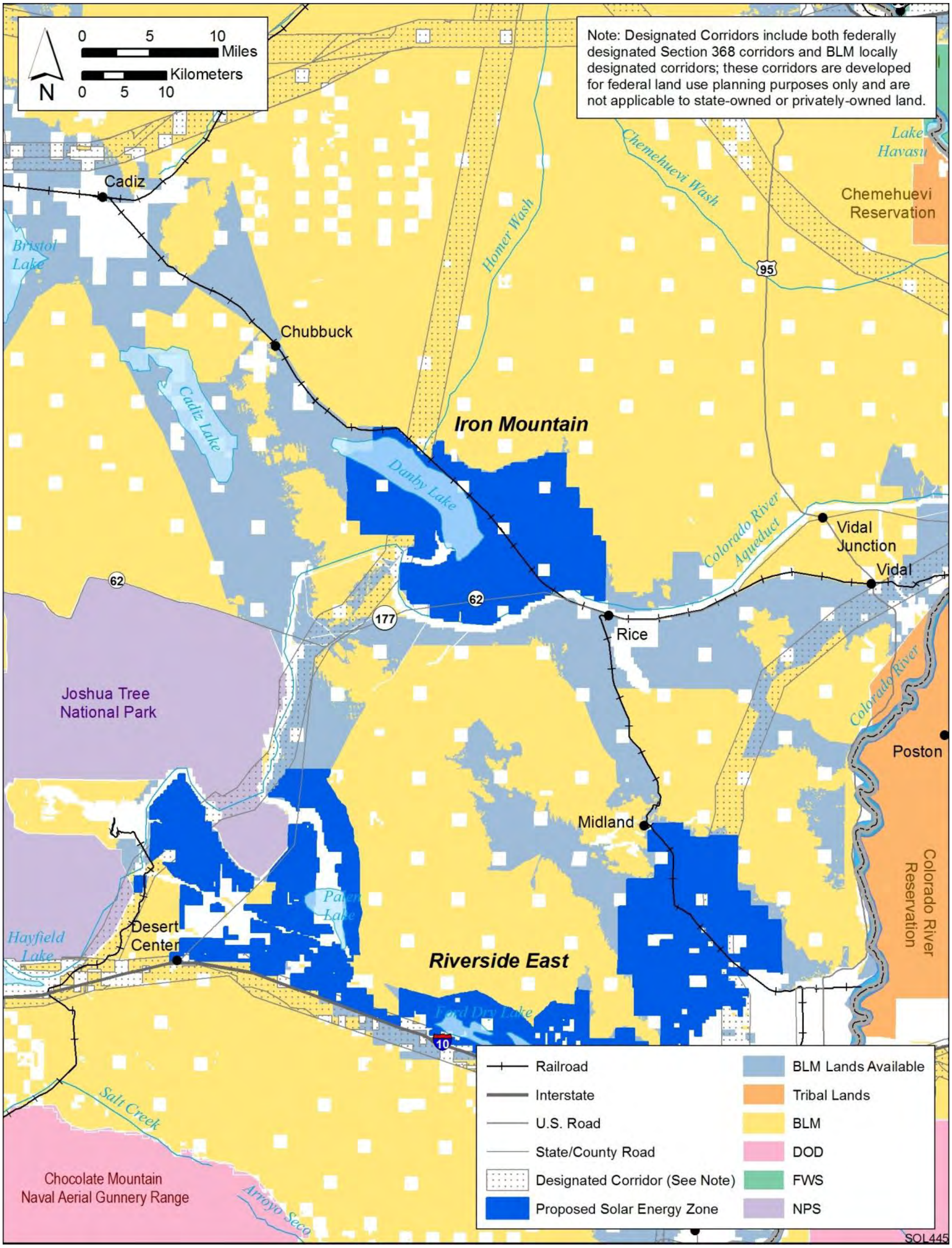

FIGURE 9.2.1-1 Proposed Iron Mountain SEZ as Presented in the Draft Solar PEIS

- Groundwater use would deplete the aquifer to the extent that, at a minimum, wet-cooling options would not be feasible. Hydrological disturbances near Danby Lake could cause localized flooding and erosion, affect groundwater recharge and discharge processes, and disrupt salt-mining operations. High total dissolved solids values of groundwater near the Danby Lake region could produce water that is nonpotable and corrosive to infrastructure.

- Clearing of a large portion of the proposed SEZ could primarily affect sand dune, playa, desert chenopod scrub, riparian, and dry wash communities, depending on the amount of habitat disturbed. The establishment of noxious weeds could result in habitat degradation.

- Potentially suitable habitat for 43 special status species occurs in the affected area of the proposed SEZ; between 1.0 and 7.5% of the potentially suitable habitat for any of these species and any wildlife species occurs in the region that would be directly affected by development.

- If aquatic biota are present in ephemeral water features (e.g., Homer Wash), they could be affected by the direct removal of surface water features within the construction footprint, a decline in habitat quantity and quality due to water withdrawals and changes in drainage patterns, as well as increased sediment and contaminant inputs associated with ground disturbance and construction activities.

- Temporary exceedances of ambient air quality standards for particulate matter at the SEZ boundaries are possible during construction. These high concentrations, however, would be limited to the immediate area surrounding the SEZ boundary. Modeling indicates Class I Prevention of Significant Deterioration (PSD) PM_{10} increments at the nearest federal Class I area (Joshua Tree NP) could be exceeded under conservative assumptions.

- Strong visual contrasts could be observed by visitors to the Palen-McCoy WA and travelers on State Road 62 and Cadiz Road. Moderate to strong visual contrasts could be observed by visitors to the Old Woman Mountains and Turtle Mountains WAs. Moderate visual contrasts could also be observed by visitors to the Rice Valley WA, while weak to moderate visual contrasts could be observed by visitors to the Joshua Tree NP and Joshua Tree WA.

- Noise levels at the nearest residences would be higher during operations than the San Bernardino County and EPA guidance levels if concentrating solar power (CSP) facilities with energy storage technologies (which could extend the daily operational time by 6 hours or more) were used at the SEZ.

- The potential for impacts on significant paleontological and cultural resources is largely unknown. The area around Danby Lake within the SEZ has a high potential to contain paleontological deposits and would require a paleontological survey. Numerous prehistoric and Native American sites and trails are potentially located within the SEZ and could be affected by solar energy development. It is possible that there will be Native American concerns about the Salt Song Trail, which passes just west of the proposed SEZ.

9.2.2 Summary of Comments Received

Many comments on the proposed Iron Mountain SEZ were received; most were in favor of eliminating the area as an SEZ because it contains environmentally and culturally sensitive areas (California Public Utilities Commission, Center for Biological Diversity, Big Pine Paiute of the Owens Valley, California Desert Coalition, Natural Resources Defense Council [NRDC] et al.,[1] Western Watersheds Project [WPP], National Parks Conservation Association, The Nature Conservancy, California Native Plant Society [CNPS], San Manuel Band of Mission Indians, Sierra Club, and Defenders of Wildlife). The Big Pine Paiute of the Owens Valley and the San Manuel Band of Mission Indians were concerned about the direct impacts on significant cultural resources. Many commentors opposed the Iron Mountain SEZ because of its proximity to Joshua Tree NP. The NRDC et al. commented that the SEZ was inconsistent with criteria developed by the conservation community for siting solar facilities in the desert. It was concerned that the SEZ includes 10,007 acres (40 km^2) of Citizen Proposed Wilderness, that development of the SEZ would preclude opportunities to connect Joshua Tree NP with the Mojave Preserve, and that the SEZ is located within a BLM-designated multihabitat management area. The NRDC et al. mentioned that the SEZ was located in an essential habitat-connectivity linkage area for desert bighorn sheep populations.

The Metropolitan Water District of Southern California was concerned about the possible impacts on its facilities and recommended that the BLM also consider cumulative effects of solar energy development on the water district's facilities. The WWP cited multiple conflicts with wildlife and habitat resources and argued that the area provides desert tortoise connectivity between the Northern and Eastern Colorado Desert Tortoise Recovery Units and contains habitat for rare plants. The National Parks Conservation Association was opposed to the SEZ because it would require significant infrastructure, would have adverse impacts on night sky resources in Joshua Tree NP, and would inhibit wildlife movements among the Mojave National Preserve, several wilderness areas to the south of the SEZ, and Joshua Tree NP.

The California Energy Commission (CEC) commented that the SEZ is not ideal for solar energy development but did not recommend eliminating the SEZ. The CEC recommended that the BLM make development of the Iron Mountain SEZ a low priority because of its remote location and high-value Mojave desert tortoise habitat corridors. The CNPS argued against

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[1] The Natural Resources Defense Council, Audubon Society, California Native Plant Society, California Wilderness Coalition, Californians for Western Wilderness, Defenders of Wildlife, the National Parks Conservation Association, Point Reyes Bird Observatory Conservation Science, Sierra Club, The Wilderness Society, and The Wildlands Conservancy submitted joint comments on the proposed California SEZs. Those comments are attributed to NRDC et al.

designation of Iron Mountain as an SEZ because it contains ecologically important vegetation communities and because numerous prehistoric and historic sites have been identified within the SEZs. Like other environmental groups, the Sierra Club commented that the development of the SEZ would have adverse impacts on desert tortoise and sensitive biological, cultural, and visual resources. Last, the Citizens for the Chuckwalla Valley were concerned about possible environmental justice impacts on people in the nearby communities of Rice, Blythe, and Desert Center.

9.2.3 Rationale for Eliminating the SEZ

On the basis of public comments received on the Draft Solar PEIS, review by the BLM, and continued review of potential impacts identified in the Draft Solar PEIS, the Iron Mountain SEZ was eliminated from further consideration and will not be identified as an SEZ in applicable land use plans. The potential impacts from solar development in the proposed Iron Mountain SEZ were considered sufficient reason to eliminate the area from further consideration.

Because of the extensive potential impacts from solar development in the proposed Iron Mountain SEZ, the lands that composed the SEZ as presented in the Draft Solar PEIS will be considered solar ROW exclusion areas; that is, applications for solar development on these lands will not be accepted by the BLM.

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9.3 PISGAH

As stated at the beginning of this chapter, the Pisgah SEZ was dropped from further consideration through the Supplement to the Draft Solar PEIS. This section presents the information (with minor updates) provided in Appendix B of the Supplement to the Draft Solar PEIS on the rationale for dropping this SEZ.

9.3.1 Summary of Potential Impacts Identified in the Draft Solar PEIS

The proposed Pisgah SEZ, as presented in the Draft Solar PEIS, had a total area of 23,950 acres (97 km^2). It is located in San Bernardino County in southeastern California (Figure 9.3.1-1). The City of Barstow is located about 25 mi (40 km) to the west of the SEZ. A few residences are close to the northwestern and southwestern boundaries of the proposed SEZ. The nearest population center, however, is Newberry Springs, which is located about 6 mi (10 km) to the west.

A designated Section 368 energy corridor[1] occupies a portion of the SEZ and could limit development in the SEZ if the corridor were developed, because solar facilities cannot be constructed under transmission lines or over pipelines. Further, the Draft Solar PEIS discussion of impacts of solar energy development in the SEZ acknowledged that solar facility development on both sides of the corridor would limit the ability to add future corridor capacity.

Potential environmental and other impacts identified in the Draft Solar PEIS included the following:

- Wilderness characteristics in 20% of the Cady Mountain Wilderness Study Area (WSA) and 27% of the Rodman Mountain WA would be adversely affected by solar development in the SEZ. The Ord-Rodman Desert Wildlife Management Area and Pisgah ACEC abut portions of the Pisgah SEZ and would be vulnerable to increased human traffic induced by the presence of the SEZ. The Rodman Mountains Cultural Area would also be vulnerable to increased traffic.

- The presence of solar development in the SEZ likely would adversely affect recreational use of the Cady Mountains WSA and Rodman Mountains WA. Opportunities for primitive recreation surrounding the SEZ would be reduced.

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[1] Section 368 of the Energy Policy Act of 2005 (P.L. 109-58) required federal agencies to engage in transmission corridor planning (see Section 1.6.2.1 of the Draft Solar PEIS). As a result of this mandate, the BLM, DOE, USFS, and DoD prepared a PEIS to evaluate the designation of energy corridors on federal lands in 11 western states, including the 6 states evaluated in this study (DOE and DOI 2008). The BLM and USFS issued RODs to amend their respective land use plans to designate numerous corridors, often referred to as Section 368 corridors.

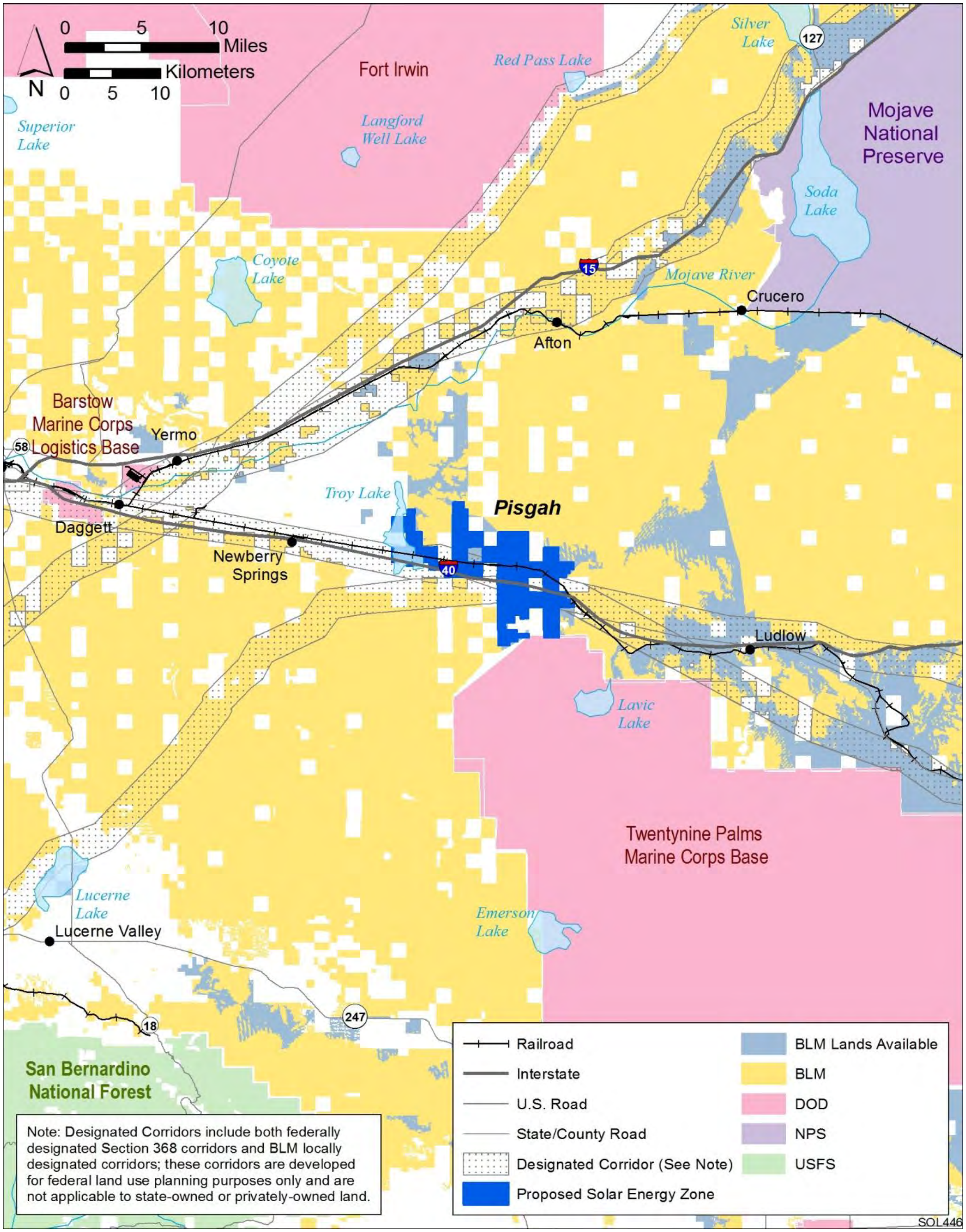

FIGURE 9.3.1-1 Proposed Pisgah SEZ as Presented in the Draft Solar PEIS

- The development of any solar energy facilities that encroach into the airspace of MTRs could conflict with military training activities and create a safety concern.

- Impacts on soil resources (e.g., soil compaction, soil horizon mixing, soil erosion by wind and runoff, sedimentation, and soil contamination) could occur. The Pisgah lava field may not be a suitable location for construction.

- Currently, 103 mining claims occur within the SEZ; most of these are in the area south of I-40, where there has been a mining operation for many years. These mining claims represent a prior existing right that, if valid, likely would preclude solar energy development as long as they are in place.

- Groundwater use would deplete the aquifer to the extent that, at a minimum, wet-cooling options would not be feasible.

- Clearing of a large portion of the proposed SEZ could primarily affect sand dune, playa, desert chenopod scrub, and dry wash communities, depending on the amount of habitat disturbed. The establishment of noxious weeds could result in habitat degradation.

- Potentially suitable habitat for 54 special status species occurs in the affected area of the proposed SEZ; less than 3% of the potentially suitable habitat for any of these species and any wildlife species occurs in the region that would be directly affected by development.

- If aquatic biota are present, they could be affected by the direct removal of surface water features within the construction footprint, a decline in habitat quantity and quality due to water withdrawals and changes in drainage patterns, as well as increased sediment and contaminant inputs associated with ground disturbance and construction activities.

- Temporary exceedances of ambient air quality standards for particulate matter at the SEZ boundaries are possible during construction. These high concentrations, however, would be limited to the immediate area surrounding the SEZ boundary.

- The SEZ is located within the CDCA, and substantial, non-mitigable visual impacts would occur within the CDCA in the SEZ and surrounding lands. Strong visual contrasts could be observed by travelers on Historic Route 66 and the Burlington Northern Santa Fe Amtrak passenger rail line. Moderate to strong visual contrasts could be observed by visitors to the Rodman Mountains and Cady Mountains WAs. Moderate visual contrasts could also be observed from the community of Newberry Springs, while weak to moderate visual contrasts could be observed by visitors to the Newberry Mountains WA.

- During construction, noise levels at the nearest residences would be higher than the San Bernardino County regulation and the EPA guidance levels. During operations, noise levels at the nearest residences would be above San Bernardino County and EPA guidance levels if CSP technologies with energy storage technologies (which could extend the daily operational time by 6 hours or more) were used at the SEZ. Noise levels at the nearest residence would be slightly higher than the San Bernardino County regulation if the SEZ were developed with dish engine facilities.

- The potential for impacts on significant paleontological and cultural resources is relatively unknown but could be high in some areas. Numerous prehistoric and Native American sites and trails are potentially located within the SEZ and could be affected by solar energy development. The SEZ includes plant species and could contain game species important to Native Americans. Ground-disturbing activities have the potential for adversely affecting these resources, along with archaeological resources and burials important to Native Americans.

- Both minority and low-income populations occur within a 50-mi (80-km) radius of the proposed SEZ boundary; thus adverse impacts of solar development could disproportionately affect minority and low-income populations.

9.3.2 Summary of Comments Received

Many comments were received on the proposed Pisgah SEZ; most were in favor of eliminating the area as an SEZ because it contains environmentally and culturally sensitive areas (Center for Biological Diversity, Big Pine Paiute of the Owens Valley, California Desert Coalition, NRDC et al.,[2] WWP, The Nature Conservancy, CNPS, San Manuel Band of Mission Indians, Sierra Club, and Defenders of Wildlife). Pacific Gas and Electric Company recommended changing the SEZ boundaries to eliminate inappropriate areas from consideration. The Big Pine Paiute of the Owens Valley, the San Manuel Band of Mission Indians, and the NRDC et al. were concerned about the direct impacts on significant cultural resources. The NRDC et al. commented that the SEZ is incompatible with the BLM’s conservation responsibilities under the ESA, Federal Land Policy and Management Act, and its own wildlife resource manuals. The NRDC et al. mentioned that the SEZ is located in an area of essential habitat connectivity and recommended that cumulative impacts on the value of the area as a wildlife corridor be addressed.

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2 The National Resources Defense Council, Audubon Society, California Native Plant Society, California Wilderness Coalition, Californians for Western Wilderness, Defenders of Wildlife, the National Parks Conservation Association, Point Reyes Bird Observatory Conservation Science, Sierra Club, The Wilderness Society, and The Wildlands Conservancy submitted joint comments on the proposed California SEZs. Those comments are attributed to NRDC et al.

The Metropolitan Water District of Southern California was concerned about socioeconomic impacts, including any financial or ratepayer impacts from development of the SEZ, and recommended that the BLM also consider cumulative effects of solar energy development on the water district's facilities. The WWP cited multiple conflicts with wildlife and habitat resources and argued that there would be impacts on bighorn sheep movement. The WWP was also concerned that the area provides the only connectivity between tortoises in the Southern Mojave and Central Mojave populations, and that development of the SEZ would affect connectivity between the West Mojave recovery unit and the eastern desert tortoise recovery units. The area is also adjacent to two ACECs and a WSA. The California Public Utilities Commission and other groups expressed concern for desert tortoise habitat located within and near the SEZ.

The Wilderness Society et al.[3] expressed concern for the golden eagle population near the SEZ and indicated that development in the proposed Pisgah SEZ would constitute a "take" of golden eagles, because it would disturb and destroy the foraging habitat of nearby golden eagles. The CNPS argued against designation of Pisgah as an SEZ because it is regionally significant in sustaining biological diversity and because development in the SEZ could result in loss of habitat and displacement of many species, including sensitive species. Like other environmental groups, the Sierra Club commented that the development of the SEZ would have adverse impacts on desert tortoise and sensitive biological, cultural, and visual resources. San Bernardino County recommended that only dry-cooling technologies be allowed.

9.3.3 Rationale for Eliminating the SEZ

On the basis of public comments received on the Draft Solar PEIS, review by the BLM, and continued review of potential impacts identified in the Draft Solar PEIS, the Pisgah SEZ was eliminated from further consideration and will not be identified as an SEZ in applicable land use plans. The potential impacts from solar development in the proposed Pisgah SEZ were considered sufficient reason to eliminate the area from further consideration as an SEZ.

Because of the extensive potential impacts from solar development, most of the lands that had composed the Pisgah SEZ will be considered solar ROW exclusion areas; that is, applications for solar development on those lands will not be accepted by the BLM. This includes specific lands identified as solar development avoidance areas during the environmental review process for the approved Calico Solar Project (CACA 49537), which composes more than 4,600 acres (19 km^2) within the SEZ.

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[3] The Wilderness Society, National Resources Defense Council, Defenders of Wildlife, Sonoran Institute, Wild Utah Project, New Mexico Wilderness Alliance, Tucson Audubon Society, Audubon Wyoming, Friends of Ironwood Forest, Arizona Wilderness Coalition, Southern Utah Wilderness Alliance, California Wilderness Coalition, Nevada Conservation League & Education Fund, Nevada Wilderness Project, Audubon New Mexico, Soda Mountain Wilderness Council, Center for Native Ecosystems, Western Environmental Law Center, Californians for Western Wilderness, Gila Resources Information Project, Gila Conservation Coalition, National Audubon Society, San Luis Valley Ecosystem Council and the Sierra Club submitted joint comments on the Draft Solar PEIS. Those comments are attributed to The Wilderness Society et al.

9.3.4 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.

DOE and DOI (U.S. Department of Energy and U.S. Department of the Interior), 2008, *Programmatic Environmental Impact Statement, Designation of Energy Corridors on Federal Land in the 11 Western States,* DOE/EIS-0386, Nov. Available at http://corridoreis.anl.gov/documents/index.cfm.

9.4 RIVERSIDE EAST

9.4.1 Background and Summary of Impacts

9.4.1.1 General Information

The proposed Riverside East SEZ is located in Riverside County in southeastern California. In 2008, the county population was 84,443. The small town of Desert Center is located at the far southwestern edge of the SEZ, along I-10, which runs east–west along the southern boundary of the SEZ. Other paved roads that cross parts of the Riverside East SEZ include State Route 177, which runs north–south through the western section of the SEZ, and Midland Road, which crosses the northeastern portion of the SEZ. U.S. 95 runs north–south about 3 mi (5 km) from the eastern boundary of the SEZ and through the City of Blythe, which is located about 6 mi (10 km) southeast of the SEZ. The nearest operating railroad is the ARZC Railroad, which passes through Rice, about 18 mi (29 km) north of the large eastern section of the proposed Riverside East SEZ.

As of October 28, 2011, two solar projects totaling 1,250 MW and about 9,000 acres had been approved within the proposed Riverside East SEZ, and seven additional solar project applications were pending in the SEZ. The combined areas of these approved projects and pending applications covers about 57,000 acres (534 km^2)of the proposed SEZ; the combined projected capacity is 4,000 MW. There is an additional approved 550-MW PV project on BLM-administered lands under construction adjacent to the western boundary of the SEZ.

As published in the Draft Solar PEIS (BLM and DOE 2010), the proposed Riverside East SEZ had a total area of 202,896 acres (821 km^2). In the Supplement to the Draft Solar PEIS (BLM and DOE 2011), the size of the SEZ was reduced, eliminating 43,439 acres (176 km^2) in the northwest portion of the SEZ (see Figure 9.4.1.1-1). Eliminating this area is primarily intended to reduce impacts on Joshua Tree NP. In addition, 11,547 acres (47 km^2) within the SEZ boundaries have been identified as non-development areas (see Figure 9.4.1.1-2). These areas consist of intermittent lakes, major washes, and areas identified for non-development through investigations for approved projects. The remaining developable area within the SEZ is 147,910 acres (599 km^2).

Because of the extensive potential impacts from solar development in the portion of the Riverside East SEZ that has been eliminated, those lands are proposed as solar ROW exclusion areas; that is, applications for solar development on these lands will not be accepted by the BLM. In addition, lands within the SEZ identified during investigations for approved projects as areas where solar energy development should not occur will be defined as non-development areas. All proposed projects within the Riverside East SEZ will continue to be reviewed by California's Renewable Energy Action Team to ensure consistency with the ongoing efforts of the DRECP (see Section 1.6.2.3).

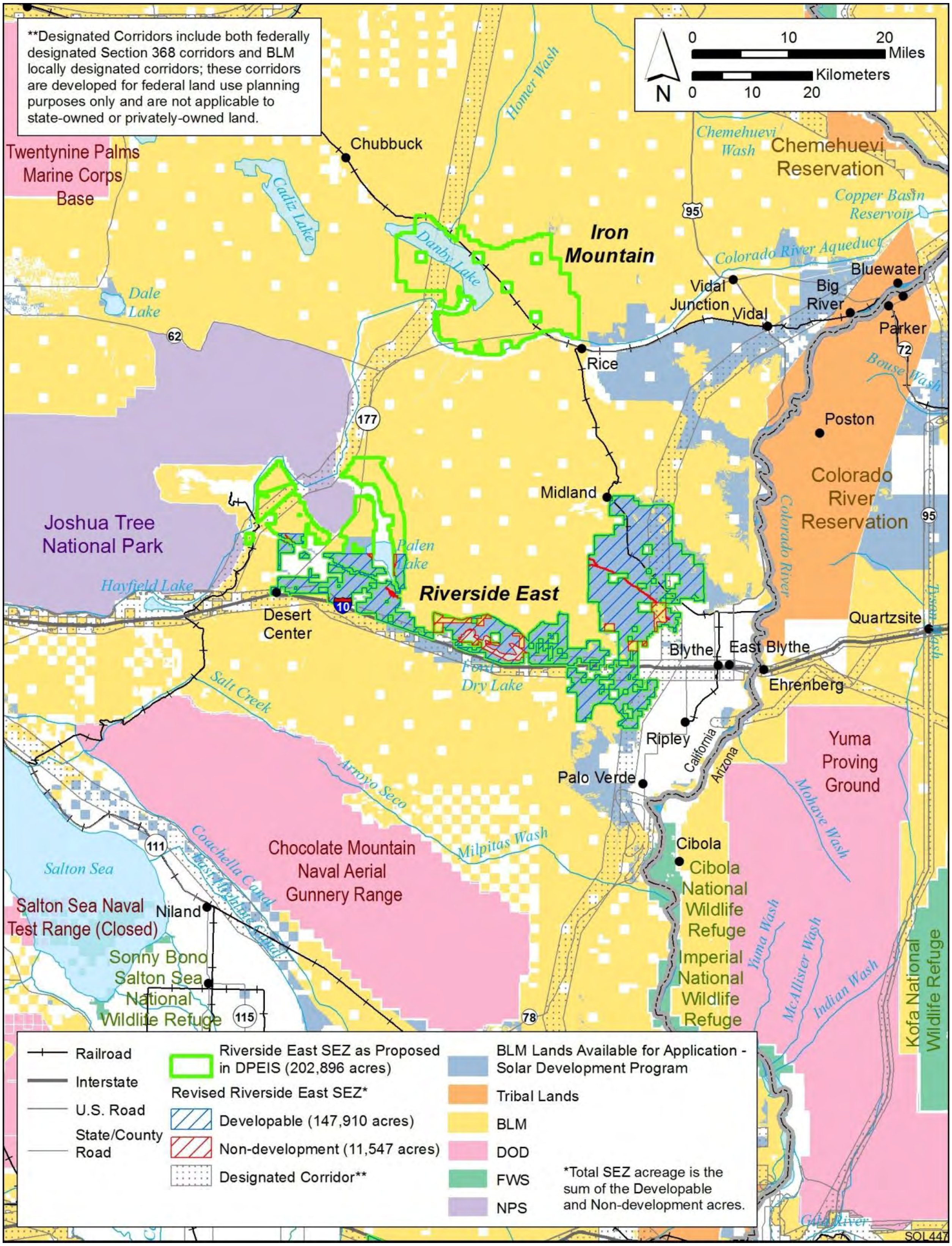

FIGURE 9.4.1.1-1 Proposed Riverside East SEZ as Revised

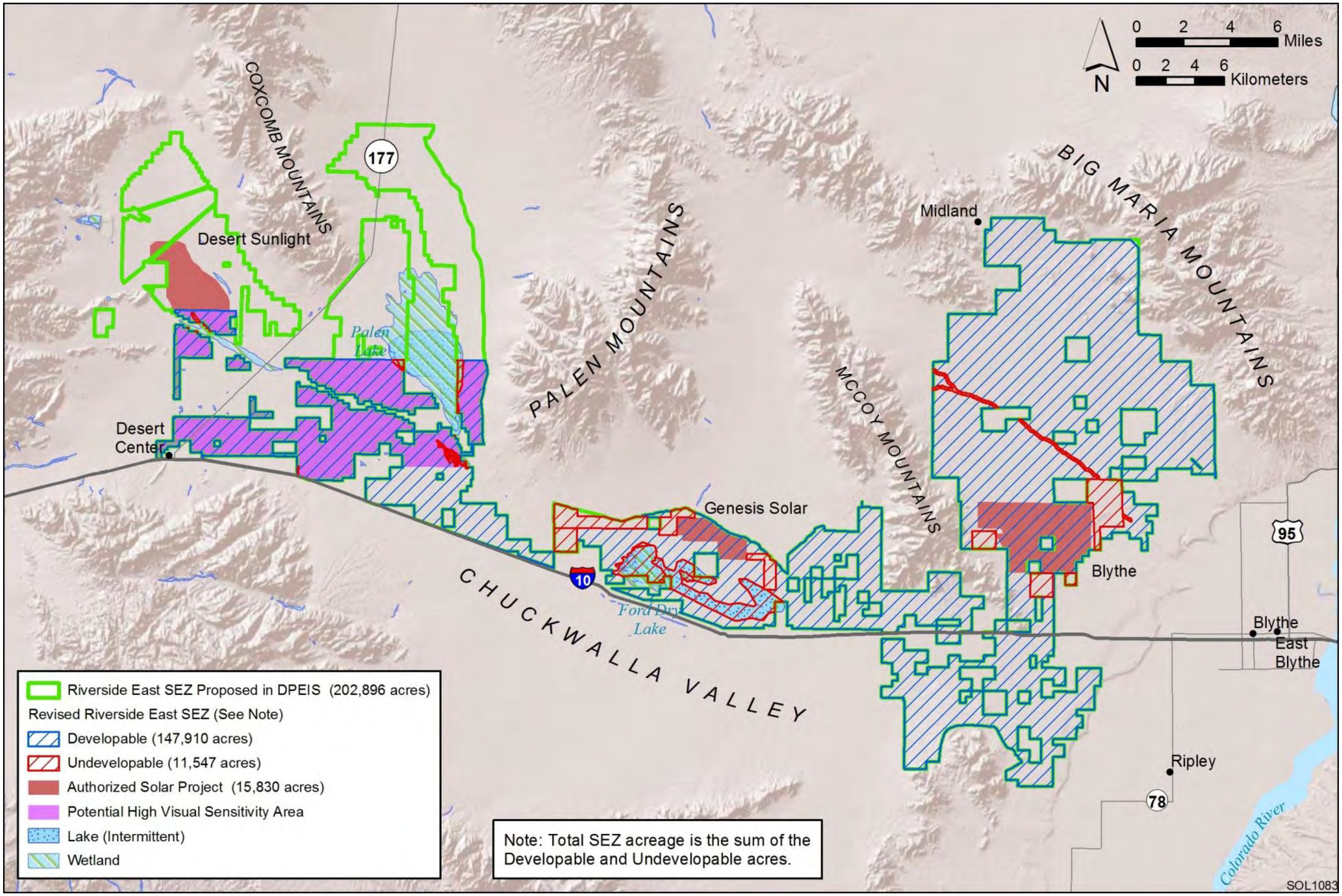

FIGURE 9.4.1.1-2 Developable and Non-development Areas for the Proposed Riverside East SEZ as Revised

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 Riverside East SEZ as described in the Draft Solar PEIS.

9.4.1.2 Development Assumptions for the Impact Analysis

Maximum solar development of the proposed Riverside East SEZ is assumed to be 80% of the developable SEZ area over a period of 20 years, a maximum of 118,328 acres (479 km^2) (the actual area developed may be less). Full development of the Riverside East SEZ would allow development of facilities with an estimated total of between 13,148 MW (power tower, dish engine, or PV technologies, 9 acres/MW [0.04 km^2/MW]) and 23,666 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 Riverside East SEZ, the nearest existing transmission line as identified in the Draft Solar PEIS is a 500-kV transmission line that runs through the SEZ. In addition, a 69-kV line passes through the eastern portion of the SEZ. It is possible that these existing lines could be used to provide access from the SEZ to the transmission grid, but the capacity of these lines would not be adequate for 13,148 to 23,666 MW of new capacity. Therefore, at full build-out capacity, new transmission lines and upgrades of existing transmission lines would be required to bring electricity from the proposed Riverside East SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Riverside East SEZ and a general assessment of the impacts of constructing and operating all new transmission facilities for those load centers are provided in Section 9.4.23. 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 any new transmission construction and/or line upgrades for any projects proposed within the SEZ.

The Riverside East SEZ overlaps a Section 368 federally designated energy corridor along I-10.[1] In addition, there is one north–south locally designated transmission corridor located in the western portion of the SEZ. 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 these corridors. The development of solar facilities and existing corridors will be dealt with by the BLM on a case-by-case basis; see Section 9.4.2.2 on impacts on lands and realty for further discussion.

For the proposed Riverside East SEZ, I-10 passes along the southern edge of the SEZ, and there are several exits from I-10 as it passes by and through the SEZ. Existing road access to

1 Section 368 of the Energy Policy Act of 2005 (P.L. 109-58) required federal agencies to engage in transmission corridor planning (see Section 1.6.2.1 of the Draft Solar PEIS). As a result of this mandate, the BLM, DOE, USFS, and DoD prepared a PEIS to evaluate the designation of energy corridors on federal lands in 11 western states, including the 6 states evaluated in this study (DOE and DOI 2008). The BLM and USFS issued RODs to amend their respective land use plans to designate numerous corridors, often referred to as Section 368 corridors.

the proposed Riverside East SEZ should be adequate to support construction and operation of solar facilities. No additional road construction outside of the SEZ is assumed to be required to support solar development, as summarized in Table 9.4.1.2-1.

9.4.1.3 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 9.4.2 through 9.4.22) 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 Riverside East SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Riverside East 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

TABLE 9.4.1.2-1 Assumed Development Acreages, Solar MW Output, and Locations of Nearest Major Road and Transmission Line for the Proposed Riverside East 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[d]
147,910 acres[a] and 118,328 acres	13,148MW[b] 23,666 MW[c]	Adjacent (I-10)	Through the SEZ, 500 kV	0 acres	Through the SEZ[e]

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

[e] A Section 368 federally designated 2-mi (3-km) wide energy corridor runs adjacent to the south boundary of the SEZ.

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 9.4.2 through 9.4.22.

9.4.2 Lands and Realty

9.4.2.1 Affected Environment

The boundaries of the proposed Riverside East SEZ have been revised, reducing the total acreage of the area from 202,896 acres (821 km^2) to 159,457 (645 km^2). Most of the acreage that was eliminated was located in the western portion of the SEZ near Joshua Tree NP. Within the remaining SEZ, an additional 11,547 acres (46.7 km^2) have been identified as non-development areas for various reasons, including the presence of intermittent lakes and major drainages; areas also have been identified for non-development through investigations of specific applications for solar energy development. Since the Draft Solar PEIS was published, two utility-scale solar energy projects have been approved within the SEZ in the central and eastern portions of the proposed SEZ (Genesis Solar and Blythe Solar, respectively). The Desert Sunlight PV project (previously inside the boundaries of the proposed SEZ but now adjacent to the western boundary of the SEZ) has also been approved. There are an additional seven pending projects within the area of the proposed SEZ. With the revision of the SEZ boundaries, the SEZ is no longer adjacent to the Colorado River Aqueduct. Two designated energy corridors still pass through the SEZ. The remaining description of the affected environment in the Draft Solar PEIS remains valid.

9.4.2.2 Impacts

Full development of the SEZ is anticipated to disturb about 118,328 acres (479 km^2), create a very large and continuous industrial-type area along a 45-mi (72-km) stretch of I-10, and exclude many existing and potential uses of the public land. Solar development along I-10, CA 177, and Midland Road would fundamentally change the viewscape of these areas for the traveling public. Because of the interspersed nature of private and public lands in the western portion of the proposed SEZ, solar development will likely raise concerns for some private landowners. There are approximately 11,640 acres (47 km^2) of private and state lands located within the external boundaries of or in near proximity to the SEZ that could be used for solar development in a manner similar to public lands if the landowners agree. Roads and trails that cross solar development areas could be closed to public use. Based on the analysis of applications for solar energy development both approved and filed to date, there is a high likelihood of isolating public lands in and around solar energy facilities such that these lands would not be readily accessible and may be hard to manage.

The Riverside East SEZ partially overlaps one Section 368 federally designated energy corridor and one locally designated transmission corridor. These existing corridors will be used primarily for the siting of transmission lines and other infrastructure such as pipelines. These existing corridors will be the preferred locations for any transmission development that is required to support solar development and future transmission grid improvements related to the build-out of the Riverside East SEZ. Any use of the corridor lands within the Riverside SEZ for solar energy facilities, such as solar panels or heliostats, must be compatible with the future use of the existing corridors. The BLM will assess solar projects in the vicinity of existing corridors on a case-by-case basis, and it will review and approve individual project plans of development to ensure compatible development that maintains the use of the corridor.

9.4.2.3 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 will 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 induced land use changes, if any, on nearby or adjacent state and private lands will not be fully mitigated.

No SEZ-specific design features for lands and realty have been identified through this Final Solar PEIS. Some SEZ-specific design features may be established for parcels within the Riverside East SEZ through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.4.3 Specially Designated Areas and Lands with Wilderness Characteristics

9.4.3.1 Affected Environment

The proposed Riverside SEZ is near or adjacent to Joshua Tree NP, seven designated WAs (including wilderness within Joshua Tree NP), and eight ACECs. The revised northwestern boundary of the proposed SEZ between the Coxcomb and Palen Mountains removes the area within the SEZ where solar development could be located very near to the National Park boundary and to the western boundary of the BLM-administered Palen-McCoy WA. The movement of the boundary in the very northwest corner of the SEZ between the Coxcomb and Eagle Mountains also moves the SEZ boundary farther from the National Park, but the approved Desert Sunlight project is located within the area that is no longer part of the SEZ. The remainder of the area removed from the proposed SEZ in the Draft Solar PEIS is now identified as an exclusion area for development of solar energy facilities.

A change from the Supplement to the Draft Solar PEIS is that the proposed technology restrictions have been removed in favor of identifying the visually sensitive areas that would be evaluated when solar energy development is considered through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

A recent inventory of wilderness characteristics has identified an area of about 20,000 acres (81 km^2) that possesses wilderness characteristics located on the valley floor adjacent to the foot of the eastern side of the McCoy Mountains. This area contains numerous channels that are tributary to McCoy Wash and is part of the area identified as desert tortoise connectivity habitat. Portions of the area likely would be classified as microphyll woodland because of the density of ironwood present. Approximately 11,925 acres (48.3 km^2) of this area is located within the boundary of the proposed SEZ (Figure 9.4.3.1-1).

9.4.3.2 Impacts

Moving the northwestern boundary of the proposed SEZ originally located between the Coxcomb and Palen Mountains to the south substantially reduces potential visual impacts on this part of Joshua Tree NP and designated wilderness within the park and on BLM-administered wilderness resources in the western side of the Palen-McCoy WA. Moving the boundary of the very northwestern portion of the proposed SEZ located between the Coxcomb and Eagle Mountains to the south prevents additional solar development on BLM-administered public lands in this area near the National Park. Designation of the lands removed from the proposed SEZ in the Draft Solar PEIS as solar exclusion areas will prevent future solar development of these areas. The BLM-authorized Desert Sunlight project in this area is now outside of the proposed SEZ boundary, but the impacts of this project will remain. Solar energy development within the revised SEZ boundary would still be very visible to portions of the National Park and designated wilderness and to surrounding BLM wilderness areas, and would still adversely affect these resources. Visual impacts of solar energy development within the western portion of the revised SEZ will be dependent upon the technologies employed and the mitigation measures required.

Except for the reduction of the potential impact on wilderness resources on the eastern side of the National Park and on the western border of the Palen-McCoy WA, the impacts on wilderness resources in the Palen-McCoy (on the southwestern and southern boundaries), Rice Valley, Big Maria Mountains, and Chuckwalla and Little Chuckwalla Mountains WAs and in the seven ACECs that are described in the Draft Solar PEIS remain valid.

The BLM is proposing that the 11,925 acres (48.3 km^2) of lands possessing wilderness characteristics within the SEZ east of the McCoy Mountains not be managed to protect those wilderness characteristics. The BLM has determined that the Riverside East SEZ has generally low resource conflict and high potential for solar energy development including access to transmission. The BLM has identified utility-scale solar energy development on public lands as a potentially important component in meeting the nation's energy goals and objectives in applicable orders and mandates (see Sections 1 and 1.1 of this Final Solar PEIS). The build out of the Riverside East SEZ for utility-scale solar energy development and the associated infrastructure would likely create impacts that would limit the BLM's effectiveness in managing

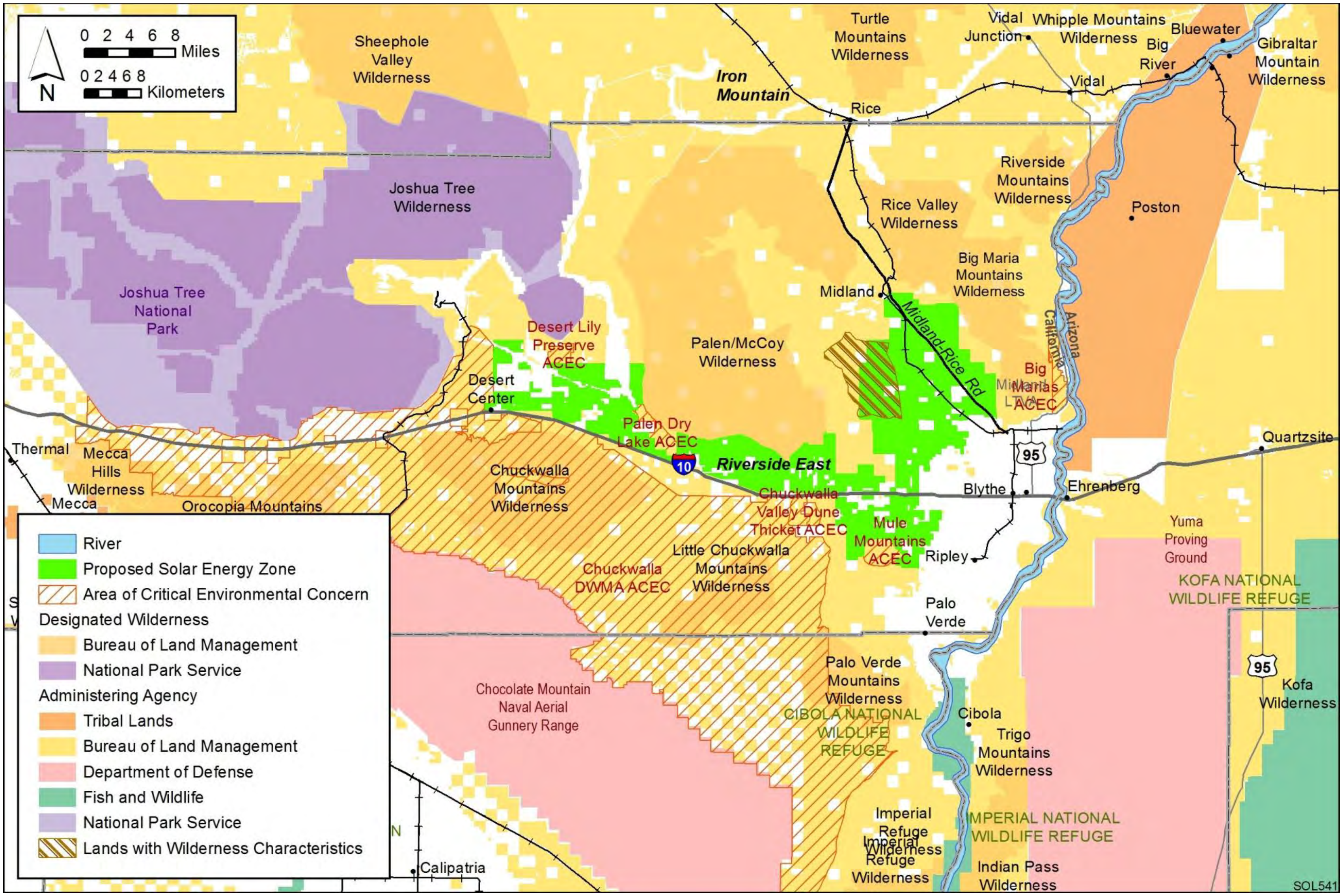

FIGURE 9.4.3.1-1 Specially Designated Areas and Lands with Wilderness Characteristics in the Vicinity of the Proposed Riverside East SEZ as Revised

to protect the subject lands with wilderness characteristics. Solar development on or near to these lands would eliminate the wilderness characteristics that currently exist. Solar energy development within the SEZ would also likely eliminate or adversely affect the wilderness characteristics on the remaining approximately 8,000 acres (32.3 km^2) of land possessing wilderness characteristics that are adjacent to the proposed SEZ boundary.

9.4.3.3 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 but will not mitigate all adverse impacts on the National Park and on wilderness characteristics in both the National Park and BLM-administered wilderness.

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:

- Once construction of solar energy facilities begins, the BLM would monitor whether there are increases in human traffic to the seven ACECs in and near the SEZ and determine whether additional design features are required to protect the resources in these areas.

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.

9.4.4 Rangeland Resources

9.4.4.1 Livestock Grazing

9.4.4.1.1 Affected Environment

As presented in the Draft Solar PEIS, there are no active grazing allotments in the proposed Riverside East SEZ. The revised area of the SEZ does not alter this finding.

9.4.4.1.2 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.

9.4.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Because the SEZ does not contain any active grazing allotments, no SEZ-specific design features to protect livestock grazing have been identified in this Final Solar PEIS.

9.4.4.2 Wild Horses and Burros

9.4.4.2.1 Affected Environment

As presented in the Draft Solar PEIS, no wild horse or burro HMAs occur within the proposed Riverside East SEZ or in close proximity to it. The revised area of the SEZ does not alter this finding.

9.4.4.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Riverside East SEZ would not affect wild horses and burros. Development within the revised area of the Riverside East SEZ does not affect this conclusion.

9.4.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

Because solar energy development within the proposed Riverside East 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.

9.4.5 Recreation

9.4.5.1 Affected Environment

With the exception of the Midland long-term visitor area (LTVA) in the eastern portion of the SEZ (described in the Draft Solar PEIS), the lands within the proposed Riverside East SEZ are not believed to support a large amount of recreational use. Although there are a wide variety of recreational opportunities within the SEZ, there are no recreational use statistics documenting use of the area. The fact that this public land is currently available for easy public access and use, has an existing network of roads and trails, and is near both large and small population centers gives it significant potential value for recreational use. The description in the Draft Solar PEIS remains valid.

9.4.5.2 Impacts

Recreation users would be displaced from areas developed for solar energy production. Currently open vehicle routes within the proposed SEZ could be closed or rerouted. It currently is unknown whether solar energy development would have an adverse impact on the use of the Midland LTVA.

Recreational users would be displaced from areas developed for solar energy production within the Riverside East SEZ. Vehicle routes currently open within the proposed SEZ could be closed or rerouted. 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 as a part of the environmental analysis of specific solar energy projects.

It currently is unknown whether solar energy development would have an adverse impact on the use of the Midland LTVA. The determination of impacts will be conducted as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.4.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreational resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide adequate mitigation for most identified impacts with the possible exception of impacts on the Midland LTVA.

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:

- A buffer area should be established between the LTVA and solar development to preserve the setting of the LTVA. The size of the buffer area should be determined based on site and visitor-specific criteria.

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.

9.4.6 Military and Civilian Aviation

9.4.6.1 Affected Environment

The description in the Draft Solar PEIS remains valid. The proposed Riverside East is located under numerous MTRs and between two SUAs. There are two civilian airports, Blythe and Desert Center, in close proximity to the SEZ. A large portion of the proposed SEZ is covered by eight MTRs.

9.4.6.2 Impacts

The development of any solar energy or transmission facilities that encroach into military airspace could interfere with military training activities and could be a safety concern. Concerns have been raised that thermal plumes from condensers associated with solar facilities and reflected glare from solar collectors or mirrors could be hazardous for pilots approaching or departing the local airports. The description in the Draft Solar PEIS remains valid.

9.4.6.3 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.

No SEZ-specific design features for 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.

9.4.7 Geologic Setting and Soil Resources

9.4.7.1 Affected Environment

9.4.7.1.1 Geologic Setting

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

- The proposed Riverside East SEZ spans the length of the Chuckwalla Valley; its western end covers portions of the northern Chuckwalla, and its eastern end covers the Palo Verde Mesa (Figure 9.4.7.1-1). The boundaries of the proposed SEZ have been changed to eliminate 43,439 acres (176 km^2) in the

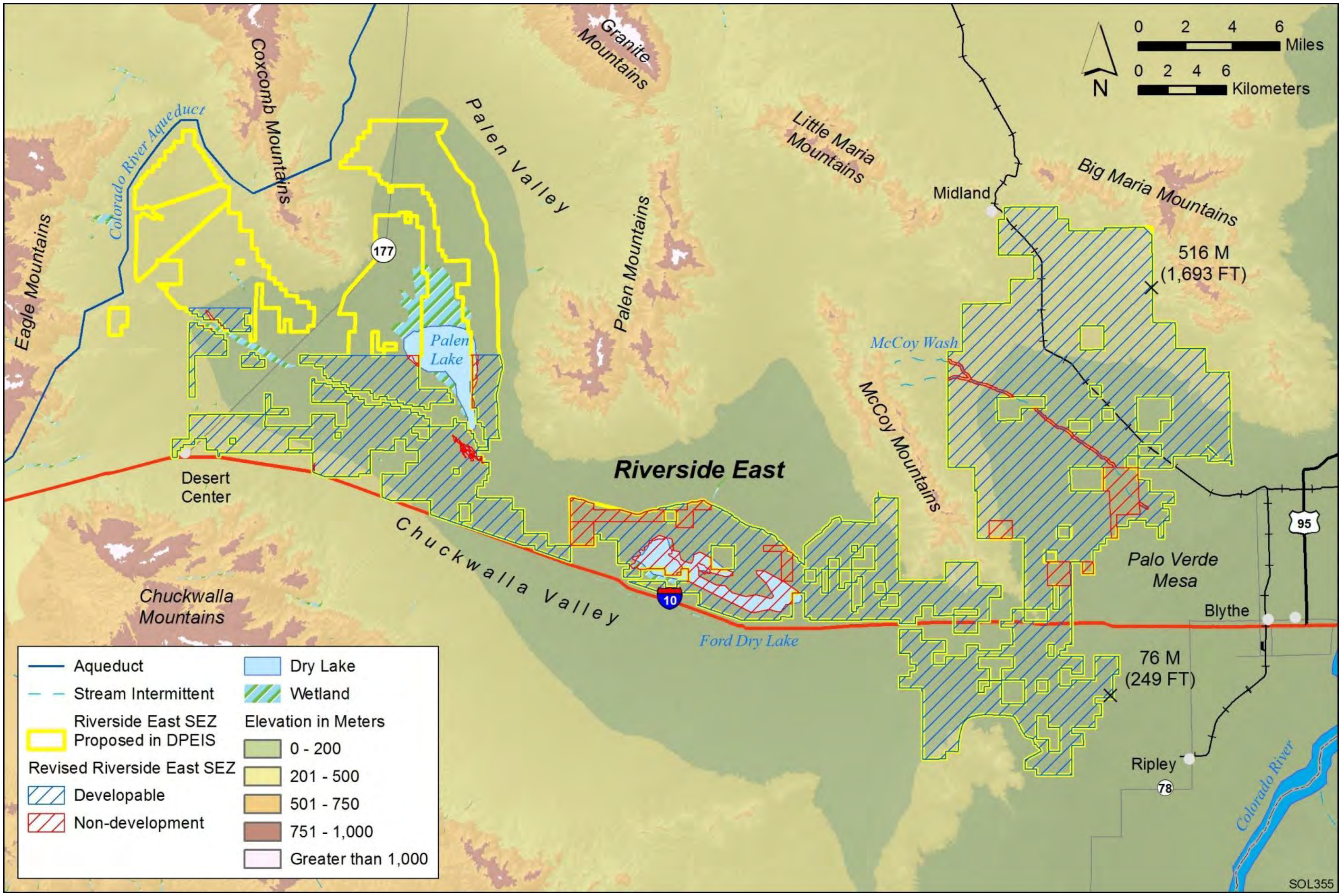

FIGURE 9.4.7.1-1 General Terrain of the Proposed Riverside East SEZ as Revised

northwest portion of the site. Within this revised area, another 11,547 acres ($46.7 km^2$) of intermittent lakes and major washes were identified as non-development areas. On the basis of these changes, the western part of the SEZ in the Chuckwalla Valley slopes to the northeast, with elevations ranging from about 820 ft (250 m) near Desert Center to less than 490 ft (150 m) in the sand dunes region along the southwestern edge of Palen Lake. The topography of the site along the central part of the Chuckwalla Valley and on Palo Verde Mesa are the same as previously described.

- The McCoy Wash is an ephemeral stream; it is not a perennial stream as stated in the Draft Solar PEIS.

- The levees referred to here do not channel runoff to the Colorado River Aqueduct; rather, these features are V-dikes that provide flood protection for the Colorado River Aqueduct. The V-dikes channel water away from the open canal segments of the Colorado River Aqueduct to the larger washes that the Colorado River Aqueduct crosses underneath by means of inverted siphons. No floodwater or other surface runoff is ever channeled to the Colorado River Aqueduct.

- The levees channel runoff into culverts and underpass channels passing beneath I-10, concentrating flows that are more diffuse to the north (upslope) of I-10.

9.4.7.1.2 Soil Resources

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

- Soils within the proposed Riverside East SEZ as revised are predominantly gravelly loams typical of alluvial fan terraces, which together make up about 67% of the site's soil coverage (Table 9.4.7.1-1). Dune land soils cover about 20% of the SEZ.

- Soil unit coverage at the proposed Riverside East SEZ as revised is shown in Figure 9.4.7.1-2. Taken together, the new SEZ boundaries and non-development areas eliminate 20,114 acres ($81 km^2$) of the Vaiva–Quilotosa–Hyder–Cipriano–Cherioni series, 6,270 acres ($25 km^2$) of the Rillito–Gunsight series, 19,253 acres ($78 km^2$) of the Rositas–Dune land–Carsitas series, 1,430 acres ($5.7 km^2$) of the Rositas–Orita–Carrizo–Aco series, 5,774 acres ($23 km^2$) (all) of the Rositas–Carrizo series, 2,055 acres ($8.3 km^2$) of Playas, 125 acres ($0.51 km^2$) of Tecopa–Rock outcrop–Lithic Torriorthents series, and 2 acres ($0.0081 km^2$) (all) of the St. Thomas–Rock outcrop series.

TABLE 9.4.7.1-1 Summary of Soil Series within the Proposed Riverside East SEZ as Revised

Map Unit Symbol	Map Unit Name	Erosion Potential: Water[a]	Erosion Potential: Wind[b]	Description	Area[a] in Acres[b] (percentage of SEZ)
s1141	Vaiva–Quilotosa–Hyder–Cipriano–Cherioni	–[c]	–	Vaiva series, Quilatosa, and Hyder series are soils on hills and mountains with slopes of 1 to 70%. Very shallow and shallow and well to excessively drained soils with medium to high runoff and moderate to moderately rapid permeability. Typically very gravelly loams to extremely gravelly coarse sandy loam. Used mainly for livestock grazing, wildlife habitat, and recreation. Cipriano and Cherioni series soils are formed on fan terraces and hills with slopes of 0 to 70%. Shallow and very shallow (to a hardpan) and somewhat excessively drained soils with low to very high runoff and moderate permeability. Typically very gravelly loam to very gravelly fine sandy loam. Used mainly for livestock grazing (both) and wildlife habitat (Cipriano series only).	64,057 (40.2)[d]
s1140	Rillito–Gunsight	–	–	Rillito series are nearly level to gently sloping soils on fan terraces (gradients of 0 to 3%). Deep and well-drained soils with low to medium surface-runoff potential and moderate to moderately rapid permeability. Gunsight series are gently sloping to sloping soils on fan or stream terraces (gradients of 0 to 60%). Very deep and somewhat excessively drained with very low to high surface-runoff potential and moderate to moderately rapid permeability. Aridic soil moisture regime. Typically very gravelly loam. Used mainly for livestock grazing and recreation.	44,268 (27.8)[e]

TABLE 9.4.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Erosion Potential: Water	Erosion Potential: Wind	Description	Area[a] in Acres[b] (percentage of SEZ)
s1136	Rositas–Dune land–Carsitas	–	–	Rositas series are gently sloping soils on dunes and sand sheets (gradients of 0 to 30%). Very deep and somewhat excessively drained with low surface-runoff potential (high infiltration rate) and rapid permeability. Typically fine sand. Dune land soils are constantly shifting medium-grained sand deposited by wind blowing across the valley. Parent material consists of eolian sands. Little or no vegetation; very rapid permeability. Carsitas series are nearly level to strongly sloping soils on alluvial fans, moderately steep valley fills, and dissected alluvial fan remnants. Excessively drained with slow surface runoff (except during torrential events) and rapid permeability. Typically gravelly sand. Used for watershed and recreation; commercial source of sand and gravel.	32,120 (20.1)[f]
s1041	Rositas–Orita–Carrizo–Aco	–	–	Rositas series described above. Orita series are nearly level to gently sloping soils on fan remnants and terraces (gradients of 0 to 2%). Parent material consists of alluvium from mixed sources. Very deep and well-drained soils with very low to medium surface-runoff potential and moderate permeability. Well suited for cultivation if irrigated but not as rangeland. Carrizo series are gently sloping soils on floodplains, alluvial fans, fan piedmonts, and bolson floors (gradients of 0 to 15%). Parent material consists of alluvium from mixed sources. Very deep and excessively drained soils with negligible to very low surface-runoff potential and rapid to very rapid permeability. Typically extremely gravelly sand. Aridic soil moisture regime.	14,561 (9.1)[g]
s1138	Playas	–	–	Very poorly drained soils formed in flats and closed basins; moderately to strongly saline. Medium surface runoff potential and low permeability.	2,378 (1.5)[h]

TABLE 9.4.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Erosion Potential: Water	Erosion Potential: Wind	Description	Area[a] in Acres[b] (percentage of SEZ)
s1126	Tecopa–Rock outcrop Lithic torriorthents	–	–	Tecopa series are sloping soils on low hills and low mountain side slopes (gradients of 15 to 75%). Very shallow and well-drained soils formed in residuum and colluvium weathered from metamorphic rocks with medium to rapid surface runoff and moderate permeability. Typically very gravelly sandy loam. Used mainly as desert rangeland. Rock outcrop occurs as low ridges or boulder piles and consists of variable rock types. Rapid surface runoff and barren of vegetation. Lithic Torriorthents are sloping soils on steep hill and mountain side slopes (gradients 15 to 60% or more) with rapid surface runoff. Typically very gravelly sand loam or loam.	2,043 (1.3)

[a] Soil series not included here: Vaiva–Rock outcrop–Lithic Torriorthents (21 acres [0.085 km^2]) and Rositas–Ripley–Indio-Gilman (9 acres [0.036 km^2]).

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

[c] A dash indicates water and wind erosion potential not rated at the Soil Series taxonomic level.

[d] A total of 3,820 acres within the Vaiva–Quilotosa–Hyder–Cipriano–Cherioni series (s1141) is currently categorized as non-development areas (denoted by red areas in Figure 9.4.7.1-2).

[e] A total of 1,473 acres (6.0 km^2) within the Rillito–Gunsight series (s1140) is currently categorized as non-development areas (denoted by red areas in Figure 9.4.7.1-2).

[f] A total of 3,136 acres (13 km^2) within the Rositas–Dune land–Carsitas series (s1136) is currently categorized as non-development areas (denoted by red areas in Figure 9.4.7.1-2).

[g] A total of 1,427 acres (5.8 km^2) within the Rositas–Orita–Carriza–Aco series (s1041) is currently categorized as non-development areas (denoted by red areas in Figure 9.4.7.1-2).

[h] A total of 1,691 acres (6.8 km^2) within the Playas (s1138) is currently categorized as non-development areas (denoted by red areas in Figure 9.4.7.1-2).

Sources: NRCS (2006); CEC (2010a).

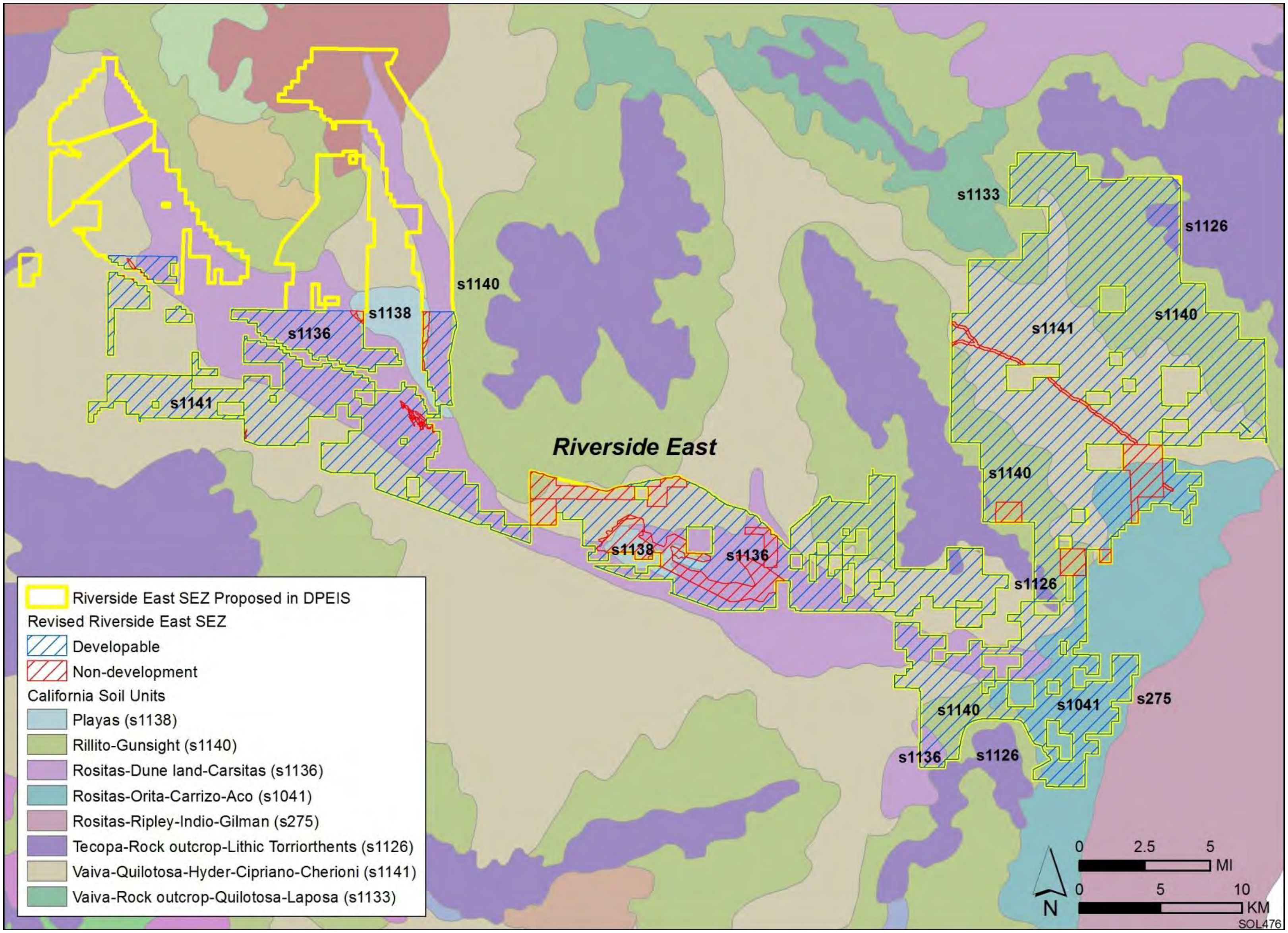

FIGURE 9.4.7.1-2 Soil Map for the Proposed Riverside East SEZ as Revised (NRCS 2008)

9.4.7.2 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 soil mapping is not complete for the California Desert area, soils have not been rated for erodibility. However, because many of the soils eliminated (or identified as non-development areas) are playas and dune land soils (about 21,300 acres [86 km^2]), the impacts related to wind erodibility are expected to be less. The assessment provided in the Draft Solar PEIS remains valid, with the following update:

- Soil disturbance of areas covered by desert pavement, especially within the western portion of the Riverside East SEZ, could result in significant soil erosion by wind, because these surfaces are underlain by fine soil particles that are highly vulnerable to erosion once exposed.

9.4.7.3 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 were identified for soil resources at the proposed Riverside East SEZ. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.4.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Riverside East SEZ has been prepared and reviewed by BLM mineral specialists knowledgeable about the region where the SEZ is located (BLM 2012c). 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 9.4.24.

9.4.8.1 Affected Environment

A new review of mining claim information in the BLM LR2000 System relevant to the proposed Riverside East SEZ shows there currently is one placer claim and one mill site claim in Township 4 South, Range 21 E, SBM, in Sections 22 and 27, respectively, and one placer claim in Township 4 South, Range 22 E, SBM, in Section 33 (BLM 2010a). The remaining description in the Draft Solar PEIS is still valid.

9.4.8.2 Impacts

The description of impacts in the proposed SEZ in the Draft Solar PEIS is still accurate. If valid, the existing mining claims would be a prior existing right and would be protected. If the area is identified as an SEZ, it would continue to be closed to all incompatible forms of mineral development. 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.

9.4.8.3 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 for mineral 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.

9.4.9 Water Resources

9.4.9.1 Affected Environment

The overall size of the proposed Riverside East SEZ has been reduced by 21% from the area described in the Draft Solar PEIS. The resulting total area of 159,457 acres (645 km^2) includes 11,547 acres (46.7 km^2) designated as non-development areas, consisting of intermittent lakes and major intermittent/ephemeral streams. The description of the affected environment given in the Draft Solar PEIS relevant to water resources at the Riverside East SEZ remains valid and is summarized in the following paragraphs.

The proposed Riverside East SEZ is within the Southern Mojave–Salton Sea subbasin of the California hydrologic region. The SEZ spans the Chuckwalla Valley and Palo Verde Mesa regions of the Mojave Desert, where precipitation is between 4 and 6 in./yr (10 and 15 cm/yr), and pan evaporation rates are estimated to be on the order of 130 in./yr (330 cm/yr). No perennial surface water features are located within the Riverside East SEZ. McCoy Wash is a significant intermittent/ephemeral stream that bisects the eastern portion of the SEZ, which includes designated non-development areas. Ford Dry Lake is located near the center of the SEZ, and Palen Lake is a wet playa (shallow depth to groundwater) located in the western portion of the SEZ. Wetland areas associated with these dry lakes and playas have been designated as non-development areas as well. Several intermittent/ephemeral streams from the surrounding mountains flow through the area, in which the general drainage pattern is from northwest to southeast.

The proposed SEZ is located in the Chuckwalla Valley and Palo Verde Mesa groundwater basins where the principal aquifer consists of alluvium and fanglomerate deposits that are on the order of 1,200 ft (366 m) thick. Groundwater typically flows eastward toward the Colorado River. Recent studies associated with fast-track solar energy developments have provided additional information pertaining to groundwater balances (summary of groundwater inflow and outflow rates) in the vicinity of the Riverside East SEZ. The Palo Verde Mesa groundwater basin receives groundwater underflow from the surrounding Chuckwalla, Palo Verde, and Colorado River basins equaling 400, 1,244, and 1,200 ac-ft/yr (493,400, 1.5 million, and 1.5 million m^3/yr), respectively, with an additional inflow from mountain front recharge estimated to be 3,086 ac-ft/yr (3.8 million m^3/yr) and irrigation return flows estimated to be 770 ac-ft/yr (950,000 m^3/yr); groundwater water withdrawals were estimated to equal the total groundwater inputs equal to 6,700 ac-ft/yr (8.3 million m^3/yr) (BLM 2010b). In the Chuckwalla Valley, groundwater recharge from precipitation is estimated to be 8,588 ac-ft/yr (10.6 million m^3/yr), groundwater underflow from the Pinto Valley and Orocopia Valley combine to be 3,500 ac-ft/yr (4.3 million m^3/yr), irrigation and wastewater pond return flows are estimated to be 1,631 ac-ft/yr (2 million m^3/yr); groundwater withdrawals are estimated at 10,361 ac-ft/yr (12.8 million m^3/yr), groundwater underflow to the Palo Verde Mesa basin is 400 ac-ft/yr (493,400 m^3/yr), and evapotranspiration from Palen Lake is estimated to be 350 ac-ft/yr (431,700 m^3/yr) (BLM 2010e, 2011m). Groundwater surface elevations have remained steady for several decades; however, it is suspected that further groundwater development in the area may lead to a decline in groundwater elevation. The best water quality in terms of TDS is in the western portion of the Chuckwalla Valley, because TDS concentrations increase as the groundwater flows eastward. High concentrations of arsenic, selenium, fluoride, chloride, boron, sulfate, and TDS occasionally restrict the use of groundwater for domestic and agricultural applications.

California uses a "plura" system to manage water resources, where riparian and prior appropriation doctrines are used for surface waters, and groundwater management is conducted primarily through local governments, local agencies, or ordinances. Groundwater for most of the proposed SEZ is subject to State of California laws, because there are no local management entities in the area. The primary water management consideration relevant to the Riverside East SEZ is the assemblage of compacts, federal laws, court decrees, and contracts that form the "Law of the River," which pertains to the management of the Colorado River. In accordance with the Law of the River, the USGS developed a method for identifying groundwater wells outside of the Colorado River's floodplain, where groundwater is replenished by Colorado River water. This method is known as the Accounting Surface, and it establishes a surface of static groundwater elevations, below which water is accounted for as Colorado River water and above which water is accounted for as local tributary replenished water. The Colorado River Accounting Surface is at an elevation between 238 and 240 ft (72.5 and 73 m) for most of the Chuckwalla Valley and Palo Verde Mesa groundwater basins. Any groundwater extractions from the Riverside East SEZ would need to coordinate with the U.S. Bureau of Reclamation regarding the potential extraction of groundwater below the Colorado River Accounting Surface, which is subject to management under the Law of the River.

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 Riverside East SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 9.4.9.1-1 through 9.4.9.1-7 and in Figures 9.4.9.1-1 through 9.4.9.1-3. Fieldwork and hydrologic analyses to determine 100-year floodplains and jurisdictional water bodies would need to be coordinated with appropriate federal, state, and local agencies. Areas within the Riverside East SEZ that are found to be within a 100-year floodplain will be designated as non-development areas. Any water features within the Riverside East SEZ determined to be jurisdictional will be subject to the permitting process described in the CWA.

9.4.9.2 Impacts

9.4.9.2.1 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 activities could potentially affect drainage patterns, along with groundwater recharge and discharge processes. Particular areas of concern regarding land disturbance mentioned in the Draft Solar PEIS include the regions around McCoy Wash, Palen Lake, Ford Dry Lake, sand dune areas near Palen Lake, and several alluvial fan features. Identified non-development areas within the proposed Riverside East SEZ include McCoy Wash, along with portions of Palen Lake and Ford Dry Lake, which reduces the potential for adverse impacts associated with land disturbance activities.

TABLE 9.4.9.1-1 Watershed and Water Management Basin Information Relevant to the Proposed Riverside East SEZ as Revised

Basin	Name	Area (acres)[b]
Subregion (HUC4)[a]	Southern Mojave–Salton Sea (1810)	10,260,588
Subregion (HUC4)	Lower Colorado (1503)	11,008,867
Cataloging unit (HUC8)	Southern Mojave (18100100)	5,627,073
Cataloging unit (HUC8)	Imperial Reservoir (15030104)	2,194,903
Groundwater basin	Palo Verde Mesa	226,000
Groundwater basin	Chuckwalla Valley	605,000
SEZ	Riverside East	159,457

[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.

TABLE 9.4.9.1-2 Climate Station Information Relevant to the Proposed Riverside East 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.)
Blythe, California (040924)	268	18	1913–2011	3.80	0.00
Eagle Mountain, California (042598)	973	33	1933–2011	3.65	0.00
Hayfield Reservoir, California (043855)	1,370	42	1933–2011	4.14	0.10
Iron Mountain, California (044297)	922	33	1935–2011	3.44	0.10

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

[b] Surface elevations for the proposed Riverside East SEZ range from 450 to 1,000 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 9.4.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ Scale Relevant to the Proposed Riverside East SEZ as Revised

	Subregion, HUC4		Subbasin, HUC8		
Water Feature	Southern Mojave–Salton Sea (ft)[a]	Lower Colorado (ft)	Southern Mojave (ft)	Imperial Reservoir (ft)	SEZ (ft)
Unclassified streams	0	11,539	0	0	0
Perennial streams	48,188	1,433,435	48,065	344,398	0
Intermittent/ephemeralstreams	130,375,835	213,542,849	81,901,598	44,916,235	3,449,894
Canals	17,608,394	8,079,744	956,372	4,404,123	28,561

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

Source: USGS (2012a).

TABLE 9.4.9.1-4 Stream Discharge Information Relevant to the Proposed Riverside East SEZ as Revised

Parameter	Station (USGS ID): Colorado River at Palo Verde Dam, California–Arizona (09429010)	Station (USGS ID): Palo Verde Canal near Blythe, California (09429000)
Period of record	1984–1988	1985–2012
No. of observations	49	281
Discharge, median (ft^3/s)[a]	15,000	1,365
Discharge, range (ft^3/s)	3,190–30,150	310–2,290
Discharge, most recent observation (ft^3/s)	9,340	1,160
Distance to SEZ (mi)[b]	22	22

[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).

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 Riverside East SEZ is a subset of the Southern Mojave and Imperial Reservoir watersheds (HUC8), for which information regarding stream channels is presented in Tables 9.4.9.1-3 and 9.4.9.1-4 in this Final Solar PEIS. The results of the intermittent/ephemeral stream evaluation are shown in Figures 9.4.9.2-1 and 9.4.9.2-2, which depict flow lines from the National Hydrography Dataset (USGS 2012a) labeled as low, moderate, and high sensitivity to land disturbance. Within the study area, 16% of the intermittent/ephemeral stream channels had low sensitivity, 82% had moderate sensitivity, and 2% had high sensitivity to land disturbance. Several intermittent/ephemeral stream reaches with moderate sensitivity to land disturbance are found within the SEZ. High concentrations of these sensitive stream reaches are located along the western boundary just north of Desert Center (Figure 9.4.9.2-1), along the western face of the McCoy Mountains (Figure 9.4.9.2-1), and in the northeastern portion of the SEZ (Figure 9.4.9.2-2).

TABLE 9.4.9.1-5 Surface Water Quality Data Relevant to the Proposed Riverside East SEZ as Revised

	Station (USGS ID)[a]	
Parameter	09429010	09429030
Period of record	1986	1961–1983
No. of records	1	827
Temperature (°C)[b]	26	20 (1.7–31.5)
Total dissolved solids (mg/L)	NA[c]	1,170 (722–1,670)
Dissolved oxygen (mg/L)	8.3	NA
pH	8	7.9 (7.1–8.3)
Total nitrogen (mg/L)	NA	NA
Phosphorus (mg/L as P)	NA	NA
Organic carbon (mg/L)	NA	NA
Calcium (mg/L)	NA	137.5 (91–190)
Magnesium (mg/L)	NA	44 (28–85)
Sodium (mg/L)	NA	210 (110–320)
Chloride (mg/L)	NA	172 (90–980)
Sulfate (mg/L)	NA	480 (220–680)
Arsenic (μg/L)	2	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).

9.4.9.2.2 Water Use Requirements for Solar Energy Technologies

Changes in the Riverside East SEZ boundaries resulted in changes to the estimated water use requirements and a reduction in the land affected by surface disturbances. This section presents changes in water use estimates for the reduced SEZ area and additional analyses pertaining to groundwater. 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 9.4.9.2-1 presents the revised estimates of water requirements for both construction and operation of solar facilities at the Riverside East SEZ, assuming 80% build-out of the SEZ and accounting for its decreased size. A basin-scale groundwater budget was assembled using available data on groundwater inputs, outputs, and storage for both the Chuckwalla Valley and Palo Verde Mesa groundwater basins, with results presented in Table 9.4.9.2-2.

TABLE 9.4.9.1-6 Water Quality Data from Groundwater Samples Relevant to the Proposed Riverside East SEZ as Revised

	Station (USGS ID)[a]	
Parameter	333939114411501	332828114443501
Period of record	1967	1980-1981
No. of records	1	8
Temperature (°C)[b]	32	21.3 (18.4–23.3)
Total dissolved solids (mg/L)	NA[c]	5,910 (5,800–6,350)
Dissolved oxygen (mg/L)	NA	NA
pH	7.5	8.35 (8.1–8.5)
Nitrate + nitrite (mg/L as N)	NA	NA
Phosphate (mg/L)	NA	NA
Organic carbon (mg/L)	NA	NA
Calcium (mg/L)	154	73.5 (65–80)
Magnesium (mg/L)	9.4	39.35 (36.6–42.7)
Sodium (mg/L)	NA	1,995 (1,800–2,150)
Chloride (mg/L)	578	1,565 (1,540–1,750)
Sulfate (mg/L)	475	1,985 (1,910–2,090)
Arsenic (µg/L)	NA	NA
Fluoride (mg/L)	NA	NA
Boron (µg/L)	NA	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).

TABLE 9.4.9.1-7 Groundwater Surface Elevations Relevant to the Proposed Riverside East SEZ as Revised

	Station (USGS ID)	
Parameter	334438115211101	333939114411501
Period of record	1952–1992	1968–2011
No. of observations	5	71
Surface elevation (ft)[a]	598	400
Well depth (ft)	347	252
Depth to water, median (ft)	199.29	147.39
Depth to water, range (ft)	108–112.86	146.15–157.76
Depth to water, most recent observation (ft)	188.38	147.08
Distance to SEZ (mi)[b]	26	12

a To convert ft to m, multiply by 0.3048.

b To convert mi to km, multiply by 1.6093.

Source: USGS (2012b).

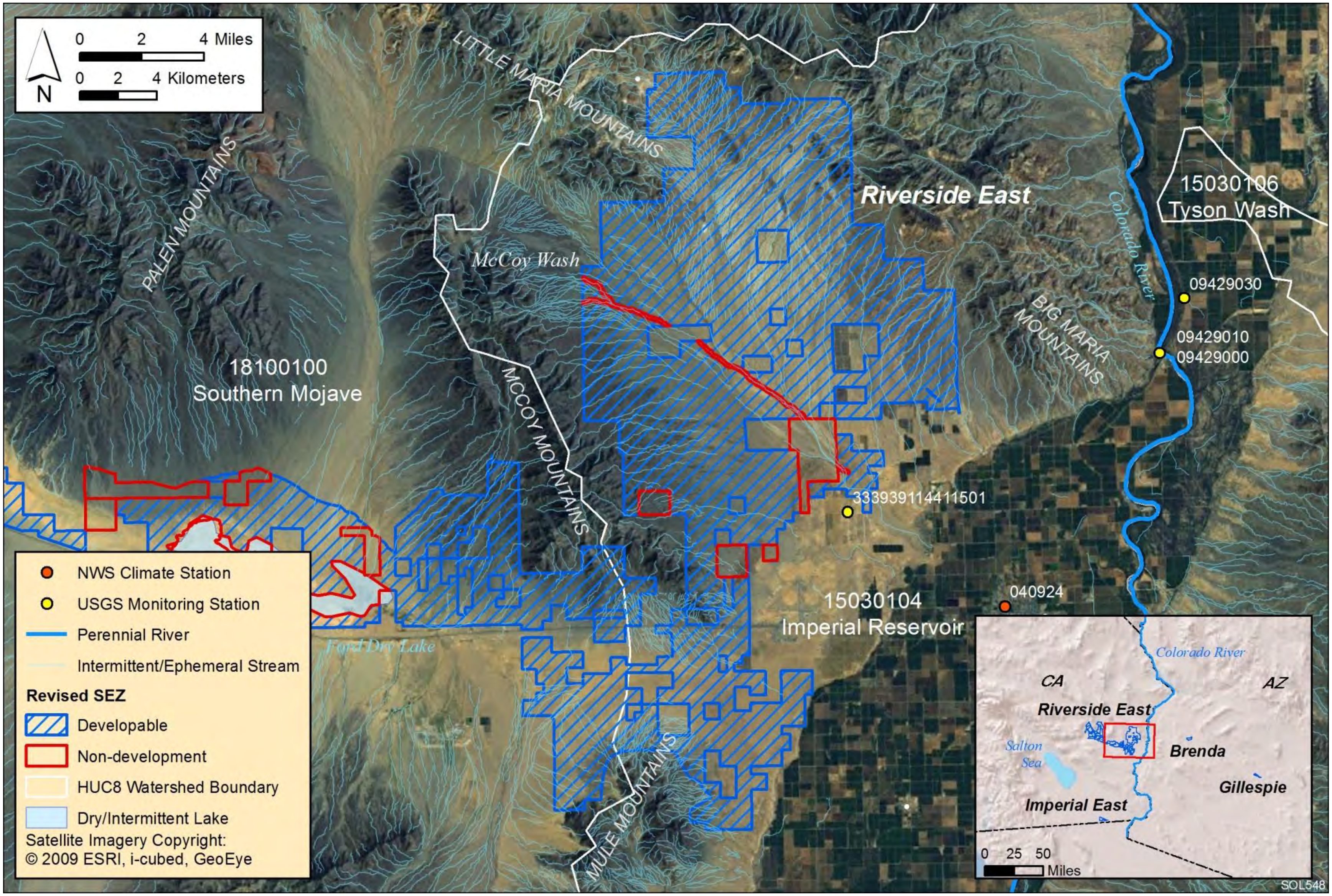

FIGURE 9.4.9.1-1 Water Features near the Proposed Riverside East SEZ as Revised, Eastern Half

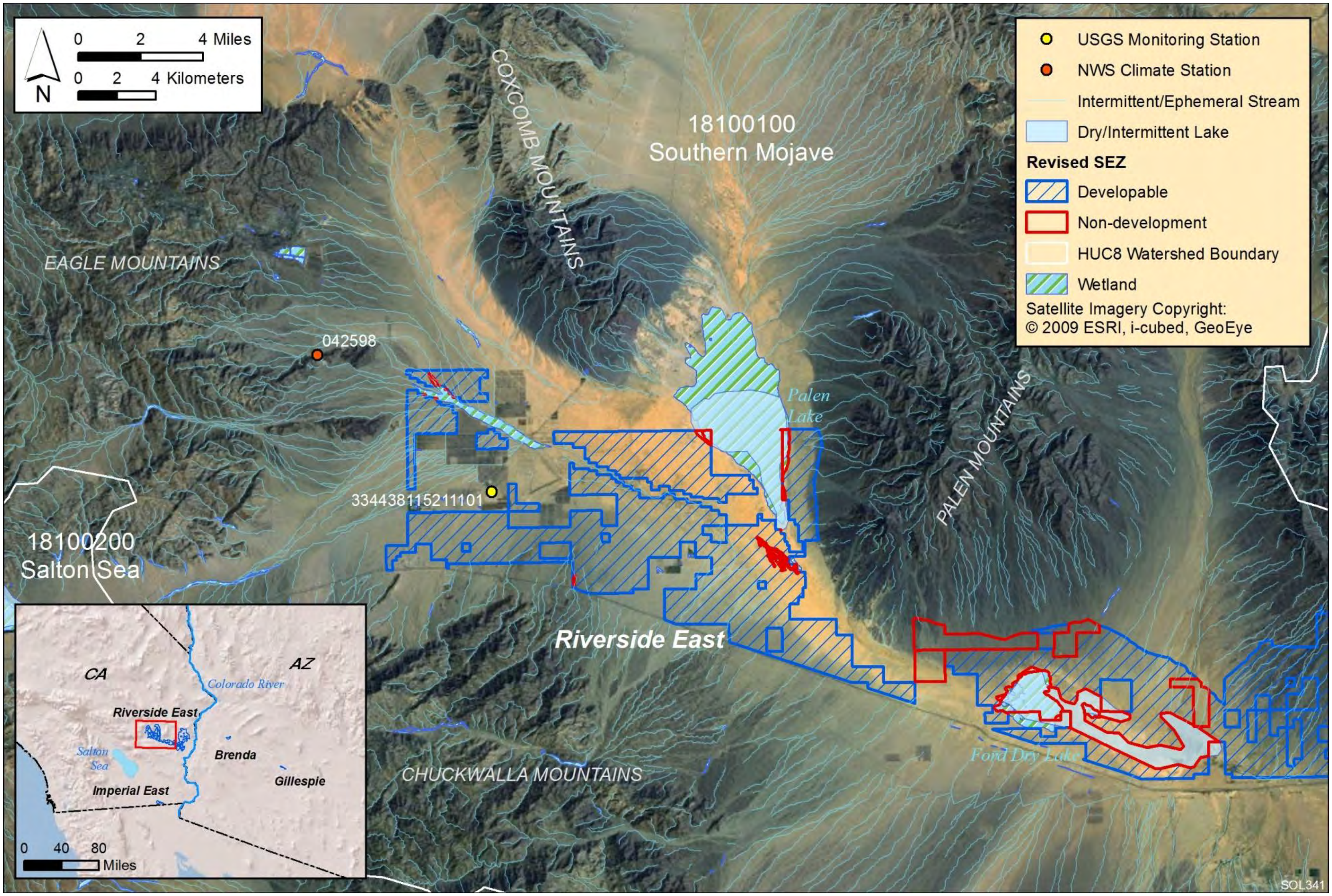

FIGURE 9.4.9.1-2 Water Features near the Proposed Riverside East SEZ as Revised, Western Half

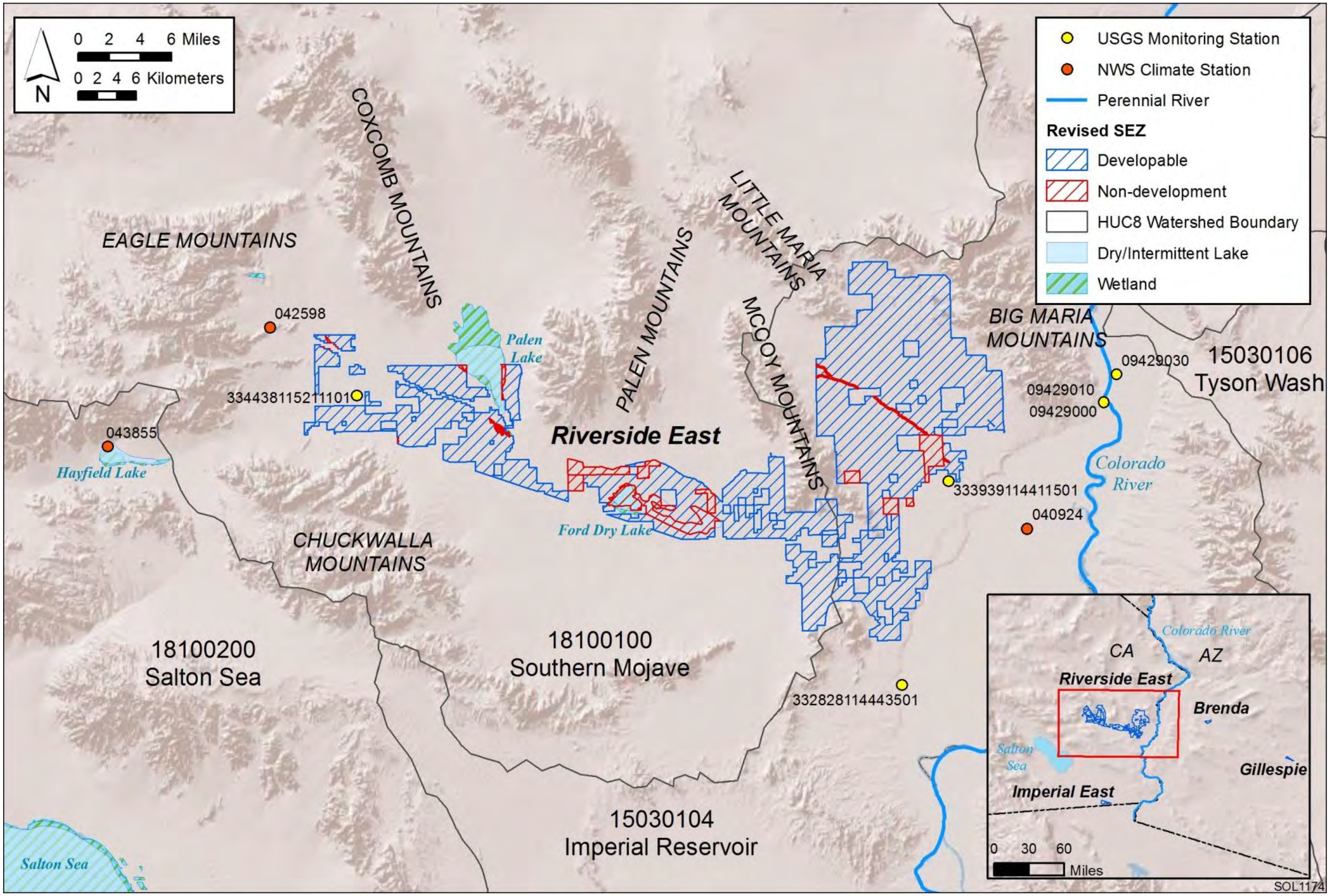

FIGURE 9.4.9.1-3 Water Features within the Southern Mojave and Imperial Reservoir Watersheds, Which Include the Proposed Riverside East SEZ as Revised

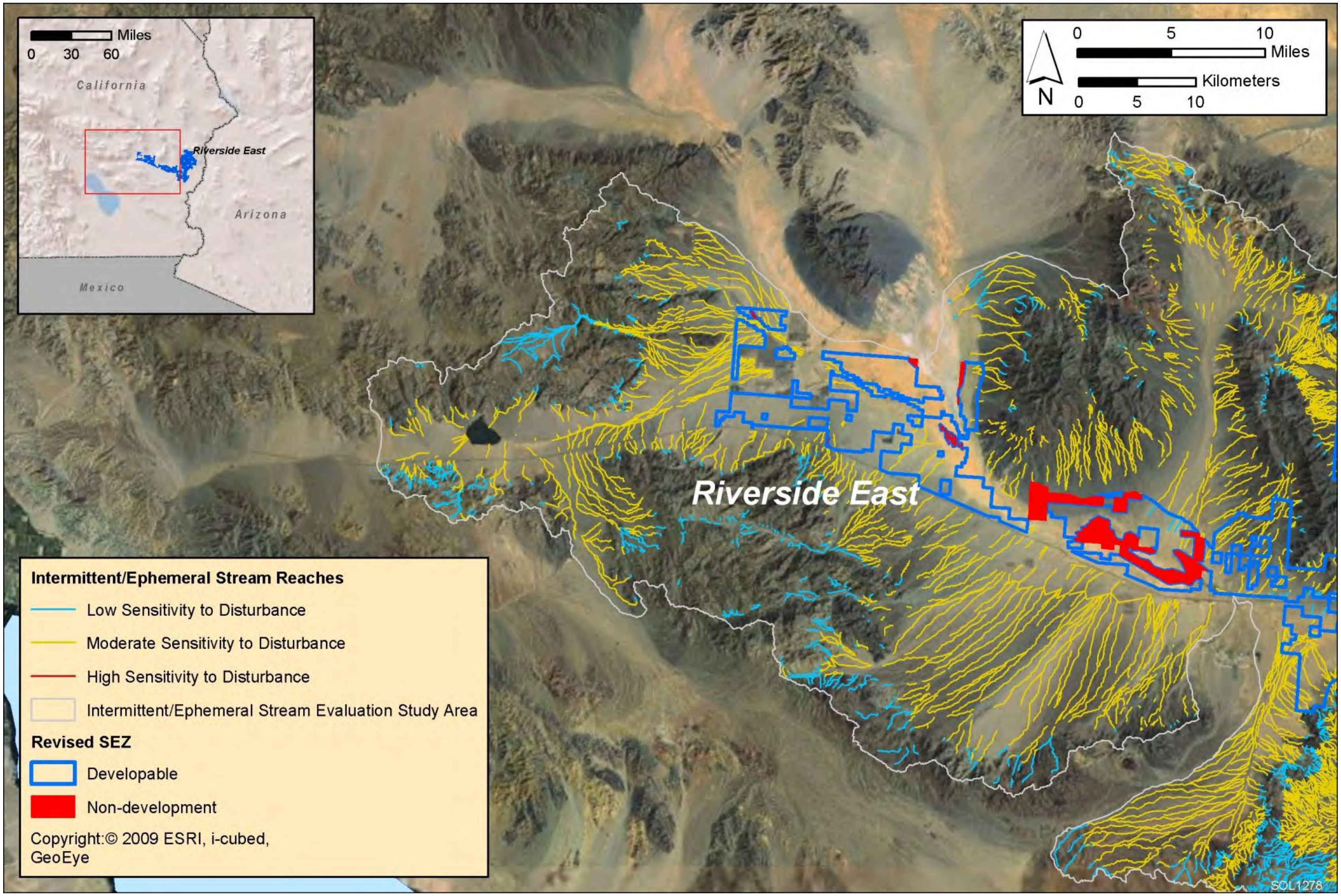

FIGURE 9.4.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Western Portion of the Proposed Riverside East SEZ as Revised

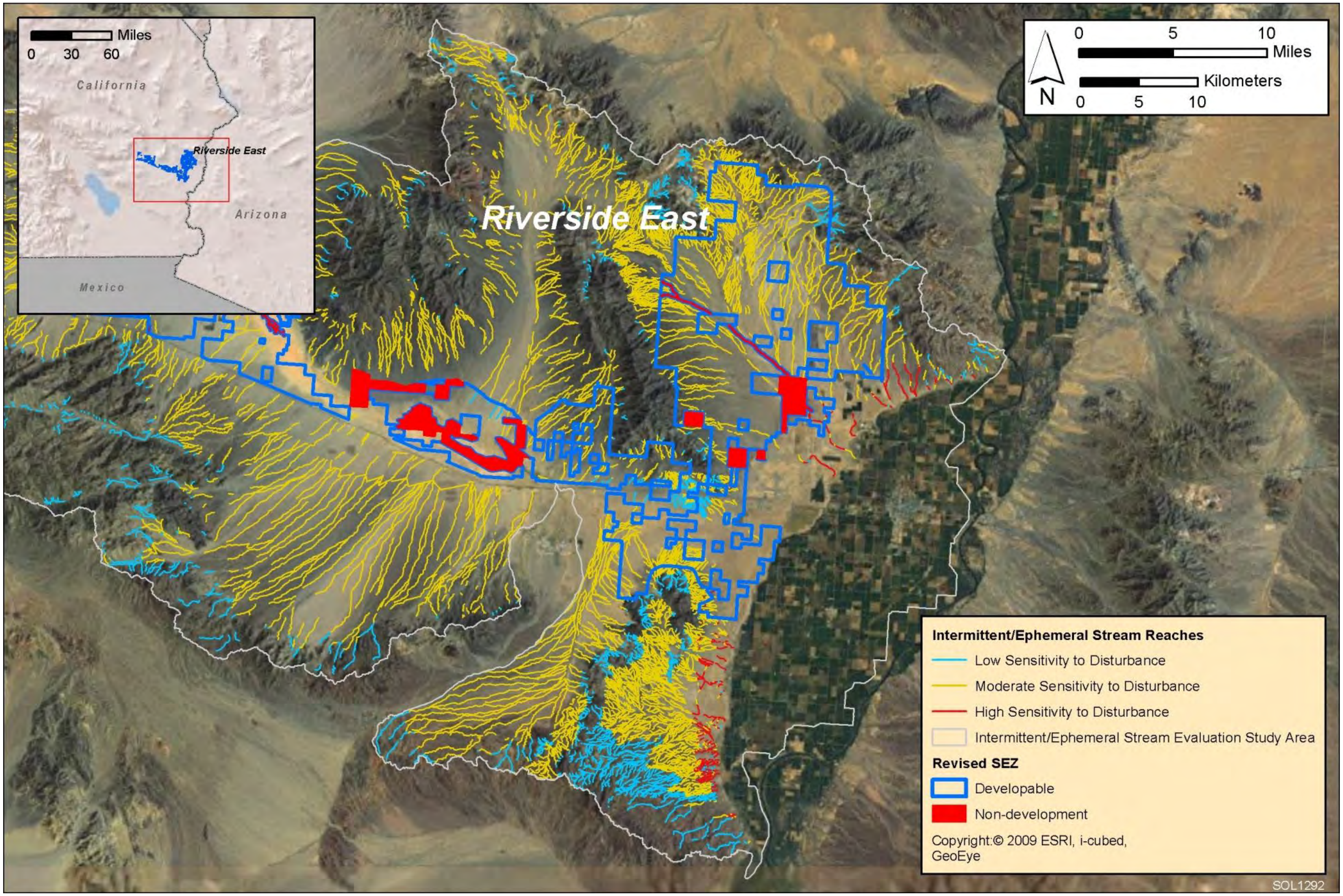

FIGURE 9.4.9.2-2 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Eastern Portion of the Proposed Riverside East SEZ as Revised

TABLE 9.4.9.2-1 Estimated Water Requirements for the Proposed Riverside East SEZ as Revised[a]

Activity	Parabolic Trough	Power Tower	Dish Engine	PV
Construction—Peak Year				
Water use requirements				
Fugitive dust control (ac-ft)[b]	4,452	6,678	6,678	6,678
Potable supply for workforce (ac-ft)	222	135	56	28
Total water use requirements (ac-ft)	4,674	6,813	6,734	6,706
Wastewater generated				
Sanitary wastewater (ac-ft)	222	135	56	28
Operations				
Water use requirements				
Mirror/panel washing (ac-ft/yr)	11,833	6,574	6,574	657
Potable supply for workforce (ac-ft/yr)	332	147	147	15
Dry cooling (ac-ft/yr)	4,733–23,666	2,630–13,148	NA	NA
Wet cooling (ac-ft/yr)	106,495–343,151	59,164–190,640	NA	NA
Total water use requirements				
Non-cooled technologies (ac-ft/yr)	NA[c]	NA	6,721	672
Dry-cooled technologies (ac-ft/yr)	16,898–35,831	9,351–19,869	NA	NA
Wet-cooled technologies (ac-ft/yr)	118,660–335,316	65,885–197,361	NA	NA
Wastewater generated				
Blowdown (ac-ft/yr)	6,723	3,735	NA	NA
Sanitary wastewater (ac-ft/yr)	332	147	147	15

[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.

The estimated total water use requirements during the peak construction year would be as high as 6,813 ac-ft/yr (8.4 million m^3/yr), which is approximately 33% of the annual groundwater inputs to the Chuckwalla Valley and Palo Verde Mesa groundwater basins combined, but less than 1% of the estimated groundwater storage in the Chuckwalla Valley. This level of groundwater pumping could cause localized groundwater drawdown impacts, but given the short duration of construction activities, the water use estimate for construction is not a primary concern to water resources in the region.

The long duration of groundwater pumping during operations (20 years) poses the greatest threat to groundwater resources in the region. The water use estimates for full build out of wet-cooled solar facilities is as high as 118,660 ac-ft/yr (146 million m^3/yr), assuming a 30% operation time (a 30% operational time was considered for all solar facility types on the basis of operations estimates for proposed utility-scale solar energy facilities; data suggest that full build-out assuming 60% operation time is not achievable) at the Riverside East SEZ. This level of groundwater extraction far exceeds any of the groundwater recharge, discharge, and storage magnitudes presented in Table 9.4.9.2-2, which makes it an unfeasible development scenario to consider.

The additional groundwater budget and one-dimensional modeling analyses considered low, medium, and high groundwater pumping scenarios that represent a full build-out of PV, one-half the amount of water needed for full build-out of dry-cooled parabolic trough (30% operational time), and the full amount of water for full build-out of dry-cooled parabolic trough (30% operational time), respectively. The low, medium, and high pumping scenarios result in groundwater withdrawals that range from 672 to 16,898 ac-ft/yr (829,000 to 20.8 million m^3/yr), or 13,440 to 337,960 ac-ft (16.6 million to 417 million m^3) over the 20-year operational period. From a groundwater budgeting perspective, the high pumping scenario of full build-out of dry cooled facilities is similar to the combined groundwater inputs to the Chuckwalla and Palo Verde Mesa groundwater basins, and over the 20-year analysis period it represents 38% of the groundwater storage in the Chuckwalla basin. The medium pumping scenario (one-half the water needs for full build-out of dry-cooled facilities) is similar to the amount of groundwater recharge via precipitation and mountain front recharge for the entire Chuckwalla Valley. The low pumping scenario over the 20-year analysis period represents 1.5% of the groundwater storage in the Chuckwalla Valley.

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. The specifics of the groundwater modeling analysis are presented in Appendix O. Note, however, that the aquifer parameters used for the one-dimensional groundwater model (Table 9.4.9.2-3) represent available literature data, and that the model aggregates these value ranges into a simplistic representation of the aquifer. For the one-dimensional groundwater modeling analysis of the Riverside East SEZ, groundwater modeling parameters presented in the analysis by Leake et al. (2008) were used. This approach uses lower- and upper-bound estimates of transmissivity to capture potential groundwater drawdown with respect to heterogeneity of the aquifer.

Depth to groundwater ranges between 80 and 270 ft (24 and 82 m) below the surface across the Chuckwalla Valley and Palo Verde Mesa. Figure 9.4.9.2-3 shows the groundwater modeling results for the upper bound of the transmissivity parameter. Groundwater drawdown ranges up to 100 ft (30 m) for the high pumping scenario, up to 50 ft (15 m) for the medium pumping scenario, and up to 5 ft (1.5 m) for the low pumping scenario. Groundwater drawdown

TABLE 9.4.9.2-2 Groundwater Budget for the Chuckwalla Valley and Palo Verde Mesa Groundwater Basins, Which Include the Proposed Riverside East SEZ as Revised

Process	Amount
Chuckwalla Valley Groundwater Basin (western and central portions of SEZ)	
Inputs	
Recharge from precipitation (ac-ft/yr)[a]	8,588
Underflow-Pinto/Orocopia Valleys (ac-ft/yr)	3,500
Irrigation return flows (ac-ft/yr)	800
Wastewater lagoon return flows (ac-ft/yr)	831
Outputs	
Groundwater withdrawals (ac-ft/yr)	10,361
Underflow to Palo Verde Mesa (ac-ft/yr)	400
Evapotranspiration – Palen Lake (ac-ft/yr)	350
Storage	
Storage – 100 ft of saturated aquifer (ac-ft)[b]	900,000
Groundwater storage capacity (ac-ft)[b,c]	9,100,000
Palo Verde Mesa Groundwater Basin (eastern portion of SEZ)	
Inputs	
Recharge from precipitation (ac-ft/yr)	3,086
Underflow-Chuckwalla/Palo Verde Mesa (ac-ft/yr)	2,844
Irrigation return flows (ac-ft/yr)	770
Outputs	
Groundwater withdrawals (ac-ft/yr)	6,700
Storage	
Groundwater storage capacity (ac-ft)[b,c]	6,840,000

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

[b] CDWR (2004)

[c] Groundwater storage capacity is the potential storage based on aquifer dimensions, not the actual groundwater storage.

Sources: BLM (2010b, e)

assuming high transmissivity is primarily limited to a 6-mi (10 km) radius from the center of pumping. Figure 9.4.9.2-3 also shows the groundwater modeling results for the lower bound of the transmissivity parameter. Groundwater drawdown ranges up to 375 ft (114 m) for the high pumping scenario, up to 180 ft (55 m) for the medium pumping scenario, and up to 15 ft (6 m) for the low pumping scenario. Groundwater drawdown assuming low transmissivity is primarily limited to a 3-mi (5-km) radius from the center of pumping.

TABLE 9.4.9.2-3 Aquifer Characteristics and Assumptions Used in the One-Dimensional Groundwater Model for the Proposed Riverside East SEZ as Revised

Parameter	Value
Aquifer type/conditions	Unconfined/basin fill
Aquifer thickness (ft)[a]	500
Transmissivity (ft^2/day)	6,300–26,200
Specific yield	0.2
Analysis period (yr)	20
High pumping scenario (ac-ft/yr)[b]	16,898
Medium pumping scenario (ac-ft/yr)	8,449
Low pumping scenario (ac-ft/yr)	672

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

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

Source: Leake et al. (2008).

The one-dimensional groundwater modeling results presented in Figure 9.4.9.2-3 is a simplified representation of potential impacts on groundwater resulting from groundwater withdrawals for solar energy development. Given the size of the Riverside East SEZ and the large quantities of groundwater withdrawals, it is likely that several groundwater wells would be needed and these wells would be distributed across the SEZ, whereas the modeling results assume one well. Groundwater well capacities within the vicinity of the Riverside East SEZ have been reported to range from 40 to 105 ac-ft/yr/ft-drawdown (443 to 1,165 m^3/day/m-drawdown) (BLM 2010b), which suggests that groundwater wells could probably be expected to withdraw on the order of 4,000 ac-ft/yr (4.9 million m^3/yr) as a high-end estimate.

The management of the Colorado River under the various laws, compacts, and decrees known as the "Law of the River" affects how much groundwater can be withdrawn from the Riverside East SEZ, because both the Chuckwalla Valley and Palo Verde Mesa groundwater basins are considered to be within the Colorado River's floodplain. As described in the Draft Solar PEIS, the USGS developed a method for quantifying the Colorado River Accounting Surface, which defines groundwater surface elevations that below which the groundwater is considered to be waters replenished by Colorado River Water and subject to management under the Law of the River. In the vicinity of the Riverside East SEZ, the Colorado River Accounting Surface is at an elevation of 238 and 240 ft (72.5 and 73 m) (Wiele et al. 2008). Currently, groundwater surface elevations depict a groundwater gradient eastward toward the Colorado River, with groundwater elevations at 488 ft (149 m) near Desert Center, 288 ft (88 m) near Palen Lake, and 245 ft (75 m) near the boundary between the Chuckwalla Valley and Palo Verde Mesa. This information suggests that groundwater drawdown cannot exceed 248 ft (76 m) near Desert Center, 48 ft (15 m) near Palen Lake, and 5 ft (1.5 m) near the Chuckwalla Valley and Palo Verde Mesa boundary. These estimates of allowable groundwater drawdown relative to the Colorado Accounting Surface are guidelines only, and solar energy developers would have to

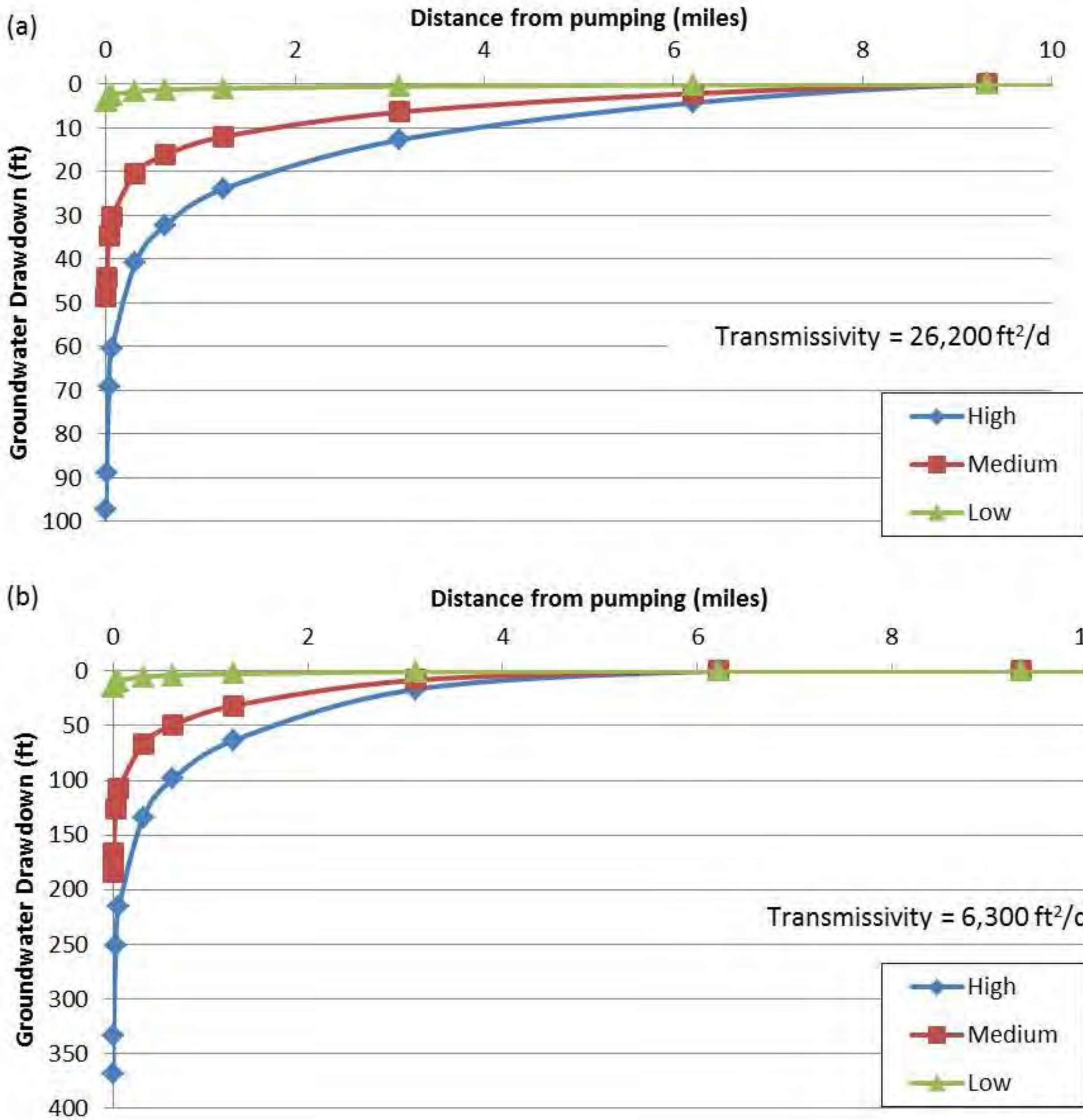

FIGURE 9.4.9.2-3 Estimated One-Dimensional Groundwater Drawdown Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Riverside East SEZ as Revised Considering (a) High Transmissivity Values and (b) Low Transmissivity Values

coordinate with the Bureau of Reclamation (BOR) (lead managing agency regarding the Law of the River) regarding any potential groundwater depletions that might affect the Colorado River Accounting Surface.

9.4.9.2.3 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.

9.4.9.2.4 Summary of Impacts on Water Resources

The additional information and analyses of water resources presented in this update agree with the information provided in the Draft Solar PEIS, which indicates that the Riverside East SEZ is located in a large desert valley with predominately intermittent/ephemeral surface water features and groundwater in a basin-fill aquifer. The large size of the SEZ corresponds to large estimates of water use for the full build-out scenario (80% of the area developed) and the potential for large land disturbances. The estimated water use requirements assuming full build-out of wet-cooling technologies would not be feasible. The high groundwater pumping scenario considered for this analysis corresponded to full build-out of dry-cooled parabolic trough with a 30% operational time.

The change in boundaries and identified non-development areas of the Riverside East SEZ exclude portions of Palen Lake, Ford Dry Lake, and McCoy Wash. These changes in the SEZ boundaries have reduced potential impacts on surface water features associated with land disturbance. The intermittent/ephemeral stream evaluation identified several stream reaches within the SEZ that have a moderate sensitivity to land disturbance. Many of these intermittent/ephemeral stream reaches within the SEZ are clustered in alluvial fan features along the western boundary just north of Desert Center (Figure 9.4.9.2-1), along the western face of the McCoy Mountains (Figure 9.4.9.2-1) and in the northeastern portion of the SEZ (Figure 9.4.9.2-2). Ultimately, any alterations to intermittent/ephemeral surface water features within the Riverside East SEZ would be subject to permitting by the CDFG's Lake and Streambed Alteration Program.

Groundwater withdrawals for solar energy facilities pose a substantial threat to groundwater resources in the Chuckwalla Valley and the Palo Verde Mesa groundwater basins. The low pumping scenario is preferred over the medium and high pumping scenarios given the results of the groundwater budget and one-dimensional modeling analyses. The vertical and horizontal extent of groundwater drawdown is largely controlled by aquifer characteristics, and the modeling results for upper and lower bounds of transmissivity shows how a lower tranmissivity value results in a larger vertical groundwater drawdown but with a lesser horizontal effect (Figure 9.4.9.3-3). The potential to withdraw groundwater below the Colorado River Accounting Surface makes understanding potential groundwater drawdown effects crucial in order to not affect the management of the Colorado River under the Law of the River. In addition to the Colorado River Accounting Surface, groundwater drawdown could affect surface water–groundwater interactions, which are particularly important in the vicinity of Palen Lake, which supports groundwater-dependent vegetation communities (see Section 9.4.10 of the Draft Solar PEIS).

Predicting impacts associated with groundwater withdrawal in desert regions 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 to protect water resources is the implementation of long-term monitoring and adaptive management (see Section A.2.4 of Appendix A). 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 the development of a more detailed numerical groundwater model for the Riverside East SEZ, which would more accurately predict potential impacts on surface water features and groundwater drawdown. When the detailed model is completed, it will be made available through the project Web site (http://solareis.anl.gov) for use by applicants, the BLM, and other stakeholders. Initial efforts are focused on modifying the numerical modeling framework developed by Leake et al. (2008), which has been used for assessing impacts for fast-track solar projects within the SEZ (BLM 2010b,e). Further refinement of this modeling framework is needed to have the potential to assess multiple projects on this large SEZ and to include finer-scale resolution of potential impacts on surface water features and the Colorado River Accounting Surface. This modeling framework can also be used to interpret groundwater monitoring data and guide adaptive management plans.

9.4.9.3 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 features have been identified:

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

- During site characterization, coordination and permitting with the CDFG regarding California's Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features; and

- The use of groundwater in the Chuckwalla Valley and Palo Verde Mesa should be planned for and monitored in cooperation with the BOR and the USGS in reference to the Colorado River Accounting Surface and the rules set forth in the Law of the River.

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.

9.4.10 Vegetation

9.4.10.1 Affected Environment

Revisions to the boundaries of the proposed Riverside East SEZ have eliminated several wetlands mapped by the NWI and two dry lakes, Palen Lake and Ford Dry Lake, in the western and central portions of the SEZ. In addition, McCoy Wash, a large drainage in the eastern portion of the SEZ, was identified as a non-development area.

As presented in Section 9.4.10.1 of the Draft Solar PEIS, 13 cover types were identified within the area of the proposed Riverside East SEZ, while 16 cover types were identified within 5 mi (8 km) of the SEZ boundary (the indirect effects area). Sensitive habitats on the SEZ include desert dry wash woodlands, desert chenopod scrub/mixed salt desertscrub (primarily associated with Ford Dry Lake), sand dune communities, and playa communities. Characteristic Sonoran Desert species observed on the SEZ include ironwood, western honey mesquite, smoketree, and blue palo verde. Desert dry washes in the SEZ support microphyll woodlands that include ironwood, smoketree, and blue palo verde. An ironwood forest, identified by the BLM as a Unique Plant Assemblage, occurs in the upper reaches of McCoy Wash. Plant communities that are dependent on groundwater include mesquite bosque and bush seep-weed communities, both primarily associated with Palen Lake, where groundwater is relatively shallow. Because of the SEZ boundary changes, the North American Warm Desert Riparian Mesquite Bosque cover type no longer occurs within the SEZ. Figure 9.4.10.1-1 shows the cover types within the affected area of the Riverside East SEZ as revised. Additional information was received regarding rare plants and plant associations on or in the vicinity of the Riverside East SEZ (Suba 2012). Alverson's foxtail cactus (*Coryphantha alversonii* [=*Escobaria alversonii*]) is a rare plant species known only from southern California and is ranked as vulnerable; it is limited in distribution but has a low degree of threats. It occurs in small isolated populations in Mohavean and Sonoran desertscrub on desert pavement, sandy or gravelly soils, alluvial fans, and coarse alluvial deposits (eFloras.org 2010; NatureServe 2010) and may be present in many of the cover types within the SEZ. A number of rare plant associations are also known from the SEZ and vicinity (Table 9.4.10.1-1).

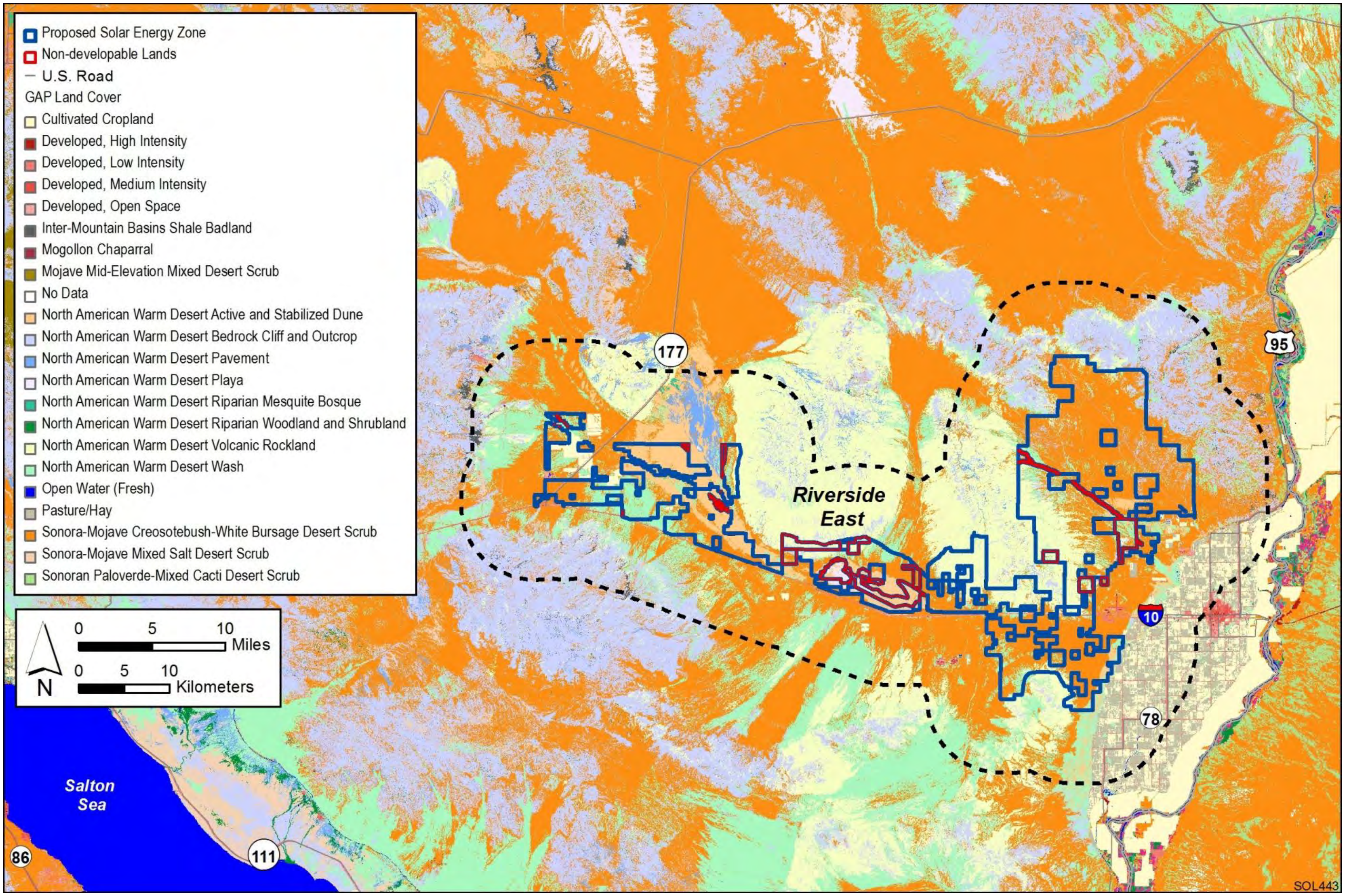

FIGURE 9.4.10.1-1 Land Cover Types within the Proposed Riverside East SEZ as Revised

TABLE 9.4.10.1-1 Vegetation Types Known or Likely to Occur in the Proposed Riverside East SEZ as Revised

Vegetation Type	Species Alliance	Species Association
Tree Dominated Types	*Parkinsonia florida – Olneya tesota* Woodland Alliance[a]	*Parkinsonia florida/Larrea tridentata – Peucephyllum schottii*[a]
		Parkinsonia florida – Olneya tesota[a]
		Parkinsonia florida/(*Psorothamnus emoryi, Pleuraphis rigida*) (provisional dune type)[a]
		Parkinsonia florida – Olneya tesota/Hyptis emoryi[a]
		Parkinsonia florida[a]
		Parkinsonia florida/Hyptis emoryi[a]
		Olneya tesota[a]
		Olneya tesota/Psorothamnus schottii[a]
	Prosopis glandulosa Woodland Alliance[a]	*Prosopis glandulosa – Atriplex* spp.[a]
	Psorothamnus spinosus Woodland Alliance[a]	*Psorothamnus spinosus/Ephedra* (*californica*) *– Ambrosia salsola*
Shrub Dominated Types	*Allenrolfea occidentalis* Shrubland Alliance[a]	*Allenrolfea occidentalis*[a]
	Ambrosia dumosa Shrubland Alliance	*Ambrosia dumosa – Ephedra californica*[a]
	Atriplex canescens Shrubland Alliance	*Atriplex canescens*
	Atriplex polycarpa Shrubland Alliance	*Atriplex polycarpa Sparse Playa*
	Atriplex spinifera Shrubland Alliance[a]	*Atriplex spinifera*[a]
	Encelia farinosa Shrubland Alliance	*Encelia farinose*

TABLE 9.4.10.1-1 (Cont.)

Vegetation Type	Species Alliance	Species Association
Shrub Dominated Types (Cont.)	*Larrea tridentata* Shrubland Alliance	*Larrea tridentate*
		Larrea tridentata – Atriplex polycarpa
		*Larrea tridentata/*Cryptogamic crust
		Larrea tridentata/Pleuraphis rigida[a]
	Larrea tridentata – Ambrosia dumosa Shrubland Alliance	*Larrea tridentata – Ambrosia dumosa*
		Larrea tridentata – Ambrosia dumosa – Krameria grayi
		Larrea tridentata – Ambrosia dumosa – Fouquieria splendens[a]
		Larrea tridentata – Ambrosia dumosa – Olneya tesota[a]
		Larrea tridentata – Ambrosia dumosa – Psorothamnus spinosus[a]
		Larrea tridentata – Ambrosia dumosa/Cryptogramic crust
	Larrea tridentata – Encelia farinosa Shrubland Alliance	*Larrea tridentata – Encelia farinosa*
		Larrea tridentata – Encelia farinosa – Ambrosia dumosa
	Pluchea sericea Shrubland Alliance[a]	*Pluchea sericea*[a]
	Suaeda moquinii Shrubland Alliance[a]	*Suaeda moquinii*[a]
Herbaceous Types	*Brassica* (*tournefortii*) Herbaceous Semi-Natural Stands	*Brassica tournefortii/Ambrosia dumosa*
	Pleuraphis rigida Herbaceous Alliance	*Pleuraphis rigida*[a] *(in desert washes and on dunes)*
		Pleuraphis rigida/Ephedra (californica)[a]
	Dicoria canescens – Abronia villosa Herbaceous Alliance[a]	*Dicoria canescens*[a]
		Salsola tragus – Oenothera deltoides[a] (provisional dune type based on observation)

TABLE 9.4.10.1-1 (Cont.)

Vegetation Type	Species Alliance	Species Association
Herbaceous Types (Cont.)	*Petalonyx thurberi* Provisional Herbaceous Stands[a]	(provisional sandy type based on observation in area and recent data collection on NPS lands)
	Wislizenia refracta Herbaceous Special Stands[a]	
Miscellaneous Land Use Types	*Simmondsia chinensis* plantations and other agricultural field	

[a] Considered as statewide rare or of high priority for inventory.

Source: Suba (2012).

9.4.10.2 Impacts

As presented the Draft Solar PEIS, the construction of solar energy facilities within the proposed Riverside East SEZ would result in direct impacts on plant communities because of 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. Within the Riverside East SEZ (as revised), approximately 118,328 acres (478.86 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.

9.4.10.2.1 Impacts on Native Species

The analysis presented in the Draft Solar PEIS for the Riverside East SEZ indicated that development would result in a large impact on one cover type, a moderate impact on eight cover types, and a small impact on all other land cover types occurring within the SEZ (Table 9.4.11.1-1 in the Draft Solar PEIS). Development within the revised Riverside East SEZ could still directly affect most of the cover types evaluated in the Draft Solar PEIS, with the exception of North American Warm Desert Riparian Mesquite Bosque (previously moderate impact); the reduction in the developable area would result in reduced impact levels on all cover types in the affected area. The impact magnitude for North American Warm Desert Playa and North American Warm Desert Pavement (both previously moderate) would be reduced to small. The impact magnitudes on all other land cover types would remain unchanged, compared to the original estimates in the Draft Solar PEIS.

Direct impacts on the NWI-mapped wetlands as well as on Palen Lake and Ford Dry Lake within the excluded and non-developable portions of the SEZ would not occur. However, direct impacts on unmapped wetlands within the remaining developable areas of the SEZ, dry wash, dry wash woodland, and ironwood (including those outside of washes) communities could still occur. In addition, indirect impacts on wetlands or dry lakes within or near the SEZ, as described in the Draft Solar PEIS, could occur. Indirect impacts on desert chenopod scrub/mixed salt desertscrub, primarily associated with Ford Dry Lake, as well as indirect impacts on mesquite bosque and bush seep-weed communities, both primarily associated with Palen Lake, could occur. Indirect impacts from groundwater use on wetlands and habitats such as mesquite bosque, microphyll (palo verde/ironwood) woodland communities (including ironwood and palo verde located outside of washes), dry wash scrub, and bush seep-weed communities, and communities located around dry lakes and playas in the region could also occur. Because McCoy Wash is excluded from development, direct impacts on the ironwood forest habitat in the wash would not occur. However, indirect impacts on habitats within the wash may occur. Direct or indirect impacts on Alverson's foxtail cactus or any of the rare plant associations listed in Table 9.4.10.1-1 could occur as a result of development within the SEZ. Impacts would depend on specific locations of project components.

9.4.10.2.2 Impacts from Noxious Weeds and Invasive Plant Species

As presented the Draft Solar PEIS, land disturbance from project activities and indirect effects of construction and operation within the Riverside East SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 9.4.10.1 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.

9.4.10.3 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 wetland, sand dune and sand transport areas, riparian, playa, dry wash (including dry wash microphyll woodland), ironwood (including those outside of washes), and chenopod scrub habitats within the Riverside East SEZ shall be avoided to the extent practicable, and any impacts minimized and/or mitigated in consultation with appropriate agencies. A buffer area shall be maintained around wetland, riparian, playa, and dry wash communities to reduce the potential for impacts on these communities on or near the SEZ.

- A qualified botanist or plant ecologist shall survey for Alverson's foxtail cactus prior to any construction activities within the SEZ. If individuals are located, individuals or populations shall be avoided through fencing and flagging of the area, including an appropriate buffer zone.

- Rare species associations listed in Table 9.4.10.1-1 shall be avoided through fencing and flagging of the area, including an appropriate buffer zone.

- Appropriate engineering controls shall be used to minimize impacts on wetland, playa, dry wash woodland, riparian, and chenopod scrub 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 would be determined through agency consultation.

- Groundwater withdrawals shall be limited to reduce the potential for indirect impacts on riparian habitat associated with groundwater discharge or groundwater-dependent communities, such as mesquite bosque, microphyll (palo verde/ironwood) communities, dry wash scrub, or bush seepweed communities, and communities located around dry lakes and playas.

It is anticipated that implementation of the programmatic design features will reduce a high potential for impacts from invasive species and impacts on wetland, sand dune, playa, dry wash (including dry wash microphyll woodland), riparian, and chenopod scrub 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.

9.4.11 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.

9.4.11.1 Amphibians and Reptiles

9.4.11.1.1 Affected Environment

As presented in Section 9.4.11.1 of the Draft Solar PEIS, representative amphibian and reptile species expected to occur within the Riverside East SEZ include the Couch's spadefoot (*Scaphiopus couchii*), red-spotted toad (*Bufo punctatus*), desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard (*Gambelia wislizenii*), Mojave fringe-toed lizard (*Uma scoparia*), side-blotched lizard (*Uta stansburiana*), western banded gecko (*Coleonyx variegatus*), and zebra-tailed lizard (*Callisaurus draconoides*), coachwhip (*Masticophis flagellum*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), groundsnake (*Sonora semiannulata*), and long-nosed snake (*Rhinocheilus lecontei*). The Mojave rattlesnake (*Crotalus scutulatus*) and sidewinder (*C. cerastes*) would be the most common poisonous snake species expected to occur on the SEZ. The reduction in the size of and developable area within the Riverside East SEZ does not alter the potential for these species to occur in the affected area.

9.4.11.1.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Riverside East SEZ could affect potentially suitable habitats for the representative amphibian and reptile species. The analysis presented in the Draft Solar PEIS for the Riverside East SEZ indicated that development would result in a moderate overall impact on the representative amphibian and reptile species (Table 9.4.11.1-1 in the Draft Solar PEIS). The reduction in the boundaries and the developable area within the Riverside East SEZ would result in reduced habitat impacts for all representative amphibian and reptile species; however, the resultant impact levels for all the representative species would remain moderate.

9.4.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

Because of the changes to the boundaries and developable area with the SEZ, the SEZ-specific design feature identified in Section 9.4.11.1.3 of the Draft Solar PEIS (i.e., the avoidance of ephemeral drainages, intermittent lakes, and major washes) 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.

9.4.11.2 Birds

9.4.11.2.1 Affected Environment

As presented in the Draft Solar PEIS, a large number of bird species could occur or have potentially suitable habitat within the affected area of the proposed Riverside East SEZ. Representative bird species identified in the Draft Solar PEIS included (1) shorebirds: killdeer (*Charadrius vociferus*) and least sandpiper (*Calidris minutilla*); (2) passerines: ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), Brewer's sparrow (*Spizella breweri*), cactus wren (*Campylorhynchus brunneicapillus*), common poorwill (*Phalaenoptilus nuttallii*), common raven (*Corvus corax*), Costa's hummingbird (*Calypte costae*), crissal thrasher (*Toxostoma crissale*), greater roadrunner (*Geococcyx californianus*), green-tailed towhee (*Pipilo chlorurus*), horned lark (*Eremophila alpestris*), house finch (*Carpodacus mexicanus*), ladder-backed woodpecker (*Picoides scalaris*), Le Conte's thrasher (*Toxostoma lecontei*), lesser nighthawk (*Chordeiles acutipennis*), loggerhead shrike (*Lanius ludovicianus*), phainopepla (*Phainopepla nitens*), sage sparrow (*Amphispiza belli*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), and white-throated swift (*Aeronautes saxatalis*); (3) raptors: American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*); and (4) upland gamebirds: Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), and white-winged dove (*Zenaida asiatica*). The reduction in the boundaries and the developable area within the Riverside East SEZ does not alter the potential for these species or other bird species to occur in the affected area.

9.4.11.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Riverside East SEZ could affect potentially suitable bird habitats. The analysis presented in the Draft Solar PEIS for the Riverside East SEZ boundaries and developable area indicated that development would result in a moderate overall impact on most representative bird species and a small impact on the least sandpiper, house finch, white-throated swift, and red-tailed hawk (Table 9.4.11.2-1 in the Draft Solar PEIS). The reduction in the boundaries and developable area of the Riverside East SEZ would result in reduced habitat impacts for all representative bird species; however, the resultant impact levels for most of the representative bird species would remain as moderate or small. The impact level for the least sandpiper would change from moderate to small.

9.4.11.2.3 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. SEZ-specific species and habitats will determine how programmatic design features are applied, for example:

- Plant species that positively influence the presence and abundance of the desert bird focal species be avoided to the extent practicable. These species include Goodding's willow (*Salix gooddingii*), Joshua tree (*Yucca brevifolia*), honey mesquite (*Prosopis glandulosa*), screwbean mesquite (*P. pubescens*), Colorado desert mistletoe (*Phoradendron macrophyllum*), quailbush (*Atriplex lentiformis*), and catclaw acacia (*Acacia greggii*).

With the implementation of programmatic design features, impacts on bird species will be reduced.

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 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.

9.4.11.3 Mammals

9.4.11.3.1 Affected Environment

As presented in 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 Riverside East SEZ. Representative mammal species identified in the Draft Solar PEIS included (1) big game species: cougar (*Puma concolor*) and mule deer (*Odocoileus hemionus*); (2) furbearers and small game species: the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus*), and white-tailed antelope squirrel (*Ammospermophilus leucurus*); and (3) small nongame species: the cactus mouse (*Peromyscus eremicus*), canyon deermouse (*P. crinitus*), 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 kangaroo rat (*Dipodomys merriami*), and southern grasshopper mouse (*Onychomys torridus*). The ranges of nine bat species encompass the SEZ: big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Californian leaf-nosed bat (*Macrotus californicus*), California mastiff bat (*Eumops perotis californicus*), California myotis (*Myotis californicus*), pallid bat (*Antrozous pallidus*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western pipistrelle (*Parastrellus hesperus*). Most bat species would utilize the SEZ only during foraging. Roost sites for the species (e.g., caves, hollow trees, rock crevices, or buildings) are absent to scarce on or in the affected area of the SEZ. The reduction in the boundaries and developable area of the Riverside East SEZ does not alter the potential for these species or any additional mammal species to occur in the affected area.

9.4.11.3.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Riverside East SEZ could affect potentially suitable habitats of mammal species. The analysis presented in the Draft Solar PEIS for the Riverside East SEZ boundaries and developable area indicated that development would result in a moderate overall impact on the representative mammal species analyzed (Table 9.4.11.3-1 in the Draft Solar PEIS). The reduction in the boundaries and developable area of the Riverside East SEZ would result in reduced habitat impacts for all representative mammal species; however, resultant impact levels for all the representative mammal species would remain as moderate.

9.4.11.3.3 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 programmatic design features, impacts on mammal species will be reduced.

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 features have been identified:

- Within the SEZ, two north–south wildlife corridors of sufficient width (a minimum width of 1.3 mi [2 km], but wider if determined to be necessary through future site-specific studies) should be identified by the BLM in coordination with the USFWS and CDFG. These corridors should be identified as non-development areas within the SEZ on the basis of modeling data (Penrod et al. 2012) and subsequent field verification of permeability for wildlife.

- The fencing around the solar energy development should not block the free passage of mule deer between the Colorado River and mountains or foothills.

If SEZ-specific design features are implemented in addition to required programmatic design features, impacts on mammal species would be small. 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.

9.4.11.4 Aquatic Biota

9.4.11.4.1 Affected Environment

The boundaries of the Riverside East 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:

- There are no perennial streams within the proposed Riverside East SEZ, but the intermittent McCoy Wash is present. However, it has been identified as a non-development area.

- Palen Lake (208 acres [1 km^2]) and Ford Dry Lake (3,945 acres [16 km^2]) are the only water bodies within the SEZ, but both are located within non-development areas.

- Wetlands within the SEZ have been identified as non-development areas.

- There are no natural perennial stream features within the area of indirect effects within 5 mi (8 km) of the SEZ; however, 8 mi (13 km) of the Colorado River Aqueduct is present.

- Palen Lake and Ford Dry Lake are the only water bodies present in the area of indirect effects. A total of approximately 4,053 acres (16 km^2) and 460 acres (2 km^2) of Palen Lake and Ford Dry Lake, respectively, are located within the area of potential indirect effects.

- Outside of the potential indirect effects area but within 50 mi (80 km) of the SEZ, there are 295 acres (1 km^2) of permanent lake (Salton Sea), 30,309 acres (123 km^2) of intermittent lake, and 7,985 (32 km^2) of dry lake. Dammed portions of the Colorado River are also present and total 56,215 acres (227 km^2). There are also several stream features, including 121 mi (195 km) of the Colorado River Aqueduct, 66 mi (106 km) of canals, and 189 mi (304 km) of intermittent streams.

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.

9.4.11.4.2 Impacts

The types of impacts on aquatic habitats and biota that could occur from development of utility-scale solar energy facilities 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 updates:

- The amount of surface water features within the SEZ and in the area of indirect effects that could potentially be affected by solar energy development is less because the size of the SEZ has been reduced.

- McCoy Wash, wetlands, Palen Lake, and Ford Dry Lake have been identified as non-development areas; therefore, construction activities would not directly affect these areas. However, as described in the Draft Solar PEIS, they could be affected indirectly by solar development activities within the SEZ.

9.4.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

- Appropriate engineering controls should be used to minimize impacts on Palen Lake, Ford Dry Lake, McCoy Wash, and their associated wetlands, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats.

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

It is anticipated that the 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 Riverside East 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.

9.4.12 Special Status Species

9.4.12.1 Affected Environment

As presented in Section 9.4.12.1 of the Draft Solar PEIS, 69 special status species were identified that could occur or have potentially suitable habitat within the affected area of the proposed Riverside East SEZ. The reduction in the size of the Riverside East 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. There were a total of 64 special status species that were determined to have moderate or large impacts in the Draft Solar PEIS that are re-evaluated here.

Since publication of the Draft Solar PEIS, the golden eagle has been identified as a special status species that could potentially occur in the affected area based on recorded occurrences and the presence of potentially suitable habitat. The golden eagle is a BLM-designated sensitive species; it is also a California fully protected species. This additional species is discussed below, along with a re-evaluation of those species determined to have moderate or large impacts in the Draft Solar PEIS. Figure 9.4.12.1-1 shows the known or potential occurrences of species in the affected area of the Riverside East SEZ that are listed, proposed, or candidates for listing under the ESA.

9.4.12.1.1 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 CAReGAP and SWReGAP habitat suitability models, approximately 136,800 acres (554 km^2) of potentially suitable habitat for the desert tortoise intersects the area of direct effects in the revised area of the Riverside East SEZ (Figure 9.4.12.1-1; Table 9.4.12.1-1). Approximately 442,000 acres (1,789 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 area of the Riverside East SEZ is situated in an area that provides habitat and genetic connectivity between areas with greater habitat suitability north and south of the SEZ (Figure 9.4.12.1-1). The USFWS determined the desert tortoise connectivity areas based upon the USGS model for desert tortoise predicted suitable habitat (Nussear et al. 2009). Furthermore, the USFWS has indicated that the desert tortoise (or its sign) has been documented within the approved and priority projects within the SEZ (Ashe 2012).

9.4.12.1.2 BLM-Designated Sensitive Species

There are 26 BLM-designated sensitive species that are discussed in this Final Solar PEIS. All but one of these species (golden eagle) were analyzed for the Riverside East 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. Information regarding the ecology and distribution of potentially suitable habitat for these species is presented in Table 9.4.12.1-1. There is no updated information regarding the habitat preferences, known occurrences, or potential for BLM-sensitive species evaluated in the Draft Solar PEIS to occur in the affected area of the revised area of the Riverside East SEZ (see Section 9.4.12.1.2 in the Draft Solar PEIS for a discussion of these species). Therefore, only the golden eagle is discussed below.

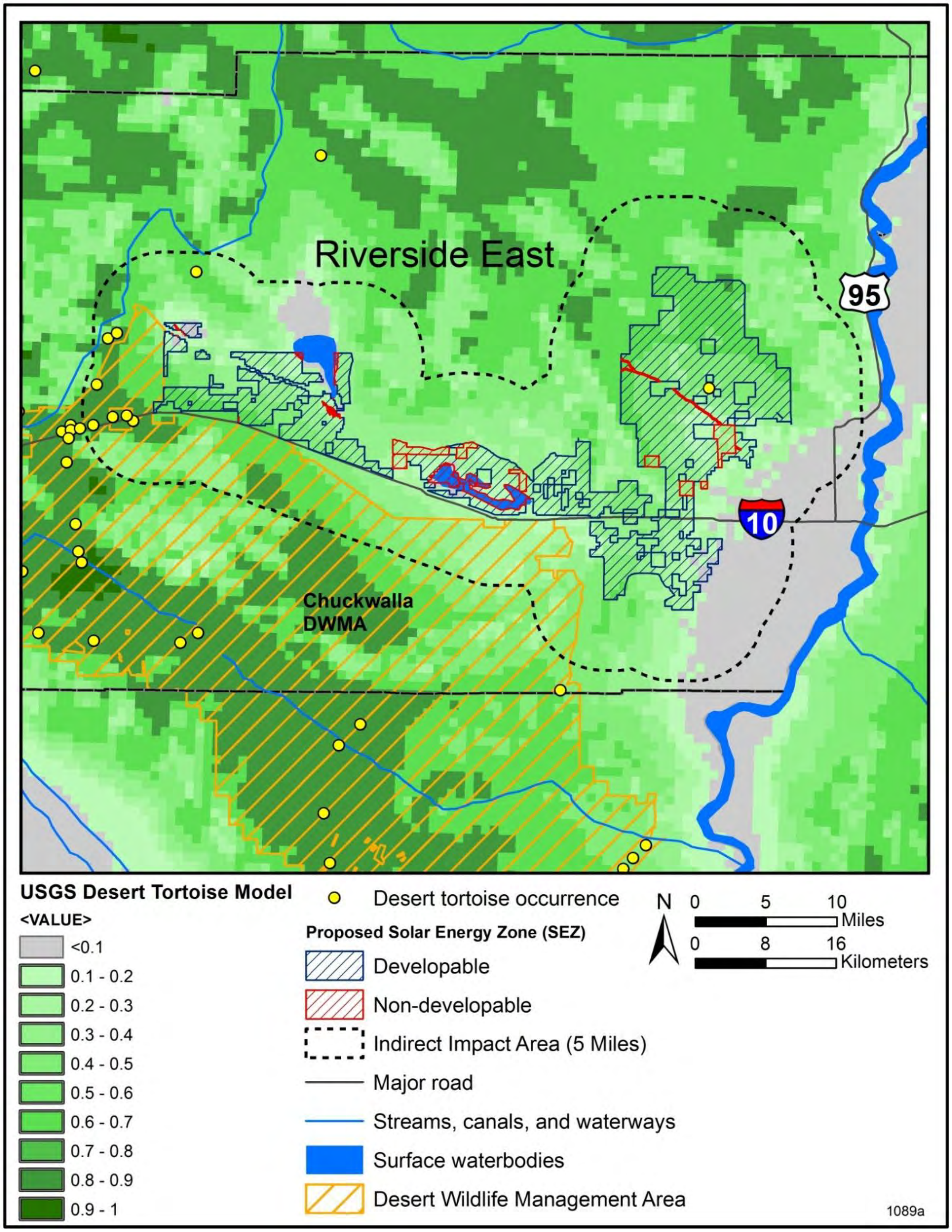

FIGURE 9.4.12.1-1 Proposed Riverside East SEZ as Revised and Distribution of Potentially Suitable Habitat for Species Listed under the Endangered Species Act (Sources: Nussear et al. 2009; CDFG 2010)

TABLE 9.4.12.1-1 Habitats, Potential Impacts, and Potential Mitigation for Special Status Species That Could Be Affected by Solar Energy Development on the Proposed Riverside East SEZ as Revised[a]

				Maximum Area of Potential Habitat Affected[d]		
Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
Plants						
Abrams' spurge	*Chamaesyce abramsiana*	CA-S1	Sandy substrates within creosotebush scrub communities in the Mojave and Sonoran Deserts at elevations below 3,000 ft.[i,j] Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla DWMA, about 1 mi[k] south of the SEZ. About 2,215,155 acres[l] of potentially suitable habitat occurs within the SEZ region.	64,600 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	192,700 acres of potentially suitable habitat (8.7% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and 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. Note that these potential mitigations apply to all special status plants.
Alkali mariposa-lily	*Calochortus striatus*	BLM-S; CA-S2; FWS-SC	Alkaline seeps, springs, and meadows at elevations between 2,600 and 4,600 ft. Nearest recorded occurrences are 40 mi west of the SEZ. About 68,658 acres of potentially suitable habitat occurs within the SEZ region.	330 acres of potentially suitable habitat lost (0.5% of available suitable habitat)	880 acres of potentially suitable habitat (1.3% of available potentially suitable habitat)	Small overall impact. Avoiding or minimizing disturbance to desert playa habitat on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Bitter hymenoxys	*Hymenoxys odorata*	CA-S2	Sandy substrates within riparian and Sonoran desertscrub communities, also within open flats, mesquite flats, ditches and drainage areas, and along roads and streams. Elevation ranges from 150 to 500 ft. Known to occur in the affected area. Nearest recorded occurrences are 5 mi east of the SEZ. About 2,657,966 acres of potentially suitable habitat occurs within the SEZ region.	80,800 acres of potentially suitable habitat lost (3.0% of available suitable habitat)	286,300 acres of potentially suitable habitat (10.8% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
California ditaxis	*Ditaxis serrata* var. *californica*	CA-S2	Sonoran desertscrub and creosotebush scrub communities at elevations between 100 and 3,300 ft. Known to occur in the affected area. Nearest recorded occurrence is near the Colorado River Aqueduct, approximately 2 mi west of the SEZ. About 2,514,766 acres of potentially suitable habitat occurs within the SEZ region.	65,350 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,000 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
California satintail	*Imperata brevifolia*	CA-S2	Chaparral, coastal sage scrub, creosotebush, desertscrub, mesic riparian scrub, and alkaline meadow and seep communities. Elevation ranges from 0 to 1,650 ft. Known to occur in the affected area. Nearest recorded occurrences are 5 mi east of the SEZ. About 2,526,349 acres of potentially suitable habitat occurs within the SEZ region.	65,350 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,000 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d] Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
Plants (Cont.)						
California saw-grass	*Cladium californicum*	CA-S2	Alkaline, freshwater, and riparian habitats including meadows, marshes, swamps, and seeps. Elevation ranges from 200 to 2,000 ft. Nearest recorded occurrence is from the vicinity of the Salton Sea, approximately 30 mi southwest of the SEZ. About 117,240 acres of potentially suitable habitat occurs within the SEZ region.	330 acres of potentially suitable habitat lost (0.3% of available suitable habitat)	1,250 acres of potentially suitable habitat (1.1% of available potentially suitable habitat)	Small overall impact. Avoiding or minimizing disturbance to desert playa and wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	BLM-S; CA-S2	Endemic to southern California. Inhabits chaparral desert sand dunes at elevations between 350 and 5,250 ft. Historically occurred on and in the vicinity of the SEZ; the species has not been recorded in the project area since 1964. Most recent recorded occurrences are 23 mi from the SEZ. About 84,357 acres of potentially suitable habitat occurs within the SEZ region.	13,300 acres of potentially suitable habitat lost (15.8% of available suitable habitat)	24,300 acres of potentially suitable habitat (28.8% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to desert dunes and sand transport systems on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Coves' cassia	*Senna covesii*	CA-S2	Sonoran Desert dry washes and slopes with sandy substrates within desertscrub and creosotebush scrub communities. Elevation ranges from 1,000 to 3,500 ft. Nearest recorded occurrence is 15 mi from the SEZ. About 3,164,051 acres of potentially suitable habitat occurs within the SEZ region.	80,800 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	277,800 acres of potentially suitable habitat (8.8% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Creamy blazing star	*Mentzelia tridentata*	BLM-S; CA-S2	Mojave desert creosotebush scrub communities on rocky and sandy substrates at elevations below 3,900 ft. Nearest recorded occurrences are 45 mi west of the SEZ. About 2,215,155 acres of potentially suitable habitat occurs within the SEZ region.	64,500 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	192,700 acres of potentially suitable habitat (8.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Desert pincushion	*Coryphantha chlorantha*	CA-S1	Gravelly bajadas, limestone, or dolomite rocky slopes associated with desert scrub communities within pinyon-juniper woodlands and Joshua tree woodlands. Elevation ranges from 148 to 7,875 ft. Nearest recorded occurrence is 30 mi from the SEZ. About 2,526,161 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,200 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Desert spike-moss	*Selaginella eremophila*	CA-S2	Gravelly or rocky slopes within creosotebush scrub and Sonoran desertscrub communities. Elevation ranges from 650 to 2,950 ft. Known to occur in the affected area. Nearest recorded occurrence is 5 mi south of the SEZ. About 2,514,766 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,100 acres of potentially suitable habitat (7.8% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Dwarf germander	*Teucrium cubense* ssp. *depressum*	CA-S2	Desert dunes, playas, riparian, creosotebush scrub, and desertscrub communities. Elevation ranges from 150 to 1,300 ft. Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla DWMA, about 1 mi south of the SEZ. About 2,727,570 acres of potentially suitable habitat occurs within the SEZ region.	79,000 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	221,000 acres of potentially suitable habitat (8.1% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to playas and desert dunes and sand transport systems could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Emory's crucifixion-thorn	*Castela emoryi*	CA-S2	Slightly wet alluvial bottomlands associated with basalt flows within Mojave desertscrub, nonsaline playas, creosotebush scrub, and Sonoran desertscrub communities. Elevation ranges from 295 to 2,200 ft. Known to occur in the affected area. Nearest recorded occurrence is about 1 mi from the western portion of the SEZ. About 2,594,668 acres of potentially suitable habitat occurs within the SEZ region.	65,700 acres of potentially suitable habitat lost (2.5% of available suitable habitat)	196,000 acres of potentially suitable habitat (7.6% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to playas could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Giant spanish-needle	*Palafoxia arida* var. *gigantea*	BLM-S; CA-S1	Desert sand dune habitats at elevations below 330 ft. Nearest recorded occurrences are 40 mi south of the SEZ. Suitable habitat may exist on the site. About 84,168 acres of potentially suitable habitat occurs within the SEZ region.	13,300 acres of potentially suitable habitat lost (15.8% of available suitable habitat)	24,300 acres of potentially suitable habitat (28.9% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to desert dunes and sand transport systems on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Glandular ditaxis	*Ditaxis claryana*	CA-S1	Sandy substrates within desertscrub communities at elevations below 1,525 ft. Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla DWMA, approximately 2 mi south of the SEZ. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,200 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Harwood's eriastrum	*Eriastrum harwoodii*	BLM-S; CA-S2	Known from fewer than 20 occurrences in southern California on desert dunes and other sandy habitats at elevations between 650 and 3,000 ft. Nearest recorded occurrence is 15 mi northwest of the SEZ in the Pinto Mountains DWMA. About 84,168 acres of potentially suitable habitat occurs within the SEZ region.	13,300 acres of potentially suitable habitat lost (15.8% of available suitable habitat)	24,300 acres of potentially suitable habitat (28.9% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to dunes and sand transport systems could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Harwood's milkvetch	*Astragalus insularis* var. *harwoodii*	CA-S2	Sonoran Desert of Arizona and California on sandy or gravelly substrates of desert dunes within desert scrub communities. Elevation ranges from 0 to 2,325 ft. Known to occur on the SEZ and in other portions of the affected area. About 2,610,178 acres of potentially suitable habitat occurs within the SEZ region.	78,600 acres of potentially suitable habitat lost (3.0% of available suitable habitat)	219,500 acres of potentially suitable habitat (8.4% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Jackass-clover	*Wislizenia refracta* ssp. *refracta*	CA-S1	Mojave and northern Sonoran Deserts in dunes, sandy washes, roadsides, and playas within creosotebush scrub, alkali sink, or desertscrub communities. Elevation ranges from 2,000 to 2,600 ft. Known to occur in wash habitats in the western portion of the SEZ near Palen Lake. About 813,288 acres of potentially suitable habitat occurs within the SEZ region.	29,000 acres of potentially suitable habitat lost (3.6% of available suitable habitat)	107,800 acres of potentially suitable habitat (13.3% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to dunes and sand transport systems, playas, or washes could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Latimer's woodland-gilia	*Saltugilia latimeri*	BLM-S; CA-S2	Mojave desertscrub communities, pinyon-juniper woodlands, and washes on rocky or sandy substrates at elevations between 1,300 and 6,500 ft. Nearest recorded occurrence is 30 mi west of the SEZ. About 2,920,277 acres of potentially suitable habitat occurs within the SEZ region.	80,800 acres of potentially suitable habitat lost (2.8% of available suitable habitat)	277,800 acres of potentially suitable habitat (9.5% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	BLM-S; CA-S1	Known from fewer than 20 occurrences in southern California near Joshua Tree NP in desert dunes and sandy flats with creosotebush scrub and Joshua tree woodland communities at elevations below 6,900 ft. Nearest recorded occurrences are 30 mi west of the SEZ. About 84,168 acres of potentially suitable habitat occurs within the SEZ region.	13,300 acres of potentially suitable habitat lost (15.8% of available suitable habitat)	24,300 acres of potentially suitable habitat (28.9% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to dunes and sand transport systems on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Lobed ground-cherry	*Physalis lobata*	CA-S1	Known from the northeastern Sonoran and southeastern Mojave Deserts in decomposed granitic substrates within creosotebush scrub, alkali sink, desertscrub, and playas communities. Elevation ranges from 1,650 to 2,600 ft. Nearest recorded occurrences are 20 mi northwest of the SEZ. About 2,594,668 acres of potentially suitable habitat occurs within the SEZ region.	65,600 acres of potentially suitable habitat lost (2.5% of available suitable habitat)	196,000 acres of potentially suitable habitat (7.6% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Munz's cholla	*Opuntia munzii*	BLM-S; CA-S1	Gravelly or sandy to rocky soils, often on lower bajadas, washes, flats, hills and canyon sides in Sonoran Desert creosotebush shrub communities at elevations below 3,280 ft. Nearest recorded occurrences are from the Chuckwalla DWMA, approximately 20 mi south of the SEZ. About 4,187,934 acres of potentially suitable habitat occurs within the SEZ region.	103,300 acres of potentially suitable habitat lost (2.5% of available suitable habitat)	495,500 acres of potentially suitable habitat (11.8% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Narrow-leaved psorothamnus	*Psorothamnus fremontii* var. *attenuatus*	CA-S2	Volcanic substrates of slopes, flats, and canyons within Sonoran desertscrub communities at elevations between 1,100 and 3,000 ft. Nearest recorded occurrences are from the vicinity of the Whipple Mountains, approximately 32 mi northeast of the SEZ. About 2,863,434 acres of potentially suitable habitat occurs within the SEZ region.	84,600 acres of potentially suitable habitat lost (3.0% of available suitable habitat)	326,500 acres of potentially suitable habitat (11.4% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Orocopia sage	*Salvia greatae*	BLM-S; CA-S2	Creosotebush scrub communities and dry washes at elevations below 2,600 ft. Known to occur in the affected area. Nearest occurrences are from the Chuckwalla DWMA about 2 mi south of the SEZ. About 2,853,196 acres of potentially suitable habitat occurs within the SEZ region.	97,900 acres of potentially suitable habitat lost (3.4% of available suitable habitat)	257,500 acres of potentially suitable habitat (9.0% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Parish's club-cholla	*Grusonia parishii*	CA-S2	Silty, sandy, or gravelly flats, dunelets, and hills within Joshua tree woodlands, creosotebush scrub, and desertscrub communities. Elevation ranges from 100 to 5,000 ft. Nearest recorded occurrences are 10 mi west of the SEZ. About 2,995,669 acres of potentially suitable habitat occurs within the SEZ region.	97,900 acres of potentially suitable habitat lost (5.7% of available suitable habitat)	359,000 acres of potentially suitable habitat (12.0% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Pink fairy-duster	*Calliandra eriophylla*	CA-S2	Sandy or rocky substrates in creosote and desertscrub communities. Elevation ranges between 390 and 4,900 ft. Known to occur in the affected area. The species is known to occur in habitats along I-10 about 0.5 mi south of the SEZ. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,200 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Purple-nerve cymopterus	*Cymopterus multinervatus*	CA-S2	Sandy or gravelly slopes within desertscrub, Joshua tree woodland, and pinyon-juniper woodland communities. Elevation ranges from 2,600 to 5,900 ft. Nearest recorded occurrences are from San Bernardino County, California, approximately 40 mi northwest of the SEZ. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	195,200 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Saguaro cactus	*Carnegiea gigantea*	CA-S1	Endemic to the Sonoran Desert along the Colorado River from the Whipple Mountains to Laguna Dam. Rocky substrates within Sonoran desertscrub and creosotescrub communities at elevations between 160 and 4,900 ft. Nearest recorded occurrence is from the Palo Verde Mountains WA, approximately 10 mi south of the SEZ. About 2,863,434 acres of potentially suitable habitat occurs within the SEZ region.	84,600 acres of potentially suitable habitat lost (3.0% of available suitable habitat)	326,500 acres of potentially suitable habitat (11.4% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Salt Spring checkerbloom	*Sidalcea neomexicana*	CA-S2	Alkaline or mesic substrates within riparian wetlands, marshes, springs, chaparral, coastal scrub, coniferous forest, desertscrub, and playas habitats. Elevation ranges from 50 to 5,000 ft. Nearest recorded occurrences are approximately 40 mi northwest of the SEZ. About 2,643,589 acres of potentially suitable habitat occurs within the SEZ region.	65,700 acres of potentially suitable habitat lost (2.5% of available suitable habitat)	196,500 acres of potentially suitable habitat (7.4% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert playa and wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Sand evening-primrose	*Camissonia arenaria*	CA-S2	Sandy washes and rocky slopes within Sonoran desertscrub communities at elevations below 3,000 ft. Nearest recorded occurrence is 13 mi south of the SEZ in the Chuckwalla DWMA. About 3,501,475 acres of potentially suitable habitat occurs within the SEZ region.	100,100 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	409,000 acres of potentially suitable habitat (11.7% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Slender cottonheads	*Nemacaulis denudata* var. *gracilis*	CA-S2	Southern California within the Mojave and Sonoran Deserts on sandy soils within coastal dunes, desert dunes, creosotebush scrub, and desertscrub communities at elevations below 1,300 ft. Nearest recorded occurrences are 40 mi west of the SEZ. About 1,786,349 acres of potentially suitable habitat occurs within the SEZ region.	78,600 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	219,500 acres of potentially suitable habitat (12.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Small-flowered androstephium	*Androstephium breviflorum*	CA-S1	Dry sandy to rocky soil substrates in desert dunes within creosotebush scrub and Mojavean desertscrub at elevations between 720 and 2,100 ft. Nearest occurrences are approximately 10 mi north of the SEZ. About 2,715,222 acres of potentially suitable habitat occurs within the SEZ region.	98,000 acres of potentially suitable habitat lost (3.6% of available suitable habitat)	351,000 acres of potentially suitable habitat (12.9% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
Spear-leaf matelea	*Matelea parvifolia*	CA-S2	Endemic to southeastern California on rocky substrates within creosotebush and desertscrub communities at elevations between 1,450 and 3,600 ft. Known to occur in the affected area. Nearest recorded occurrences are 5 mi south of the SEZ in the Chuckwalla DWMA. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,200 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Thorny milkwort	*Polygala acanthoclada*	CA-S2	Loose, sandy or gravelly slopes within shadscale scrub, chenopod scrub, Joshua tree woodland, and pinyon-juniper woodland communities at elevations between 2,500 and 7,500 ft. Nearest recorded occurrences are 25 mi west of the SEZ. About 2,526,161 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,200 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Three-awned grama	*Bouteloua trifida*	CA-S2	Eastern Mojave Desert mountains on dry, rocky, often calcareous slopes within desertscrub communities. Elevation ranges between 2,300 and 6,500 ft. Nearest recorded occurrence is 40 mi north of the SEZ. About 2,282,236 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	195,200 acres of potentially suitable habitat (8.6% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

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 (Cont.)						
White-margined beardtongue	*Penstemon albomarginatus*	BLM-S; CA-S1; FWS-SC	Desert sand dune habitats and Mojave desertscrub communities at elevations below 3,600 ft. Nearest recorded occurrences are 50 mi north of the SEZ. About 2,366,404 acres of potentially suitable habitat occurs within the SEZ region.	78,600 acres of potentially suitable habitat lost (3.3% of available suitable habitat)	219,500 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Wiggins' cholla	*Opuntia wigginsii*	CA-S1	Sandy substrates of small washes and flats within creosotebush scrub and Sonoran desertscrub communities. Elevation ranges from 100 to 2,900 ft. Known to occur in the affected area. Nearest recorded occurrences are approximately 5 mi south of the SEZ. About 2,909,226 acres of potentially suitable habitat occurs within the SEZ region.	80,800 acres of potentially suitable habitat lost (2.8% of available suitable habitat)	277,700 acres of potentially suitable habitat (9.5% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Arthropods						
Bradley's cuckoo wasp	*Ceratochrysis bradleyi*	CA-S1	Endemic to California where it is known only from eastern Riverside County in Sonoran desertscrub, creosote-scrub, yucca and cholla cactus, saltbush, and desert dune communities. Known to occur in the affected area. Nearest recorded occurrence is 2 mi east of the SEZ. About 2,610,178 acres of potentially suitable habitat occurs within the SEZ region.	13,300 acres of potentially suitable habitat lost (0.5% of available suitable habitat)	28,400 acres of potentially suitable habitat (1.1% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

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]
Arthropods (Cont.)						
Cheeseweed owlfly	*Oliarces clara*	CA-S1; FWS-SC	Colorado River drainage of southwestern Arizona and southern California within creosote-scrub communities on or near bajadas at elevations below 330 ft. Nearest recorded occurrence is 10 mi north of the SEZ. About 2,215,155 acres of potentially suitable habitat occurs within the SEZ region.	64,500 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	192,700 acres of potentially suitable habitat (8.7% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Riverside cuckoo wasp[m]	***Hedychridium argenteum***	CA-S1	Endemic to California where it is known only from eastern Riverside County in Sonoran desertscrub, creosotebush scrub, yucca and cholla cactus, saltbush, and desert dune communities. The only known CNDDB occurrence for this species is within the SEZ near the southern border of the SEZ. About 2,610,178 acres of potentially suitable habitat occurs within the SEZ region.	78,600 acres of potentially suitable habitat lost (3.0% of available suitable habitat)	219,500 acres of potentially suitable habitat (8.4% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Roberts' rhopalolemma bee	*Rhopalolemma robertsi*	CA-S1	Endemic to southern California from desert wash habitats in southern San Bernardino County. Nearest recorded occurrences are 35 mi west of the SEZ. About 637,257 acres of potentially suitable habitat occurs within the SEZ region.	15,500 acres of potentially suitable habitat lost (2.4% of available suitable habitat)	82,500 acres of potentially suitable habitat (13.0% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d] Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
Amphibians						
Couch's spadefoot	*Scaphiopus couchii*	CA-S2; CA-SC	Scattered populations east of the Algodones Mountains north along the Colorado River in wetland habitats that include temporary pools, ponds, and puddles. Often occurs in arid and semiarid shrublands, shortgrass plains, mesquite savanna, creosotebush, thorn forest, and cultivated areas. Elevation ranges from 690 to 1,120 ft. Nearest recorded occurrences are 6 mi southeast of the SEZ. About 424,690 acres of potentially suitable habitat occurs within the SEZ region.	18,500 acres of potentially suitable habitat lost (4.3% of available suitable habitat)	63,000 acres of potentially suitable habitat (14.9% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Reptiles						
Desert tortoise	***Gopherus agassizii***	ESA-T; CA-T; CA-S2	Mojave and Sonoran Deserts in desert creosotebush communities on firm soils for digging burrows, along riverbanks, washes, canyon bottoms, creosote flats, and desert oases. Known to occur on the SEZ (western and northeastern portions) and in the affected area. About 4,205,025 acres of potentially suitable habitat occurs within the SEZ region.	136,800 acres of potentially suitable habitat lost (3.3% of available suitable habitat)	442,000 acres of potentially suitable habitat (10.5% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and 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 CDFG.

TABLE 9.4.12.1-1 (Cont.)

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]
Reptiles (Cont.)						
Mojave fringe-toed lizard	*Uma scoparia*	BLM-S; CA-SC	Sandy habitats in the Mojave Desert from Death Valley south to the Colorado River near Blythe, California, and extreme western Arizona. Sparsely vegetated desert areas with fine windblown sand, including dunes, flats, and washes at elevations below 3,000 ft. Nearest recorded occurrences are 25 mi north of the SEZ. About 1,840,628 acres of potentially suitable habitat occurs within the SEZ region.	108,700 acres of potentially suitable habitat lost (5.9% of available suitable habitat)	415,000 acres of potentially suitable habitat (22.6% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance of desert dunes and sand transport systems or washes could reduce impacts. In addition, pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects could reduce impacts.
Rosy boa	*Charina trivirgata*	BLM-S; FWS-SC	Southeastern California and western Arizona in scrublands, rocky deserts, and canyons with permanent or intermittent streams. Nearest recorded occurrences are from Joshua Tree NP, approximately 25 mi west of the SEZ. About 4,171,153 acres of potentially suitable habitat occurs within the SEZ region.	136,900 acres of potentially suitable habitat lost (3.3% of available suitable habitat)	443,300 acres of potentially suitable habitat (10.6% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and 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.

TABLE 9.4.12.1-1 (Cont.)

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]
Birds						
Bendire's thrasher	***Toxostoma bendirei***	BLM-S; CA-SC	Summer resident in the SEZ region in a variety of desert habitats with fairly large shrubs or cacti and open ground, or open woodland with scattered shrubs and trees, between 0 and 550 m elevation. Nearest recorded occurrence is 2 mi south of the SEZ in the Chuckwalla DWMA. About 2,526,161 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.6% of available suitable habitat)	195,000 acres of potentially suitable habitat (7.7% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Ferruginous hawk	*Buteo regalis*	BLM-S; FWS-SC	Winter resident and migrant in the SEZ region at lower elevations in open grasslands, shrublands, sagebrush flats, desertscrub, desert valleys, and fringes of pinyon-juniper habitats. Occurs in Riverside County, California, in the SEZ region. About 1,978,858 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable foraging habitat lost (3.3% of available suitable habitat)	244,600 acres of potentially suitable habitat (12.4% of available potentially suitable habitat)	Moderate overall 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.
Golden eagle	*Aquila chrysaetos*	BLM-S; CA-FP	An uncommon to common permanent resident and migrant in southern California. Habitat includes rolling foothills, mountain areas, and desert shrublands. Nests on cliff faces and in large trees in open areas. About 3,104,000 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable foraging habitat lost (2.1% of available suitable habitat)	244,600 acres of potentially suitable habitat (7.9% of available potentially suitable habitat)	Moderate overall 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 9.4.12.1-1 (Cont.)

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]
Birds (Cont.)						
Hepatic tanager	*Piranga flava*	CA-S1	Summer resident in SEZ region in open coniferous forests, montane pine-oak forests, riparian woodlands, and pine savanna. Nests high in coniferous or deciduous trees. Nearest recorded occurrences are 17 mi from the SEZ. About 3,283 acres of potentially suitable habitat occurs within the SEZ region.	0 acres	228 acres of potentially suitable habitat (6.9% of available potentially suitable habitat)	Small overall impact. No direct effects. Only indirect effects are possible.
Loggerhead shrike	*Lanius ludovicianus*	CA-SC; FWS-SC	Breeds in SEZ region in open woodlands with moderate grass cover interspersed with areas of bare ground. Nearest recorded occurrences are approximately 10 mi south of the SEZ. About 3,635,415 acres of potentially suitable habitat occurs within the SEZ region.	147,000 acres of potentially suitable habitat lost (4.1% of available suitable habitat)	457,200 acres of potentially suitable habitat (12.6% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance of all woodland habitat on the SEZ would reduce or eliminate impacts. Alternatively, pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

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]
Birds (Cont.)						
Western burrowing owl	*Athene cunicularia hypugaea*	BLM-S; CA-S2; CA-SC; FWS-SC	Year-round resident in the SEZ region. Open areas with short, sparse vegetation, including grasslands, agricultural fields, and disturbed areas. Nests in burrows created by mammals or tortoises. Known to occur in the affected area. Nearest occurrences are within 1 mi east of the SEZ. About 4,653,092 acres of potentially suitable habitat occurs within the SEZ region.	147,000 acres of potentially suitable habitat lost (3.2% of available suitable habitat)	553,500 acres of potentially suitable habitat (11.9% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied burrows and habitats in the area of direct effects or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Mammals						
Arizona myotis	*Myotis occultus*	CA-S2; CA-SC; FWS-SC	Ponderosa pine and oak-pine woodlands in close proximity to water, and riparian forests within along the Colorado River. Known to occur in the affected area. Nearest recorded occurrences are 4 mi east of the SEZ. About 802,324 acres of potentially suitable habitat occurs within the SEZ region.	15,500 acres of potentially suitable habitat lost (1.9% of available suitable habitat)	83,000 acres of potentially suitable habitat (10.3% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d] Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
Mammals (Cont.)						
California leaf-nosed bat	*Macrotus californicus*	BLM-S; CA-S2; CA-SC; FWS-SC	Year-round resident in SEZ region in desert riparian, desert wash, desertscrub, and palm oasis habitats at elevations below 2,000 ft. Roosts in mines, caves, and buildings. Known to occur in the affected area. Nearest recorded occurrences are from the Palen-McCoy Wilderness within 2 mi of the SEZ. About 3,973,317 acres of potentially suitable habitat occurs within the SEZ region.	84,800 acres of potentially suitable habitat lost (2.1% of available suitable habitat)	358,700 acres of potentially suitable habitat (9.0% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.
Cave myotis	*Myotis velifer*	BLM-S; CA-S1; CA-SC; FWS-SC	Year-round resident in SEZ region in desertscrub, shrublands, washes, and riparian habitats. Roosts in colonies in caves. Known to occur in the affected area. Nearest recorded occurrence is from the Mule Mountains ACEC about 2 mi south of the SEZ. About 4,136,719 acres of potentially suitable habitat occurs within the SEZ region.	84,800 acres of potentially suitable habitat lost (2.0% of available suitable habitat)	359,000 acres of potentially suitable habitat (8.7% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

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]
Mammals (Cont.)						
Colorado Valley woodrat	*Neotoma albigula venusta*	CA-S1	Low-lying desert, creosote-mesquite, and pinyon-juniper habitats. Distribution is strongly influenced by the availability of den-building materials, including litter of cholla, prickly pear, mesquite, and catclaw, as well as its low tolerance for cold temperatures. Known to occur in the affected area. Nearest recorded occurrences are on BLM lands about 1 mi southeast of the SEZ. About 3,066,791 acres of potentially suitable habitat occurs within the SEZ region.	144,800 acres of potentially suitable habitat lost (4.7% of available suitable habitat)	423,400 acres of potentially suitable habitat (13.8% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	BLM-S; FWS-SC	Open, steep rocky terrain in mountainous habitats of the eastern Mojave and Sonoran Deserts in California. Rarely uses desert lowlands, except as corridors for travel between mountain ranges. Known to occur in the affected area. Nearest recorded occurrences are from the Joshua Tree Wilderness and the Chuckwalla DWMA, about 2 mi north, west, and south of the SEZ. About 1,896,141 acres of potentially suitable habitat occurs within the SEZ region.	10,500 acres of potentially suitable habitat lost (0.6% of available suitable habitat)	121,000 acres of potentially suitable habitat (6.4% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats within the SEZ other habitats that serve as movement corridors could further reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

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]
Mammals (Cont.)						
Pallid bat	*Antrozous pallidus*	BLM-S; CA-SC; FWS-SC	Year-round resident in SEZ region in low-elevation desert communities, including grasslands, shrublands, and woodlands. Roosts in caves, crevices, and mines. Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla Mountains Wilderness approximately 5 mi south of the SEZ. About 3,668,119 acres of potentially suitable habitat occurs within the SEZ region.	69,300 acres of potentially suitable habitat lost (1.9% of available suitable habitat)	276,000 acres of potentially suitable habitat (7.5% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.
Palm Springs pocket mouse	*Perognathus longimembris bangsi*	BLM-S; CA-S2; CA-SC	Creosote scrub, desertscrub, and grasslands on loose or sandy soils. Nearest recorded occurrence is from the Chuckwalla DWMA, approximately 25 mi west of the SEZ. About 3,749,649 acres of potentially suitable habitat occurs within the SEZ region.	146,000 acres of potentially suitable habitat lost (3.9% of available suitable habitat)	427,000 acres of potentially suitable habitat (11.4% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	CA-S2; CA-SC; FWS-SC	Year-round resident in SEZ region lowland areas, including creosotebush and chaparral habitats in association with very large boulders, high cliffs, rugged rock outcroppings, and rocky canyons. Nearest recorded occurrences are 37 mi south of the SEZ. About 1,964,239 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (3.3% of available suitable habitat)	195,000 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]: Within SEZ (Direct Effects)[e]	Outside SEZ (Indirect Effects)[f]	Overall Impact Magnitude[g] and Species-Specific Mitigation[h]
Mammals (Cont.)						
Spotted bat	*Euderma maculatum*	BLM-S; CA-S2	Year-round resident in SEZ region in deserts, grasslands, and mixed coniferous forests at elevations below 10,000 ft. Roosts in caves, rock crevices, and buildings. Nearest recorded occurrence is 40 mi west of the SEZ. Suitable habitat exists on the site. About 2,363,936 acres of potentially suitable habitat occurs within the SEZ region.	65,300 acres of potentially suitable habitat lost (2.8% of available suitable habitat)	195,500 acres of potentially suitable habitat (8.3% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM-S; CA-S2; CA-SC; FWS-SC	Year-round resident in SEZ region in all habitats but subalpine and alpine habitats, and at any season. Roosts in caves, mines, tunnels, buildings, or other man-made structures. Known to occur in the affected area. Nearest recorded occurrences are approximately 4 mi southeast of the SEZ. About 5,065,765 acres of potentially suitable habitat occurs within the SEZ region.	118,000 acres of potentially suitable habitat lost (2.3% of available suitable habitat)	581,500 acres of potentially suitable habitat (11.5% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

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]
Mammals (Cont.)						
Western mastiff bat	*Eumops perotis californicus*	BLM-S; CA-SC; FWS-SC	Year-round resident in SEZ region in open semiarid habitats, including conifer and deciduous woodlands, shrublands, grasslands, chaparral, and urban areas. Roosts in crevices in cliff faces, buildings, and tall trees. Known to occur in the affected area. Nearest recorded occurrence is 5 mi south of the SEZ. About 4,069,881 acres of potentially suitable habitat occurs within the SEZ region.	118,000 acres of potentially suitable habitat lost (2.9% of available suitable habitat)	581,500 acres of potentially suitable habitat (14.3% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.
Western small-footed myotis	*Myotis ciliolabrum*	BLM-S; CA-S2	Year-round resident in SEZ region in woodland and riparian habitats at elevations below 9,000 ft. Roosts in caves, buildings, mines, and crevices of cliff faces. Nearest recorded occurrence is from the Chocolate Mountains, approximately 30 mi south of the SEZ. About 661,873 acres of potentially suitable habitat occurs within the SEZ region.	15,500 acres of potentially suitable habitat lost (2.3% of available suitable habitat)	83,000 acres of potentially suitable habitat (12.5% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

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]
Mammals (Cont.)						
Western yellow bat	*Lasiurus xanthinus*	BLM-S; AZ-WSC; AZ-S2; CA-SC	Year-round resident in SEZ region in desert riparian, desert wash, and palm oasis habitats at elevations below 2,000 ft. Roosts in trees. Nearest recorded occurrence is from Blythe, California, approximately 6 mi east of the SEZ. About 1,340,978 acres of potentially suitable habitat occurs within the SEZ region.	15,500 acres of potentially suitable habitat lost (1.2% of available suitable habitat)	83,000 acres of potentially suitable habitat (6.2% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoidance or minimization of disturbance to discovered roost areas on the SEZ could reduce impacts.
Yuma mountain lion	*Puma concolor browni*	CA-S1; CA-SC	Riparian bottomlands, cottonwood-willow forests, mesquite bosques, adjacent desert foothills, low rocky mountains, and canyons within desert, chaparral shrubland, and mixed woodland communities especially sites with dense vegetation, caves or other natural cavities, rocky outcrops ranging, and tree/brush edges. Elevation ranges from 1,000 to 3,500 ft. Nearest recorded occurrences are 25 mi south of the SEZ. About 2,833,446 acres of potentially suitable habitat occurs within the SEZ region.	126,000 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	458,000 acres of potentially suitable habitat (16.2% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoidance or minimization of disturbance to habitats within the SEZ that serve as movement corridors could further reduce impacts.

Footnotes on next page.

TABLE 9.4.12.1-1 (Cont.)

[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 9.4.12.1-1 of the Draft Solar PEIS.

[b] BLM-S = listed as a sensitive species by the BLM; CA-E = listed as endangered by the State of California; CA-S1 = ranked as S1 in the state of California; CA-S2 = ranked as S2 in the state of California; CA-T = listed as threatened by the State of California; ESA-T = listed as threatened under the ESA; ESA-UR = under review for listing under the ESA; FWS-SC = USFWS species of concern. An asterisk denotes that the listing status applies to populations only within the state of Arizona.

[c] For plant and invertebrate species, potentially suitable habitat was determined by using CAReGAP and SWReGAP land cover types (USGS 2005; Davis et al. 1998). For reptile, bird, and mammal species, potentially suitable habitat was determined by using CAReGAP and SWReGAP habitat suitability models as well as land cover models (USGS 2005; Davis et al. 1998). Area of potentially suitable habitat for each species is presented for the SEZ region, defined as the area within 50 mi (80 km) of the SEZ center.

[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 using CAReGAP or SWReGAP habitat suitability and land cover models (USGS 2005; Davis et al. 1998). This approach probably overestimates the amount of suitable habitat in the project area. Impacts of access road and transmission line construction, upgrade, or operation are not assessed in this evaluation because of the proximity of existing infrastructure to the SEZ.

[e] Direct effects within the SEZ consist of the ground-disturbing activities associated with construction and the 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. Indirect effects include effects from surface runoff, dust, noise, lighting, and so on from the SEZ, but do not include ground-disturbing activities. The potential degree of indirect effects would decrease with increasing distance from the SEZ.

[g] Overall impact magnitude categories were based on professional judgment and include (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; and (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. Programmatic 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] Elevations in the areas of direct and indirect effects range from about 230 ft (70 m) to 3,800 ft (1,160 m).

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

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

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

[m] Species in bold text have been recorded or have designated critical habitat in the affected area.

Golden Eagle

The golden eagle is an uncommon to common permanent resident in southern California. This species was not analyzed for the Riverside East 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 revised area of the SEZ and throughout the area of indirect effects (Table 9.4.12.1-1). On the basis of an evaluation of CAReGAP land cover types, approximately 5,000 acres (20 km^2) of cliffs and rock outcrops, which may represent potentially suitable nesting habitat, occurs on the SEZ (Table 9.4.12.1-1). However, nesting habitat for the golden eagle is not likely to occur on the SEZ, because lands with <5% slope are not suitable golden eagle nesting habitat.

9.4.12.1.3 State-Listed Species

Two species listed by the State of California were discussed in the Draft Solar PEIS for the Riverside East SEZ—the desert tortoise and the Gila woodpecker. The desert tortoise is listed as threatened under the CESA; this species was previously discussed as a species listed under the ESA (Section 9.4.12.1.1). The Gila woodpecker is listed as endangered under the CESA. As determined in the Draft Solar PEIS, impacts on this species were determined to be small; no updated information for this species is presented in this Final Solar PEIS, because there is no new information regarding the species' potential occurrence on the SEZ and impacts on this species from solar energy development within the revised SEZ are still considered to be small.

One additional species included in this Final Solar PEIS—the golden eagle—is listed as a California fully protected species. This species was previously discussed as a BLM-designated sensitive species (Section 9.4.12.1.2).

9.4.12.1.4 Rare Species

Of the 68 rare species evaluated in the Draft Solar PEIS for the Riverside East SEZ, 64 of these species are re-evaluated in this Final Solar PEIS. Of these rare species, 37 have not been discussed as ESA-listed species (Section 9.4.12.1.1), BLM-designated sensitive (Section 9.4.12.1.2), or state-listed (Section 9.4.12.1.3). Each of these species has the potential to occur in the affected area of the revised Riverside East SEZ. Information regarding the ecology and distribution of potentially suitable habitat for these species is presented in Table 9.4.12.1-1.

9.4.12.2 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 Riverside East SEZ could affect potentially suitable habitats of special status species. The analysis presented in the Draft Solar PEIS for the Riverside East SEZ indicated that development would result in moderate or large overall impacts on most special status species (Table 9.4.12.1-1 in the Draft Solar PEIS). Development within the revised Riverside East SEZ could still affect the same special status species evaluated in the Draft Solar PEIS. However, the reduction in the SEZ boundaries and the developable area of the Riverside East SEZ would result in reduced impact levels compared to original estimates in the Draft Solar PEIS. Those species that were determined to have moderate or large impacts in the Draft Solar PEIS are discussed below and in Table 9.4.12.1-1. Impacts on species that were determined to have small overall impacts in the Draft Solar PEIS are not discussed, because impacts on these species in the revised SEZ are expected to remain small.

In addition, impacts on the golden eagle—a special status species that was not evaluated for the Riverside East SEZ in the Draft Solar PEIS—are discussed below and in Table 9.4.12.1-1. The impact assessment for this additional species was carried out in the same way as for those species analyzed in the Draft Solar PEIS (Section 9.4.12.2 of the Draft Solar PEIS).

9.4.12.2.1 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 are present for digging burrows. 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 9.4.12.1-1; Table 9.4.12.1-1). According to habitat suitability models, approximately 136,800 acres (554 km^2) of potentially suitable habitat could be directly affected by construction and operations of solar energy development on the revised SEZ (Table 9.4.12.1-1). This direct effects area represents about 3.3% of available suitable habitat of the desert tortoise in the region. The USGS desert tortoise model (Nussear et al. 2009) indicates that the majority of the SEZ is composed of less suitable habitat than the surrounding landscape (modeled suitability value ≤0.5 out of 1.0). About 442,000 acres (1,789 km^2) of suitable habitat occurs in the area of potential indirect effects; this area represents about 10.5% of the available suitable habitat in the region (Table 9.4.12.1-1).

On the basis of desert tortoise surveys conducted in Joshua Tree NP, near the western border of the revised SEZ, the USFWS estimated that 80% build-out of scale solar energy development on the SEZ may directly affect up to 2,865 desert tortoises on the SEZ (Stout 2009). In addition to direct impacts, development on the SEZ could indirectly affect desert tortoises by fragmenting and degrading adjacent habitat.

Information provided by the USFWS since the publication of the Draft Solar PEIS has identified the SEZ as being situated in an area that provides habitat and genetic connectivity between areas with greater habitat suitability north and south of the SEZ where desert tortoise densities are presumably higher (Figure 9.4.12.1-1) (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 Riverside East SEZ, therefore, may isolate and fragment these tortoise populations by creating impediments to natural migration patterns. The SEZ is situated between the Chuckwalla and Pinto Mountains DWMAs (these DWMAs also contain USFWS-designated critical habitat for desert tortoise), and the SEZ may provide important connectivity for desert tortoise movements between the DWMAs (BLM and CDFG 2002; Stout 2009). Therefore, development on the SEZ may disrupt desert tortoise population dynamics in nearby DWMAs and designated critical habitat. Fragmentation would be exacerbated by the installation of exclusionary fencing at the perimeter of the SEZ or individual project areas.

The overall impact on the desert tortoise from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Riverside East SEZ is considered moderate, because the amount of potentially suitable habitat for this species in the area of direct effects represents between 1 and 10% of potentially suitable habitat in the region, and the implementation of programmatic design features alone is unlikely to substantially reduce these impacts. Avoidance of all 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.

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 (if necessary). In addition, the CESA provides authority to the CDFG to regulate potential impacts on the desert tortoise and other species listed under the CESA. Therefore, formal consultation with the CDFG would also be required to permit the incidental take of desert tortoises in the SEZ.

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 CDGF and follow the *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council 1994) and other current translocation guidance provided by the USFWS and CDFG. Consultation will identify potentially suitable recipient locations, density thresholds for tortoise populations in recipient locations, 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 of the desert tortoise, translocation is widely accepted as a useful strategy for the conservation of this species (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 enhancement of desert tortoise habitat on existing federal lands. Consultations with the USFWS and CDGF would be necessary to determine the appropriate mitigation ratio to acquire, enhance, and preserve desert tortoise compensation lands.

9.2.12.2.2 Impacts on BLM-Designated Sensitive Species

Impacts on the 25 BLM-designated sensitive species that are re-evaluated for this Final Solar PEIS are discussed in Table 9.4.12.1-1. Impacts for two of these species (alkali mariposa-lily and Nelson's bighorn sheep) were reduced from moderate to small overall levels. For all other BLM-designated sensitive species re-evaluated for this Final Solar PEIS, there is no additional information that would alter the potential for these species to be affected by solar energy development within the revised SEZ (see Section 9.4.12.2.2 in the Draft Solar PEIS for a discussion of impacts on these species); overall impact determinations for these remaining BLM-designated sensitive species remain moderate or large (Table 9.4.12.1-1). Impacts on the one additional BLM-designated sensitive species, the golden eagle, are discussed below.

Golden Eagle

The golden eagle was not analyzed for the Riverside East SEZ in the Draft Solar PEIS. This species is an uncommon to common permanent resident in southern California, and potentially suitable foraging habitat is expected to occur in the affected area of the revised Riverside East SEZ. Approximately 65,300 acres (264 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct effects area represents 2.1% of potentially suitable habitat in the SEZ region. About 244,600 acres (990 km^2) of potentially suitable foraging habitat occurs in the area of indirect effects; this area represents about 7.9% of the available suitable foraging habitat in the SEZ region (Table 9.4.12.1-1). Most of this area could serve as foraging habitat (open shrublands). On the basis of an evaluation of CAReGAP land cover types, approximately 5,000 acres (20 km^2) of cliffs and rock outcrops, which may represent potentially suitable nesting habitat, occurs on the SEZ (Table 9.4.12.1-1).

The overall impact on the golden eagle from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Riverside East SEZ is considered moderate, because the amount of potentially suitable habitat for this species in the area of direct effects represents between 1% and 10% 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 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.

9.4.12.2.3 Impacts on State-Listed Species

Two species listed by the State of California were discussed in the Draft Solar PEIS for the Riverside East SEZ—the desert tortoise and the Gila woodpecker. The desert tortoise is listed as threatened under the CESA; impacts on this species were previously discussed in Section 9.4.12.2.1) due to this species' status under the ESA. The Gila woodpecker is listed as endangered under the CESA. As determined in the Draft Solar PEIS, impacts on this species were determined to be small; no updated information for this species is presented in this Final Solar PEIS, because there is no new information regarding the species' potential occurrence on the SEZ and impacts on this species from solar energy development within the revised SEZ are still considered to be small.

One additional species included in this Final Solar PEIS, the golden eagle, is listed as a California fully protected species. Impacts on this species were previously discussed in Section 9.4.12.2.2 due to this species' status under the BLM.

9.4.12.2.4 Impacts on Rare Species

Of the 68 rare species evaluated in the Draft Solar PEIS for the Riverside East SEZ, 64 of these species are re-evaluated in this Final Solar PEIS. Of these rare species, impacts on 37 have not been previously discussed in Sections 9.4.12.2.1, 9.4.12.2.2, or 9.4.12.2.3. Each of these species has the potential to occur in the affected area of the revised Riverside East SEZ. Impacts for these remaining 37 special status species are presented in Table 9.4.12.1-1.

9.4.12.3 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 guide 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 9.4.12.1-1 of the Draft Solar PEIS and the golden eagle. 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 of desert playa and wash habitats within the SEZ shall be avoided or minimized to the extent practicable. Ford Dry Lake, Palen Lake, and

McCoy Wash represent the greatest amount of desert playa and wash habitat on the SEZ, and these habitats have been identified as non-developable areas. Pre-disturbance surveys shall be conducted to determine the presence of additional desert playa and wash habitat within the developable area; development within these habitats shall be avoided or minimized to the extent practicable. Adverse impacts on the following species may be reduced with the avoidance of these playas and desert wash habitats on the SEZ: alkali mariposa-lily, California saw-grass, Coves' cassia, Emory's crucifixion-thorn, jackass-clover, Salt Spring checkerbloom, sand evening-primrose, Roberts' rhopalolemma bee, and crissal thrasher.

- Disturbance of sand dune habitats and sand transport systems on the SEZ shall be avoided or minimized to the extent practicable. Substantial sand dune habitat has now been eliminated from the developable area within the SEZ. However, pre-disturbance surveys shall be conducted to determine the presence of additional sand dune habitat within the developable area; development within these habitats shall be avoided or minimized to the extent practicable. Adverse impacts on the following species could be reduced with the avoidance of sand dune habitats and sand transport systems: chaparral sand-verbena, dwarf germander, giant Spanish-needle, Harwood's eriastrum, jackass-clover, little San Bernardino Mountains linanthus, and Mojave fringe-toed lizard.

- Consultations with the USFWS and the CDFG shall be conducted to address the potential for impacts on the desert tortoise, a species listed as threatened under the ESA and CESA. Consultation will identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.

- Occupied habitats for species that are designated as California fully protected species shall be completely avoided. Under California Fish and Game Code Sections 3511, 4700, 5050, and 5515, take or possession of these species is prohibited at any time. Minimization and mitigation measures cannot be developed for California fully protected species. This policy applies to any habitats utilized by the golden eagle in the affected area of the revised Riverside East SEZ.

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, the following SEZ-specific design feature for special status species has been identified:

Within the SEZ, two north–south wildlife corridors of sufficient width (a minimum width of 1.3 mi [2 km], but wider if determined to be necessary through future site-specific studies) should be identified by the BLM in coordination with the FWS and the California Department of Game and Fish. These corridors should be identified as non-development areas within the SEZ on the basis of modeling data (Penrod et al 2012) and subsequent field verification of permeability for wildlife.

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. 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.

9.4.13 Air Quality and Climate

9.4.13.1 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 valid.

9.4.13.1.1 Existing Air Emissions

The Draft Solar PEIS presented Riverside County emissions data for 2002. More recent data for 2008 (ARB 2009) were reviewed. The two emissions inventories are from different sources and assumptions; for example, the 2008 data did not include biogenic VOC emissions. In the more recent data, emissions of SO_2, CO, VOCs and $PM_{2.5}$ were lower, while emissions of NO_x and PM_{10} were higher. These changes would not affect modeled air quality impacts presented in this update.

9.4.13.1.2 Air Quality

The calendar quarterly average NAAQS of 1.5 $\mu g/m^3$ for lead (Pb) presented in Table 9.4.13.1-2 of the Draft Solar PEIS has been replaced by the rolling 3-month standard (0.15 $\mu g/m^3$). The federal 24-hour and annual SO_2 and 1-hour O_3, standards have been revoked as well (EPA 2011). These changes will not affect the modeled air quality impacts presented in this Final Solar PEIS. CAAQS have not been changed.

Given the reduced size of the proposed Riverside East SEZ, the distances to the nearest Class I areas are somewhat larger than were presented in the Draft Solar PEIS. Previously, Joshua Tree NP abutted the proposed SEZ. With the revised boundaries, Joshua Tree NP is about

1.8 mi (2.9 km) from the nearest SEZ boundary. All other Class I areas are located beyond 62 mi (100 km) of the updated boundaries of the proposed Riverside East SEZ.

9.4.13.2 Impacts

9.4.13.2.1 Construction

Methods and Assumptions

The methods and assumptions remain almost the same as presented in the Draft Solar PEIS, except for the following. In the Draft Solar PEIS, a hypothetical disturbance area of 9,000 acres (36.4 km^2) was modeled, assumed to be located between the Joshua Tree NP and scattered residences north of Lake Tamarisk to maximize potential impacts on both. In this Final Solar PEIS, the assumed location of the disturbance area of 9,000 acres (36.4 km^2) was moved to the south near Lake Tamarisk and the town of Desert Center because of the removal from the SEZ of the northernmost areas adjacent to Joshua Tree NP. Because of this southward shift of the modeled area, predicted concentration levels are lower at Joshua Tree NP but higher at residences than those presented in the Draft Solar PEIS.

Results

Potential particulate air impacts from construction were remodeled based on the revised boundaries of the proposed Riverside East SEZ.[2] As noted in Table 9.4.13.2-1 of the Draft Solar PEIS, the background levels of 24-hour and annual PM_{10} in the Draft were above the standard levels used for comparison. Thus, any increase from construction emissions would increase levels already above the comparison levels. Background levels of annual $PM_{2.5}$ were 90% of the standard level. Changes in magnitude to predicted impacts at the boundary would be expected to be larger than changes at greater distances from the SEZ. Table 9.4.13.2-1 presents the updated maximum modeled concentrations from construction fugitive dust.

Although the total disturbed area analyzed was the same for the Draft Solar PEIS and this Final Solar PEIS, the revised maximums at the SEZ boundaries are lower by about 10 to 25% than those in the Draft Solar PEIS, although totals could still exceed the NAAQS/SAAQS levels. These updated predictions are still consistent with the conclusion in the Draft Solar PEIS that

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[2] 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 the like, is not known; thus air quality modeling cannot be conducted. It has been assumed that an area of 9,000 acres (36.4 km^2) in total would be disturbed continuously; thus 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 9.4.13.2-1 Maximum Air Quality Impacts from Emissions Associated with Construction Activities for the Proposed Riverside East SEZ as Revised

Pollutant[a]	Averaging Time	Rank[b]	Maximum Increment[b] (Concentration (µg/m^3))	Background[c] (Concentration (µg/m^3))	Total (Concentration (µg/m^3))	NAAQS/CAAQS[d] (Concentration (µg/m^3))	Increment (Percentage of NAAQS/CAAQS[e])	Total (Percentage of NAAQS/CAAQS[e])
PM_{10}	24 hours	H6H	441	157	598	150/50	294/881	398/1,195
	Annual	NA[f]	76.2	56.0	132	NA/20	NA/381	NA/661
$PM_{2.5}$	24 hours	H8H	28.2	26.8	55.0	35/NA	81/NA	157/NA
	Annual	NA	7.6	10.8	18.4	15/12	51/64	123/154

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 9.4.13.1-2 of the Draft Solar PEIS.

d First and second values are NAAQS and CAAQS, respectively.

e First and second values are concentration levels as a percentage of NAAQS and CAAQS, respectively.

f NA = not applicable.

maximum particulate levels in the vicinity of the SEZ could exceed the standard levels used for comparison. These high particulate concentrations would be limited to the immediate vicinity of the proposed SEZ boundary and would decrease quickly with distance.

Other locations modeled include the nearest residences, Lake Tamarisk, Desert Center, and Eagle Mountain Pumping Station. With the change in assumed location of the construction disturbance area, modeled impacts increased at most of these locations. For example, at Lake Tamarisk, 24-hour PM_{10} concentration increments changed from 80 µg/m^3 in the Draft Solar PEIS to 120 µg/m^3 in this Final Solar PEIS.

Predicted 24-hour and annual PM_{10} concentration increments at the nearest Class I Area, Joshua Tree NP, would be about 86 and 5.6 µg/m^3 or 1,077% and 139% of the PSD increments for Class I areas, respectively. Because of the increased distance to Joshua Tree NP, this update estimates PSD increments of one-fifth of the value presented in the Draft Solar PEIS, but these values are still far higher than the maximum allowable PSD increments for Class I areas. Thus, conclusions presented in the Draft Solar PEIS remain valid.

The conclusions of the Draft Solar PEIS remain valid for the predicted 24-hour and annual PM_{10} and $PM_{2.5}$ concentration levels; they could exceed NAAQS and/or CAAQS levels at the SEZ boundaries and in immediate surrounding areas during the construction of solar facilities. To reduce potential impacts on ambient air quality and to comply with BLM design features, aggressive dust control measures would be used. Potential air quality impacts on nearby residences and towns would be lower. Modeling indicates that construction activities could result in concentrations far above Class I PSD PM_{10} increments at the nearest federal Class I area (Joshua Tree NP). Construction activities are not subject to the PSD program, and the comparison provides only a screen for gauging the size of the impact. In addition, the assumed scenario—in which three construction projects would occur simultaneously near the westernmost portion of the SEZ—is quite conservative. If construction locations were spread across the SEZ or the projects occurred at different times, potential impacts would be anticipated to be much lower. Accordingly, impacts of construction activities on ambient air quality are expected to be moderate and temporary.

Because in both the Draft Solar PEIS and this Final Solar PEIS the same area size is assumed to be disturbed, emissions from construction equipment and vehicles would be almost the same as those mentioned in the Draft Solar PEIS. However, any potential impacts on AQRVs at nearby federal Class I areas (Joshua Tree NP) would be somewhat less than those in the Draft Solar PEIS because of the increased distance to the Joshua Tree NP. Thus, as concluded in the Draft Solar PEIS, emissions from construction-related equipment and vehicles are temporary and could cause some unavoidable but short-term impacts.

9.4.13.2.2 Operations

The reduction in the developable area of the proposed Riverside East SEZ by about 27% from 202,896 acres (821.1 km^2) to 147,910 acres (598.6 km^2) decreases the generating capacity and annual power generation and thus decreases the potentially avoided emissions presented in the Draft Solar PEIS. A revised power generation capacity ranging from 13,148 to 23,666 MW is estimated for the proposed Riverside East SEZ for various solar technologies (see Section 9.4.1.2). 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 displaced. Table 9.4.13.2-2 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 Table 9.4.13.2-2. For example, for the technologies estimated to require 9 acres/MW (power tower, dish engine, and PV), up to 4,837 tons of NO_x per year (= 72.9% × the low-end value of 6,636 tons per year as tabulated in the Draft Solar PEIS) could be avoided by full solar development of the revised area of the proposed Riverside East SEZ. Although the total emissions avoided by full solar development of the proposed SEZ are reduced from those presented in the Draft Solar PEIS, the conclusions of the Draft Solar PEIS remain valid. Solar facilities built in the proposed Riverside East SEZ could considerably reduce fuel combustion-related emissions in California but relatively less so than those built in other states with higher fossil use rates.

TABLE 9.4.13.2-2 Annual Emissions from Combustion-Related Power Generation Avoided by Full Solar Development of the Proposed Riverside East 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
147,910	13,148–23,666	23,035–41,462	2,945–5,301 (17,399–31,318)	4,837–8,707 (25,642–46,155)	0.043–0.077 (0.20–0.37)	11,444–20,600 (18,175–32,716)
Percentage of total emissions from electric power systems in the state of California[e]			22–39%	22–39%	22–39%	22–39%
Percentage of total emissions from all source categories in the state of California[f]			4.2–7.5%	0.40–0.72%	–[g]	2.7–4.8%
Percentage of total emissions from electric power systems in the six-state study area[e]			1.2–2.1% (6.9–12%)	1.3–2.4% (6.9–12%)	1.5–2.6% (6.9–12%)	4.4–7.9% (6.9–12%)
Percentage of total emissions from all source categories in the six-state study area[f]			0.62–1.1% (3.7–6.6%)	0.18–0.32% (0.95–1.7%)	–	1.3–2.5% (2.2–3.9%)

[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 (0.036 km^2) per MW (power tower, dish engine, and PV technologies) would be required.

[c] A capacity factor of 20% is assumed.

[d] Composite combustion-related emission factors for SO_2, NO_x, Hg, and CO_2 of 0.26, 0.42, 3.7×10^{-6}, and 994 lb/MWh, respectively, were used for the state of California. Values in parentheses are estimated based on composite combustion-related emission factors for SO_2, NO_x, Hg, and CO_2 of 1.51, 2.23, 1.8×10^{-6}, and 1,578 lb/MWh, respectively, averaged over six southwestern states.

[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).

9.4.13.2.3 Decommissioning and Reclamation

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

9.4.13.3 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 for air quality 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.

9.4.14 Visual Resources

9.4.14.1 Affected Environment

The SEZ boundaries have been revised to eliminate 43,439 acres (176 km^2) in the northwest portion of the SEZ. Areas specified for non-development include 11,547 acres (46.7 km^2); these areas consist of intermittent lakes, major washes, and areas identified for non-development through investigations for approved projects. The remaining developable area within the SEZ is 147,910 acres (598.6 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.

A VRI map for the SEZ and surrounding lands is shown in Figure 9.4.14.1-1; it provides information from the BLM's September 2010 VRI, which was finalized in October 2011 (BLM 2011l). As shown, the VRI classes for the SEZ are VRI Class II, indicating high relative visual values; Class III, indicating moderate relative visual values; and Class IV, indicating low relative visual values.

Within the 25-mi (40-km), 650-ft (198-m) viewshed of the revised SEZ, land is located in the Barstow, El Centro, Needles, and Palm Springs–South Coast Field Offices. The VRI Classes of these lands are as follows:

- Barstow Field Office
  - 315 acres (1.3 km^2) of VRI Class I areas and
  - 2,950 acres (11.9 km^2) of VRI Class IV.

- El Centro Field Office
  - 12,592 acres (51.0 km^2) of VRI Class I areas,
  - 22,710 acres (91.9 km^2) of VRI Class II areas,
  - 13,857 acres (56.1 km^2) of Class III areas, and
  - 22,628 acres (91.6 km^2) of VRI Class IV.

- Needles Field Office
  - 13,642 acres (55.2 km^2) of VRI Class I areas,
  - 2,602 acres (10.5 km^2) of VRI Class II areas,

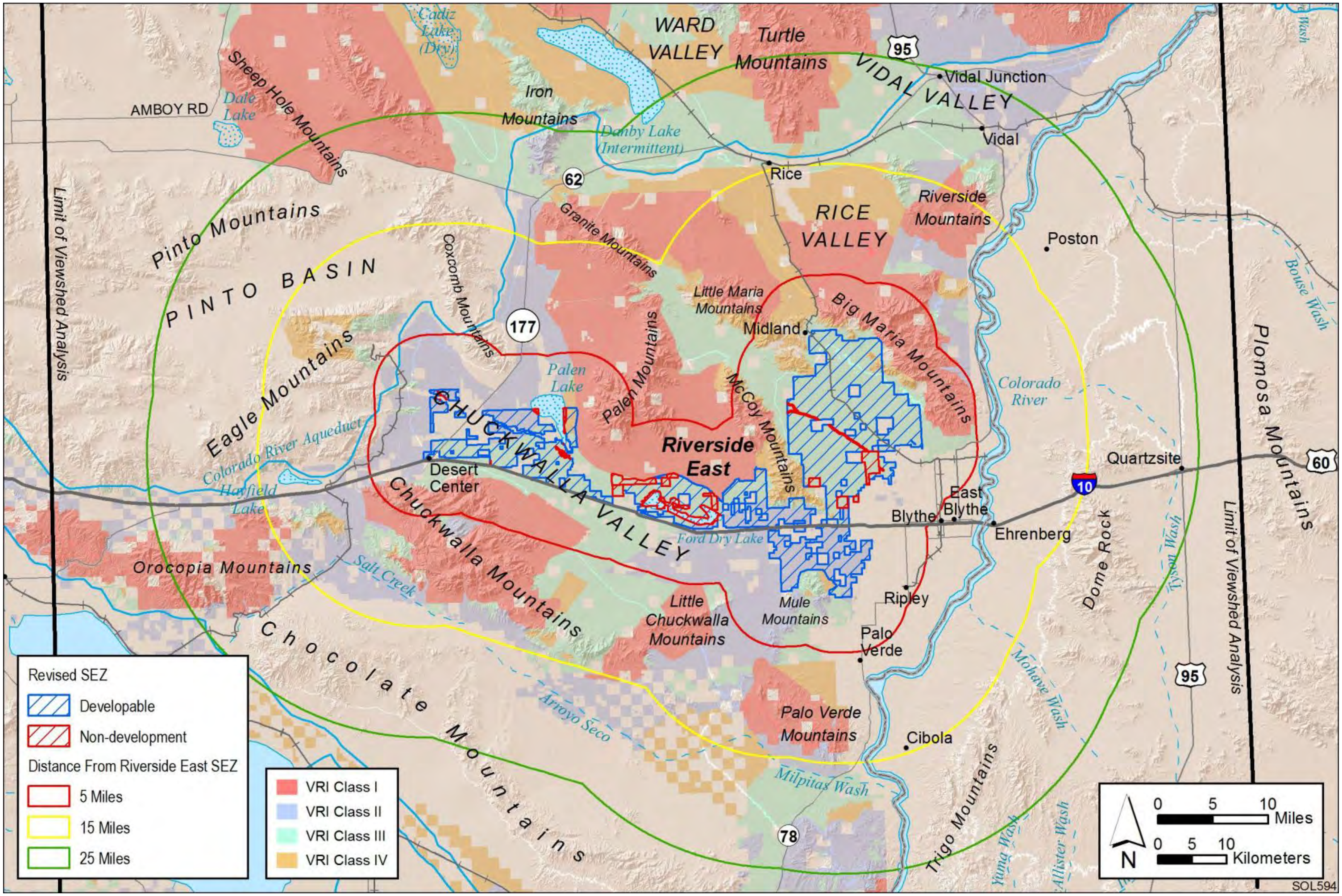

FIGURE 9.4.14.1-1 Visual Resource Inventory Values for the Proposed Riverside East SEZ as Revised

- 59,803 acres (242.0 km^2) of Class III areas, and
- 13,266 acres (53.7 km^2) of VRI Class IV.

- Palm Springs–South Coast Field Office
  - 294,529 acres (1,192.0 km^2) of VRI Class I areas,
  - 198,431 acres (803.0 km^2) of VRI Class II areas,
  - 272,605 acres (1,103.2 km^2) of Class III areas, and
  - 92,551 acres (374.5 km^2) of VRI Class IV.

9.4.14.2 Impacts

The reduction in size of the SEZ would substantially reduce the total visual impacts associated with solar energy development in the SEZ. The change limits the total amount of solar facility infrastructure that would be visible and reduces the geographic extent of the visible infrastructure.

The reduction in size eliminated approximately 21% 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. Much of the land surrounding the SEZ would not have views of the areas removed from the SEZ; visual contrasts would not be reduced for these lands. Contrast reduction generally would be greatest for viewpoints closest to the portions of the SEZ that were eliminated and especially for those that had broad, wide-angle views of these areas. In general, contrast reductions also would be larger for elevated viewpoints relative to nonelevated 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.

9.4.14.2.1 Impacts on the Proposed Riverside East SEZ

Although the reduction in size of the SEZ substantially reduces 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 electricity transmission lines. In general, strong visual contrasts from solar development still would be expected to be observed from viewing locations within the SEZ.

9.4.14.2.2 Impacts on Lands Surrounding the Proposed Riverside East 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 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 9.4.14.2-1 shows the combined results of the viewshed analyses for all four solar technologies. The colored portions 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 the absence of screening vegetation or structures and adequate lighting and other atmospheric conditions. 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 and 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, and dark purple, and at least the upper portions of power tower receivers could be visible from the additional areas shaded in medium brown.

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

Figure 9.4.14.2-2 shows the results of a 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 could have views of solar facilities within the SEZ and therefore potentially would be subject to visual impacts from those facilities. Distance zones that correspond with 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;

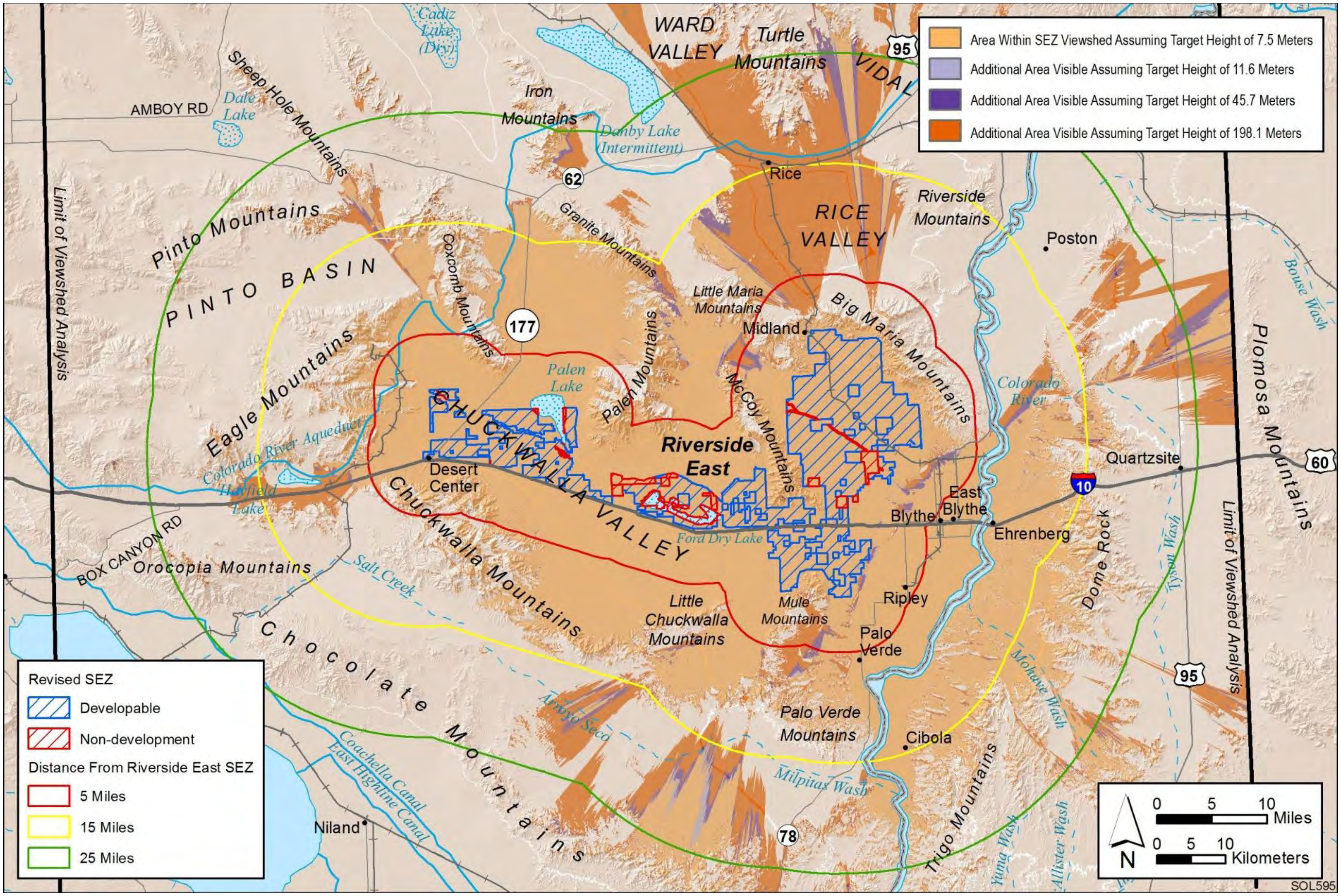

FIGURE 9.4.14.2-1 Viewshed Analyses for the Proposed Riverside East SEZ as Revised and Surrounding Lands, Assuming Viewshed Heights of 24.6 ft (7.5 m), 38 ft (11.6 m), 150 ft (45.7 m), and 650 ft (198.1 m) (shaded areas indicate lands from which solar development and/or associated structures within the SEZ could be visible)

- Congressionally authorized Wild and Scenic Study Rivers;
- 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 SRMAs; and
- ACECs designated because of outstanding scenic qualities.

The results of the GIS analysis are summarized in Table 9.4.14.2-1. The change in size of the SEZ alters the viewshed, such that the visibility of the SEZ and solar facilities within the SEZ from the surrounding lands would be reduced.

With the reduction in size of the SEZ, solar energy development within the SEZ would still be expected to create moderate or strong visual contrasts for viewers within many of the surrounding scenic resource areas and other resources listed in Table 9.4.14.2-1. These areas include the CDCA, Joshua Tree NP and WA, Bradshaw Scenic Highway, Big Maria Mountains WA, Chuckwalla Mountains WA, Little Chuckwalla Mountains WA, Palen-McCoy WA, Palo Verde Mountains WA, Rice Valley WA, and Corn Springs ACEC. An additional area that may experience moderate levels of contrast includes the Colorado River Corridor SRMA; this area was not analyzed in the Draft Solar PEIS.

Solar development on lands in the SEZ visible from and in close proximity to Joshua Tree NP and the Palen-McCoy WA has a higher potential to cause visual impacts on the NP and the WA. The BLM has identified lands in the SEZ within areas west of Township 005S and Range 017E and north of Township 006S and Range 016E, as well as north of Sections 26, 27, 28, and 29 of Township 005S and Range 017E, as potential high visual sensitivity areas, where solar development is subject to additional SEZ-specific mitigation that will be identified when project-specific environmental analyses are conducted. Solar development within these areas is also subject to additional SEZ-specific mitigation.

In addition to these areas, impacts on other lands and resource areas were evaluated: I-10; State Route 177; the surrounding communities of Blythe, East Blythe, Ehrenberg, Palo Verde, Ripley, Cibola (Arizona), and Desert Center; and nearby residences.

9.4.14.2.4 Summary of Visual Resource Impacts for the Proposed Riverside East SEZ

The visual contrast analysis in the Draft Solar PEIS determined that because there could be multiple solar facilities within the Riverside East SEZ, a variety of technologies employed, and a range of supporting facilities required, solar development within the SEZ would make it

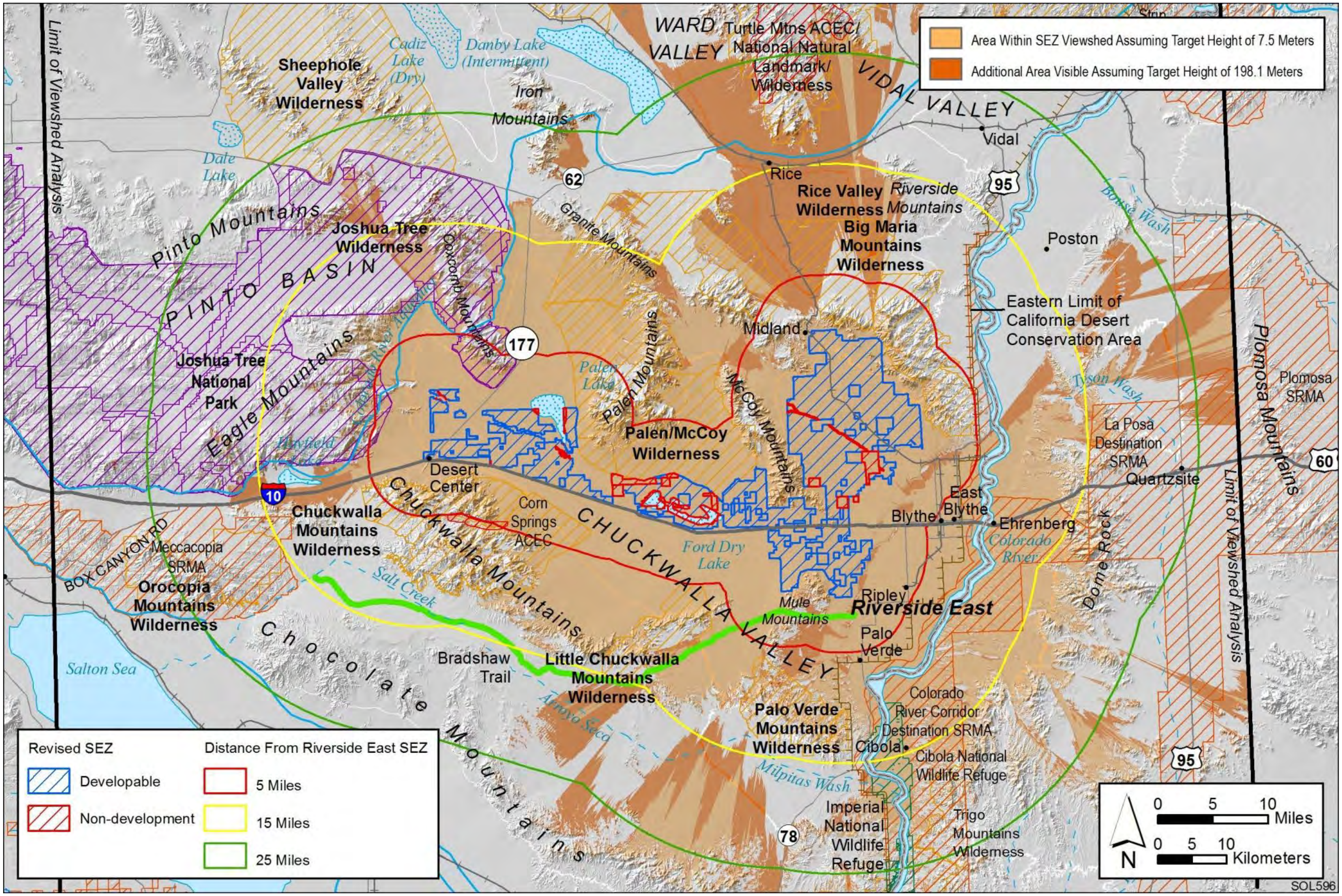

FIGURE 9.4.14.2-2 Overlay of Selected Sensitive Visual Resource Areas onto Combined 650-ft (198.1-m) and 24.6-ft (7.5-m) Viewsheds for the Proposed Riverside East SEZ as Revised

TABLE 9.4.14.2-1 Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Proposed Riverside East SEZ as Revised, Assuming a Target Height of 650 ft (198.1 m)

		Feature Area or Linear Distance[d]		
			Visible Between	
Feature Type	Feature Name (Total Acreage/ Linear Distance)[a,b,c]	Visible within 5 mi	5 and 15 mi	15 and 25 mi
NCA	California Desert (25,919,319 acres)	642,788 acres (2%)[b]	533,852 acres (2%)	276,110 acres (1%)
National Park	Joshua Tree (793,331 acres)	12,656 acres (2%)	68,003 acres (9 %)	36,647 acres (5 %)
Scenic Highway	Bradshaw Trail[e] (70 mi)	8.5 mi (12%)	10.1 mi (14%)	0.7 mi (1%)
WAs	Big Maria Mountains (47,786 acres)	8,861 acres (19%)	42 acres (0%)	0 acres
	Chuckwalla Mountains (101,624 acres)	31,330 acres (31%)	25,597 acres (25%)	0 acres
	Imperial Refuge (15,718 acres)	0 acres	0 acres	508 acres (3%)
	Joshua Tree (591,997 acres)	9,681 acres (2%)	56,742 acres (10%)	32,068 acres (5%)
	Little Chuckwalla Mountains (28,707 acres)	42 acres (0%)	16,619 acres (58%)	69 acres (0%)
	Orocopia Mountains (59,784 acres)	0 acres	199 acres (0%)	2,231 acres (4%)
	Palen-McCoy (247,033 acres)	70,838 acres (29%)	104,311 acres (42%)	9,039 acres (4%)
	Palo Verde Mountains (31,858 acres)	0 acres	13,701 acres (43%)	0 acres
	Rice Valley (43,438 acres)	7,737 acres (18%)	28,072 acres (65%)	0 acres
	Sheephole Valley (195,346 acres)	0 acres	0 acres	477 acres (0%)

TABLE 9.4.14.2-1 (Cont.)

		Feature Area or Linear Distance[d]		
			Visible Between	
Feature Type	Feature Name (Total Acreage/ Linear Distance)[a,b,c]	Visible within 5 mi	5 and 15 mi	15 and 25 mi
WAs (*Cont.*)	Trigo Mountains (30,403 acres)	0 acres	0 acres	3,432 acres (11%)
	Turtle Mountains (182,493 acres)	0 acres	0 acres	13,161 acres (7%)
NWRs	Cibola (18,398 acres)	0 acres	7,161 acres (39%)	17,133 acres (93%)
	Imperial (31,465 acres)	0 acres	0 acres	1,666 acres (5%)
ACECs Designated for Outstanding Scenic Values	Corn Springs (2,463 acres)	332 acres (13%)	747 acres (30%)	0 acres
	Turtle Mountains (50,057 acres)	0 acres	0 acres	2,198 acres (4%)

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

[b] To convert mi to km, multiply by 1.609.

[c] The Turtle Mountains NNL is not included in this table. This area was in the viewshed of the original proposed SEZ and was included in the corresponding table in the Draft Solar PEIS; however, this area is not within the viewshed of the proposed SEZ as revised.

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

[e] Source: BLM (2012b).

essentially industrial in appearance and would contrast strongly with the surrounding, mostly natural-appearing landscape.

The elimination of acreage within the SEZ reduces the visual contrast associated with solar facilities as seen both within the SEZ and from some surrounding lands in both daytime and nighttime views. The reductions in visual contrast resulting from the boundary changes can be summarized as follows:

- Within the Riverside East SEZ: Contrasts experienced by viewers in the northwest portion of the SEZ would be substantially reduced because of the elimination of 43,439 acres (176 km^2) of land within the SEZ; however, strong contrasts still would result in the remaining developable area. There would be a reduction in contrasts in the central portion of the SEZ between the Palen-McCoy WA and I-10 and in scattered areas east of the McCoy Mountains because of the designation of non-development lands in the SEZ.

- CDCA: Since the SEZ is located within the CDCA, only a minimal reduction in contrasts would occur because of the elimination of portions of the SEZ; solar development within the SEZ still would cause strong contrasts for viewers within portions of the CDCA.

- Joshua Tree NP: A reduction in contrasts would occur in those areas of the NP located adjacent to the SEZ as proposed in the Draft Solar PEIS. With the elimination of acreage in the northwest portion of the SEZ, expected contrast levels would likely decrease from "strong" to "moderate" for viewpoints in the northeastern portion of the NP; expected contrast levels would be lower but still "strong" for most viewpoints in the southeastern portions of the National Park.

- Bradshaw Scenic Highway: A very slight reduction in contrasts would be anticipated because of the designation of non-development lands in the SEZ; however, solar development within the SEZ still would cause minimal to strong contrasts, depending on viewer location on the trail.

- Big Maria Mountains WA: A very slight reduction in contrasts would be anticipated because of the designation of non-development lands in the SEZ; however, solar development within the SEZ still would cause strong contrasts.

- Chuckwalla Mountains WA: A slight reduction in contrasts would be anticipated because of the elimination of portions of the SEZ and designation of some lands as non-developable; solar development within the SEZ still would cause strong contrasts.

- Imperial Refuge WA: A reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause minimal contrasts.

- Joshua Tree WA: See above for Joshua Tree NP.

- Little Chuckwalla Mountains WA: A slight reduction in contrasts would be anticipated because of the elimination of areas within the central portion of the SEZ that are labeled as non-developable; however, solar development still would cause moderate to strong contrasts, depending on viewer location within the WA.

- Orocopia Mountains WA: A very slight reduction in contrast would be anticipated; however, solar development within the SEZ still would cause weak contrasts.

- Palen-McCoy WA: A reduction in contrasts would be anticipated in those areas located along the western border of the WA, because of the elimination of portions of the SEZ. However, solar development would still cause strong contrasts in those areas of the WA immediately adjacent to the central portion of the SEZ. Weak to strong contrasts still would be anticipated in other portions of the WA, depending on viewer location.

- Palo Verde Mountains WA: No reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak to moderate contrasts, depending on viewer location within the WA.

- Rice Valley WA: No reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause strong contrasts.

- Sheephole Valley WA: No reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal to weak contrasts.

- Trigo Mountains WA: A reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak contrasts.

- Turtle Mountains WA: A reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak contrasts.

- Cibola NWR: A reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak contrasts.

- Imperial NWR: A reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause minimal contrasts.

- Turtle Mountains NNL: The Turtle Mountains NNL is no longer within the viewshed; expected contrast levels would be lowered from “weak” to “none.”

- Corn Springs ACEC: A slight reduction in contrasts would be anticipated because of the elimination of portions of the SEZ and designation of some lands as non-developable; solar development within the SEZ still would cause minimal (within the canyon) to strong contrasts (outside the canyon).

- Turtle Mountains ACEC: A reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause weak contrasts.

- I-10: A reduction in contrasts would occur in that portion of the interstate located adjacent to the central portion of the SEZ because of the identification of areas as non-developable. Solar development in areas of the SEZ along the remainder of the interstate would still cause strong contrasts.

- State Route 177: A reduction in contrasts would occur along this route in those areas adjacent to portions of the SEZ that were eliminated, from about 2 mi (3.2 km) south of Joshua Tree NP northward. Solar development within the SEZ still would cause strong contrasts to State Route 177, especially for those areas just north of I-10.

- Blythe: No reduction in contrasts would be anticipated; however, solar development would still cause moderate to strong contrasts.

- East Blythe: No reduction in contrasts would be anticipated; however, solar development within the SEZ still would cause moderate to strong contrasts.

- Ehrenberg: No reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak to moderate contrasts.

- Palo Verde: No reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak to moderate contrasts.

- Ripley: No reduction in contrasts would be anticipated; solar development within the SEZ still would cause moderate to strong contrasts.

- Cibola, Arizona: No reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak contrasts.

- Desert Center (including Lake Tamarisk): A reduction in contrasts would occur because of the elimination of portions of the SEZ; however, solar development within the SEZ still would cause strong contrasts due to the proximity of the community to the SEZ.

In addition to those areas evaluated within the Draft Solar PEIS, the following areas also may potentially be affected by solar development within the SEZ:

- Colorado River Corridor SRMA: Expected contrast levels would be "weak to moderate" for certain areas in the SRMA in the gap between the Mule Mountains and the Big Maria Mountains, with no contrast expected for other portions of the SRMA.

- La Posa Destination SRMA: Expected contrast levels would be "weak." The SRMA is located approximately 15 mi (241 km) east of the SEZ.

Table 9.4.14.2-2 provides the acreage of these areas that would be visible within the 650-ft (198.1-m) viewshed.

TABLE 9.4.14.2-2 Additional Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Proposed Riverside East SEZ as Revised, Assuming a Target Height of 650 ft (198.1 m)

		Feature Area or Linear Distance within 650.0-ft (198.1-m) Viewshed[c]		
			Visible Between	
Feature Type	Feature Name (Total Acreage)[a]	Visible within 5 mi[b]	5 and 15 mi	15 and 25 mi
SRMAs	Colorado River Corridor (240,578 acres)	294 acres (0%)	103,620 acres (43%)	33,639 acres (14%)
	La Posa Destination (362,523 acres)	0 acres	0 acres	8,872 acres (2%)

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

[b] To convert mi to km, multiply by 1.609.

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

9.4.14.3 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 would reduce potential visual impacts somewhat, the degree of effectiveness of these design features can only be assessed 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, the following SEZ-specific design feature for visual resources has been identified:

- Special visual impact mitigation should be considered for solar development on lands in the SEZ within areas west of Township 005S and Range 017E and north of Township 006S and Range 016E, as well as north of Sections 26, 27, 28, and 29 of Township 005S and Range 017E. These areas are visible from and in close proximity to Joshua Tree NP and the Palen-McCoy WA, and thus have a higher potential to cause visual impacts on the National Park and the WA. The BLM has identified these lands as potential high visual sensitivity areas, where solar development is subject to additional SEZ-specific mitigation that will be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis. These lands are shown in Figure 9.4.1.1-2.

9.4.15 Acoustic Environment

9.4.15.1 Affected Environment

The developable area of the proposed Riverside East SEZ was reduced from 202,896 acres (821.1 km^2) to 147,910 acres (598.6 km^2). With the change in the proposed boundaries, distances to some of the noise receptors are greater than in the Draft Solar PEIS. The employee residences at Eagle Mountain Pumping Station are now 3 mi (5 km) from the SEZ boundary. Distances to other sensitive receptors remain the same as in the Draft Solar PEIS.

9.4.15.2 Impacts

9.4.15.2.1 Construction

With the reduction in the developable area of the Riverside East SEZ, the updated noise impacts presented in this Final Solar PEIS will be the same or less than those in the Draft Solar PEIS and, except as noted below for wildlife impacts in specially designated areas, the conclusions presented in the Draft Solar PEIS remain valid.

On the basis of comments received and recent references as applicable, this Final Solar PEIS used an updated 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. As a result of this updated significance threshold, the assessment of impacts has been updated as follows. Noise levels at several specially designated areas adjacent to the SEZ could be about 74 dBA, a level above the updated significance threshold. The estimated noise level at the receptor about 1,700 ft (520 m) from the SEZ boundary is about 55 dBA. Accordingly, noise from construction in the proposed Riverside East SEZ could adversely affect wildlife in a small area in several specially designated areas for a short time period when construction activities would occur near the SEZ boundary adjacent to the specially designated areas. However, noise levels of about 35 dBA in Joshua Tree NP are lower than this threshold. In addition, as discussed in Section 5.10.2 of the Draft Solar PEIS and this Final Solar PEIS, there is the potential for other effects 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 project-specific basis, including consideration of site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern.

Construction would cause some unavoidable but localized short-term noise impacts on neighboring communities, particularly for activities occurring near the western and eastern boundaries of the proposed Riverside East SEZ boundaries, close to the nearby residences. No adverse vibration impacts are anticipated from construction activities, including from pile driving for dish engines.

9.4.15.2.2 Operations

With the decrease in developable area of the proposed SEZ, the updated noise estimates in this Final Solar PEIS are the same as or less than those in the Draft Solar PEIS, except as noted below for impacts from TES and dish engine facilities near residences or in specially designated areas.

Parabolic Trough and Power Tower

As stated above under construction impacts, for this Final Solar PEIS an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. For TES operations, estimated daytime and nighttime noise levels at the boundary of the specially designated areas adjacent to the SEZ are about 51 and 61 dBA, respectively. Estimated noise levels within a distance of 0.5 mi (0.8 km) from the SEZ exceed the threshold level during nighttime hours. Thus, noise from operations of a parabolic trough or power tower facility equipped with TES in the proposed Riverside East SEZ could affect wildlife in some portions of the nearby specially designated areas adjacent to the SEZ. However, a predicted nighttime noise level of about 47 dBA would not exceed the threshold level in Joshua Tree NP. In addition, as discussed in Section 5.10.2 of the Draft Solar PEIS and this Final Solar PEIS, there is the potential for other effects to occur at lower noise levels (Barber et al. 2011). With the approximate significance threshold of 55 dBA and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from a parabolic trough or power tower facility equipped with TES would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. These noise levels could be audible and affect soundscapes in Joshua Tree NP.

Dish Engines

Potential noise impacts were remodeled for dish engine technologies to account for the updated SEZ boundaries. The reduction in developable area of the proposed Riverside East SEZ by about 27% would reduce the number of dish engines by a similar percentage. However, even with this reduction, noise levels within 3 mi (5 km) of the SEZ boundary could still exceed the Riverside County standard level of 45 dBA daytime L_{eq} for rural environments. In addition, if dish engines were located near the western or eastern boundaries close to nearby residences, this could result in noise levels above the Riverside County standard and the EPA guideline levels, and could have corresponding adverse noise impacts on residents there. Noise from dish engines might be masked by background noise if a receptor is located near noisy background sources, such as highways. However, noise from dish engines would have considerable impacts on receptors with low background noise levels.

For a dish engine facility, the highest noise levels at the boundary of specially designated areas adjacent to the SEZ would be about 62 dBA and still could exceed the updated approximate significance threshold at 0.3 mi (0.5 km). Thus, noise from an operating dish engine facility in the proposed Riverside East SEZ could affect wildlife in some portions of the nearby specially designated areas. Noise levels at Joshua Tree NP, which is located about 1.8 mi (2.9 km) from the SEZ, would not exceed the threshold. As discussed in Section 5.10.2 of this Final Solar PEIS, there is the potential for other effects to occur at lower noise levels (Barber et al. 2011). With the approximate significance threshold of 55 dBA and the potential for impacts at lower noise levels, noise impacts on terrestrial wildlife from a dish engine facility would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. These noise levels could be audible and affect soundscapes in Joshua Tree NP.

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

9.4.15.2.3 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 moderate and temporary. Similarly, potential vibration impacts on surrounding communities and vibration-sensitive structures during decommissioning of any solar facility would be lower than those during construction and thus minimal.

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

9.4.16 Paleontological Resources

9.4.16.1 Affected Environment

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

- The BLM Regional Paleontologist may have additional information regarding the paleontological potential of the SEZ and be able to update the temporary assignment of PFYC Class 3b as used in the Draft Solar PEIS.

- The San Bernardino County Museum paleontologist also may have additional information regarding the potential of paleontological resources in the vicinity of the SEZ.

9.4.16.2 Impacts

The assessment provided in the Draft Solar PEIS remains valid. Impacts on paleontological resources are unknown, but the potential is high in the older alluvial fans and areas of alluvial valley deposits of the SEZ. However, a more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted.

9.4.16.3 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 due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for paleontological resources have been identified. Because the PFYC of the proposed Riverside East SEZ is Class 3b (unknown potential), paleontological surveys would be needed to identify those areas that may have significant paleontological resources; therefore, the need for and nature of any SEZ-specific design features will depend on the findings 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.

9.4.17 Cultural Resources

9.4.17.1 Affected Environment

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

- The Palen Solar Power Project identified a total of 39 new sites: 6 prehistoric and 33 historic. Prehistoric site types include fire-affected rock deposits, groundstone concentrations, and lithic scatters of flakes and tools. Historic site types include refuse deposits, World War II tank tracks, mining claims, survey markers, and a corral (BLM 2011b).

- The Blythe Solar Power Project identified 203 new sites: 24 prehistoric sites and 179 historic sites. Prehistoric site types include lithic scatters, prehistoric quarry sites, thermal features, and a pot drop. Historic sites include early twentieth century habitation sites, Desert Training Center/California–Arizona Maneuver Area (DTC/C-AMA) related sites, mining claims, historic roads, and refuse scatters (BLM 2010b).

- The Genesis Solar Power Project identified 50 new sites: 28 prehistoric sites, 20 historic sites, and 2 multicomponent sites. Prehistoric site types include ceramic scatters, trail segments, artifact scatters, temporary camps, rock clusters, and geoglyphs. Historic sites include refuse scatters, road segments, and a well (CEC 2010b). Since construction began, more recent sites also have been identified below the surface in areas previously surveyed.

- The Desert Sunlight Solar Project identified 419 total new sites: 285 historic sites, 121 prehistoric sites, 1 multicomponent site, and 12 sites of unknown temporal affiliation. Prehistoric site types include rock hearths, lithic scatters, and petroglyphs. Historic site types include quartz reductions, refuse scatters, DTC/C-AMA related sites, mining claims and prospectors pits, survey markers, and road segments (Denniston 2011).

- A Class I literature review was completed by SWCA Environmental Consultants (SWCA and University of Arizona 2011) for the original footprint of the Riverside East SEZ. The results of the records search do not reflect the results from the Palen, Blythe, Genesis, and Desert Sunlight Solar Power Projects, as discussed above, or any other recent investigations, and these projects are not counted in the survey totals. The results of the records search identified the following additional information:
  - At least 49 surveys have been conducted within the original boundary of the SEZ. Of these 49, at least 42 satisfy modern survey requirements. Approximately 10% of the SEZ has been surveyed to modern standards (50- to 66-ft [5- to 20-m] transects), but not necessarily within the last 10 years.

- A total of 787 sites were identified during the records search: 291 prehistoric sites, 424 historic sites, 62 multicomponent sites, and 10 sites of unknown temporal affiliation. Site types listed in the Draft Solar PEIS remain valid.
- A total of 277 additional sites were identified within 1 mi (1.6 km) of the SEZ: 102 prehistoric sites, 151 historic sites, 12 multicomponent sites, and 12 sites of unknown temporal affiliation. Site types listed in the Draft Solar PEIS remain valid.
- A total of 16 previously recorded sites have been determined eligible for listing in the NHRP.
- In total, 29 sites have received eligibility recommendations, however, without documented SHPO concurrence. Six sites have been recommended "eligible" by their recorders; two sites are within the SEZ and four sites are within 1 mi (1.6 km) of the SEZ boundary. The Eagle Mountain Pumping Plant was recommended eligible, but the California SHPO stated additional research was needed in order to concur with the determination. Nineteen of the sites that have been recommended "not eligible" are within the SEZ; four are within 1 mi (1.6 km) of the SEZ.

- 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 II stratified random sample survey of 5,948 acres (24.1 km^2), or roughly 5% of the revised footprint of the SEZ. Areas of interest, such as dune areas and along washes, as determined through the Class I review, have been incorporated in the survey design and sampling strategy. Some subsurface testing of dune and/or colluvium areas should be considered in the sampling strategies for future surveys. The Class II survey is being conducted by the BLM to meet its ongoing Section 110 responsibilities under the 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 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.
  - Recordation of trail segments in full to assist in better understanding of cultural landscapes.
  - NRHP evaluation of all newly recorded resources, as well as for previously recorded resources that have not yet been evaluated.
  - Continuation of government-to-government consultation as described in Section 2.4.3 of the Supplement to the Draft Solar PEIS and IM 2012-032 (BLM 2011k), including follow-up to recent ethnographic studies with tribes not included in the original studies to determine whether those tribes have similar concerns.

9.4.17.2 Impacts

As stated in the Draft Solar PEIS, direct impacts on significant cultural resources could occur in the proposed Riverside East SEZ. The proposed SEZ falls within the boundaries of the DTC/C-AMA, which contains scattered resources related to General Patton's training area. The southern end of the Salt Song Trail and portions of the Cocomaricopa and *Xam Kwatchan* Trails fall within the Riverside East SEZ, and the Mule Mountain, Alligator Rock, Palen Dry Lake ACECs are all adjacent to the proposed SEZ (see Section 9.4.17 in the Draft Solar PEIS).

As a result of the Class I literature review and review of the final project reports for the Palen, Blythe, Genesis, and Desert Sunlight Solar Projects, the following new impact was identified:

- Approximately 1,775 sites are located in or within 1 mi (1.6 km) of the original footprint of the proposed Riverside East SEZ and could be affected by development. NRHP eligibility of the majority of these sites is unknown at this time; thus the magnitude of impact (i.e., whether it constitutes an adverse effect) cannot be ascertained until eligibility determinations are made and the California SHPO concurs with those determinations.

9.4.17.3 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 evaluations, surveys, and consultations will occur. If any of the sites located in or adjacent to the proposed SEZ are found to meet the eligibility criteria for listing in the NRHP, they will be subject to the programmatic design features regarding eligible sites as described in Section A.2.2 of Appendix A.

On the basis of the impact analysis completed 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 features have been identified:

- Consultation efforts should include discussions on significant archaeological sites and traditional cultural properties and on sacred sites and trails with views of the proposed SEZ, such as the Salt Song, Cocomaricopa, and *Xam Kwatchan* Trails, which connect spiritual landscapes and sacred sites in the area. The possibility of discovering human burials in the vicinity of the proposed Riverside East SEZ should also be discussed. Tribal participation in the Section 106 process will take place according to the Solar PA, including opportunities for tribal input regarding inventory design and treatment decisions and procedures for inadvertent discoveries during construction and operations.

- Significant resources clustered in specific areas, such as those surrounding Ford Dry Lake or within the DTC/C-AMA area, which retain sufficient integrity, should be avoided.

- Monitoring is recommended in sand sheet and colluvium environments similar to those in which buried sites were recently discovered during construction of the Genesis Solar development.

- Because the proposed Riverside East SEZ is located adjacent to or near six ACECs, it is possible that the ACECs could be subject to an increase in human and vehicle traffic. Potential construction vehicle corridors should be discussed prior to development of the proposed SEZ in order avoid possible impacts on historic resources within these ACECs and to determine alternative roads or paths to the development area.

Additional SEZ-specific design features would be determined in consultation with the California SHPO, local BLM offices, and affected tribes and would depend on the findings of future investigations. Some SEZ-specific design features may be established through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

9.4.18 Native American Concerns

9.4.18.1 Affected Environment

Data provided in the Draft Solar PEIS and Supplement to the Draft remain valid with the following updates:

- No new affected tribal cultural properties or landscapes were identified in the Class I literature review (SWCA and University of Arizona 2011). However, the Big Pine Paiute Tribe has expressed opposition to development within the Riverside East SEZ because it contains culturally sensitive areas.

- Government-to-government consultation will continue; potential topics to be discussed include the Prehistoric Trail Network Cultural Landscape/Historic District, which includes the Salt Song Trail, the *Xam Kwatcan* Trail, and the Cocomaricopa Trail; effects of workers and increased traffic on sacred sites; the loss of culturally important plants; the use and availability of water and the contamination of groundwater; ecological segmentation; important natural landscape features, such as the Big Marias, Coxcomb Mountains, Eagle Mountain, Alligator Rock, Black Rock, Palen Dry Lake, Ford Dry Lake, McCoy Springs, and Corn Springs; and several nearby ACECs and NRHP-listed properties, such as the Blythe Intaglios and the Mule Tank Discontiguous Rock Art District.

9.4.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. The Agua Caliente, Quechan, and Chemehuevi Tribes have expressed concern over the potential visual effects and physical impacts on cultural resources and landscapes. During previous fast-track solar projects located within the proposed Riverside East SEZ, Native Americans identified Alligator Rock, the Palen Dry Lake shoreline, the South Chuckwalla Mountains Petroglyph District, McCoy Springs, Black Rock, and local ACECs (Alligator Rock, Palen Dry Lake, and Mule Mountains ACECs) as important landscape features within 15 mi (24 km) of the SEZ. Tribes also have expressed specific concerns about the Salt Song and Cocomaricopa Trails (see Section 9.4.18.2 of the Draft Solar PEIS). Although specific landscapes and resources within the Riverside East SEZ were not identified by Native American tribes through an ethnographic study, government-to-government consultation efforts, or public comment, beliefs and concerns identified by representatives of other tribes throughout the Solar PEIS study area are potentially a concern in this SEZ as well. Expected impacts on Native Americans from solar energy development within the Riverside East SEZ are divided into three major categories: impacts on spiritual and culturally important landscapes, impacts on prehistoric and historic archaeological sites, and impacts on local native resources.

Tribal representatives from the nine tribes that participated in the ethnographic studies believe the cultural resources found within the landscape are important in helping them understand their past, present, and future. In almost all cases, Tribal representatives would like to see SEZs managed as spiritual cultural landscapes, with areas of special significance formally nominated as traditional cultural properties (SWCA and University of Arizona 2011). All nine tribes have expressed concern for the possible destruction of native plant and animal habitat and the potential decrease in water resources as a result of solar development, and these resources will likely be a concern within the Riverside East SEZ as well (see Section 9.4.18.2 of the Draft Solar PEIS). In addition, when large swaths of traditional plants have been noted within or near an SEZ, Tribal representatives have made specific requests to consider co-managing these natural resources with the BLM (SWCA and University of Arizona 2011). Solar energy facilities cover large tracts of ground, and even if the implementation of design features is taken into account, it is unlikely that avoidance of all resources would be possible. However, as discussed in Sections 9.4.10 and 9.4.11 of this Final Solar PEIS, impacts on some plant and animal resources are expected to be minimal, because there is an abundance of similar plant and animal habitat in the area. Moderate impacts are expected on some special status species, such as cholla cactus (*Cylindropuntia* spp.), bighorn sheep (*Ovis canadensis*), Gambel's quail (*Callipepla gambelii*), white-winged doves (*Zenaida asiatica*), mourning dove (*Zenaida macrocura*), desert tortoise (*Gopherus agassizii*), and Mojave rattlesnake (*Crotalus* spp.).

9.4.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on Native American concerns are described in Section A.2.2 of 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 occur. The tribes would be notified regarding the results of archaeological surveys, and they would be immediately contacted upon the discovery of Native American human remains and associated cultural items.

On the basis of the impact analysis 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 Native American concerns have been identified. However, monitoring is recommended in sand sheet and colluvium environments similar to those in which buried sites were recently discovered during construction of a solar development. The need for and nature of SEZ-specific design features would be determined during government-to-government consultation with affected tribes as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis. Potentially significant sites, landscapes, and resources within the vicinity of the Riverside East SEZ, including the Prehistoric Trail Network Cultural Landscape/Historic District, which includes the Salt Song Trail, the *Xam Kwatcan* Trail, and the Cocomaricopa Trail; culturally important plants and animals; Big Maria Mountains; Coxcomb Mountains; Eagle Mountain; Black Rock; Palen Dry Lake, Ford Dry Lake, and McCoy Springs; local ACECs, including Palen Lake, Mule Tank, Corn Springs, and Alligator Rock; and NRHP-listed properties, such as the Blythe Intaglios, the Mule Tank Discontiguous Rock Art District, and the South Chuckwalla Mountains Petroglyph District, should be considered and discussed during consultation.

9.4.19 Socioeconomics

9.4.19.1 Affected Environment

Although the boundaries of the Riverside East SEZ have been reduced compared to the boundaries in the Draft Solar PEIS, the socioeconomic 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 updates to affected environment information given in the Draft Solar PEIS are required.

9.4.19.2 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 the BLM, the in-migration of solar facility workers and their families, and impacts on local housing markets and community service employment. The impact assessment provided in the Draft Solar PEIS remains valid, with the following updates.

9.4.19.2.1 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 15,633 jobs (Table 9.4.19.2-1). Construction activities would constitute 1.3% of total ROI employment. A solar development would also produce $927.3 million in income. Direct sales taxes would be $41.2 million; direct income taxes, $18.9 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 means that some in-migration of workers and their families from outside the ROI would be required, with up to 2,229 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) would mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with up to 770 rental units expected to be occupied in the ROI. This occupancy rate would represent 1.6% of the vacant rental units expected to be available in the ROI.

In addition to the potential impact on housing markets, in-migration would also 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 21 new teachers, 4 physicians, and 5 public safety employees (career firefighters and uniformed police officers) would be required in the ROI. These increases would represent 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 8,501 jobs (Table 9.4.19.2-1). Such a solar development would also produce $308.8 million in income. Direct sales taxes would be $0.6 million; direct income taxes $8.1 million. On the basis of fees established by the BLM (BLM 2010c), acreage rental payments would be $46.2 million, and solar generating capacity payments, at least $155.5 million.

Operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 657 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 is not expected to be large, with up to 408 owner-occupied units expected to be occupied in the ROI.

TABLE 9.4.19.2-1 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ as Revised with Solar Trough Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	5,232	5,155
Total	15,633	8,501
Income[c]		
Total	927.3	308.8
Direct state taxes[c]		
Sales	41.2	0.6
Income	18.9	8.1
BLM payments[c]		
Rental	NA[d]	46.2
Capacity fee[e]	NA	155.5
In-migrants (no.)	2,229	657
Vacant housing[f] (no.)	770	408
Local community service employment		
Teachers (no.)	21	6
Physicians (no.)	4	1
Public safety (no.)	5	1

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 1,800 MW (corresponding to 9,000 acres [36 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 23,666 MW.

c Values are reported in $ million 2008.

d NA = not applicable.

e 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 2010c), 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.

f 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 (health, education, and public safety) employment. An increase in such employment would be required to meet existing levels of service in the provision of these services in the ROI. Accordingly, up to six new teachers, one physician, and two public safety employees would be required in the ROI.

9.4.19.2.2 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 6,227 jobs (Table 9.4.19.2-2). Construction activities would constitute 0.5% of total ROI employment. Such a solar development would also produce $369.3 million in income. Direct sales taxes would be less than $16.4 million; direct income taxes, $7.5 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 means that some in-migration of workers and their families from outside the ROI would be required, with up to 888 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 is not expected to be large, with up to 307 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.6% 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 eight new teachers, one physician, and two public safety employees 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 power tower technologies would be 3,740 jobs (Table 9.4.19.2-2). Such a solar development would also produce $124.6 million in income. Direct sales taxes would be $0.1 million; direct income taxes $4.2 million. On the basis of fees established by the BLM (BLM 2010c), acreage rental payments would be $46.2 million, and solar generating capacity payments, at least $86.4 million.

TABLE 9.4.19.2-2 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ as Revised with Power Tower Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	2,084	2,662
Total	6,227	3,740
Income[c]		
Total	369.3	124.6
Direct state taxes[c]		
Sales	16.4	0.1
Income	7.5	4.2
BLM payments[c]		
Rental	NA[d]	46.2
Capacity[e]	NA	86.4
In-migrants (no.)	888	339
Vacant housing[f] (no.)	307	211
Local community service employment		
Teachers (no.)	8	3
Physicians (no.)	1	1
Public safety (no.)	2	1

[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 1,000 MW (corresponding to 9,000 acres [36 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 13,148 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] 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 2010c), 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.

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

Operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 339 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) would mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with up to 211 owner-occupied units expected to be required 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 four new teachers, one physician, and one public safety employee would be required in the ROI.

9.4.19.2.3 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 2,531 jobs (Table 9.4.19.2-3). Construction activities would constitute 0.2% of total ROI employment. Such a solar development would also produce $150.1 million in income. Direct sales taxes would be less than $6.7 million; direct income taxes, $3.1 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 local workforce, construction of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with up to 361 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 is not expected to be large, with up to 125 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.3% 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. These increases would represent less than 0.1% of total ROI employment expected in these occupations.

TABLE 9.4.19.2-3 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ as Revised with Dish Engine Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	847	2,587
Total	2,531	3,634
Income[c]		
Total	150.1	121.1
Direct state taxes[c]		
Sales	6.7	0.1
Income	3.1	4.1
BLM payments[c]		
Rental	NA[d]	46.2
Capacity[e]	NA	86.4
In-migrants (no.)	361	330
Vacant housing[f] (no.)	125	205
Local community service employment		
Teachers (no.)	3	3
Physicians (no.)	1	1
Public safety (no.)	1	1

[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 1,000 MW (corresponding to 9,000 acres [36 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 13,148 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] 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 2010c), 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.

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

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 3,634 jobs (Table 9.4.19.2-3). Such a solar development would also produce $121.1 million in income. Direct sales taxes would be $0.1 million; direct income taxes, $4.1 million. On the basis of fees established by the BLM (BLM 2010c), acreage rental payments would be $46.2 million, and solar generating capacity payments, at least $86.4 million.

Operation of a dish engine solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 330 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 is not expected to be large, with up to 205 owner-occupied units expected to be required 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 four new teachers, one physician, and one public safety employee would be would be required in the ROI.

9.4.19.2.4 Photovoltaic

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of PV technologies would be up to 1,181 jobs (Table 9.4.19.2-4). Construction activities would constitute 0.1% of total ROI employment. Such a solar development would also produce $70.0 million in income. Direct sales taxes would be less than $3.1 million; direct income taxes, $1.4 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 means that some in-migration of workers and their families from outside the ROI would be required, with up to 168 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 is not expected to be large, with up to 58 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 9.4.19.2-4 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ as Revised with PV Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	395	258
Total	1,181	363
Income[c]		
Total	70.0	12.1
Direct state taxes[c]		
Sales	3.1	<0.1
Income	1.4	0.4
BLM payments[c]		
Rental	NA[d]	46.2
Capacity[e]	NA	69.1
In-migrants (no.)	168	33
Vacant housing[f] (no.)	58	20
Local community service employment		
Teachers (no.)	2	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 1,000 MW (corresponding to 9,000 acres [36 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 13,148 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

[e] 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 2010c), assuming full build-out of the site.

[f] Construction activities would affect vacant rental housing; operations activities would affect 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 two new teachers would be required in the ROI. This increase would represent less than 0.1% of total ROI employment expected in this occupation.

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 363 jobs (Table 9.4.19.2-4). Such a solar development would also produce $12.1 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, less than $0.4 million. On the basis of fees established by the BLM (BLM 2010c), acreage rental payments would be $46.2 million, and solar generating capacity payments, at least $69.1 million.

Operation of a PV solar facility likely would require that some in-migration of workers and their families from outside the ROI, with up to 33 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 is not expected to be large, with up to 20 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.

9.4.19.3 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 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.

9.4.20 Environmental Justice

9.4.20.1 Affected Environment

The data presented in the Draft Solar PEIS have changed because of the change in boundaries of the proposed Riverside East SEZ. The affected environment information for environmental justice presented in the Draft Solar PEIS has also changed, as reflected in the following discussion.

The data in Table 9.4.20.1-1 show the minority and low-income composition of the total population located within a 50-mi (80-km) radius of the proposed Riverside East SEZ based on 2000 Census data and 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 who also identify 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 Arizona, 20.4% of the population is classified as minority, while 13.2% 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; that is, 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; that is, there are no low-income populations in the SEZ.

Within the 50-mi (80-km) radius in California, 65.6% of the population is classified as minority, while 22.8% is classified as low-income. While the number of minority individuals does not exceed the state average by 20 percentage points or more, the number of minority individuals exceeds 50% of the total population in the area; that is, there is a minority population in the SEZ as a whole 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; that is, there are no low-income populations in the SEZ as a whole.

Figures 9.4.20.1-1 and 9.4.20.1-2 show the locations of the minority and low-income population groups, respectively, within the 50-mi (80-km) radius around the boundary of the SEZ.

In the California portion of the 50-mi (80-km) radius around the SEZ, more than 50% of the population is classified as minority in block groups located in the City of Blythe itself and

TABLE 9.4.20.1-1 Minority and Low-Income Populations within the 50-mi (80-km) Radius Surrounding the Proposed Riverside East SEZ as Revised

Parameter	Arizona	California
Total population	59,311	218,940
White, non-Hispanic	47,211	75,253
Hispanic or Latino	8,212	123,642
Non-Hispanic or Latino minorities	3,888	20,045
One race	3,104	17,031
Black or African American	331	11,262
American Indian or Alaskan Native	2,395	2,067
Asian	306	2,933
Native Hawaiian or Other Pacific Islander	43	429
Some other race	29	340
Two or more races	784	3,014
Total minority	12,100	143,687
Low-income	7,700	43,406
Percentage minority	20.4	65.6
State percentage minority	24.5	40.5
Percentage low-income	13.2	22.8
State percentage low-income	13.9	14.2

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

to the immediate west and southwest of the city; in the western part of the county in the vicinity of Desert Hot Springs; in Imperial County in the vicinity of Calipatria and Westmoreland; and in the Fort Yuma Indian Reservation in the Colorado River valley. Block groups with a minority population which is more than 20 percentage points higher than the state average are located in the City of Blythe, to the immediate west of the city, and in the western portions of the 50-mi (80-km) radius in the vicinity of Indio and Coachella. In the Arizona portion of the 50-mi (80-km) radius, more than 50% of the population is classified as minority in block groups located in the Colorado River Indian Reservation, in the City of Parker, and to the east of the Colorado River, south of Blythe.

Census block groups in the 50-mi (80-km) radius in California that have more than 50% of their population classified as low-income are located in the vicinity of the City of Twentynine Palms, in the western portion of Riverside County, and in Arizona, to the northeast of Yuma. Census block groups in California where the low-income population is more than 20 percentage points higher than the state average are located in the City of Blythe, in the western portion of

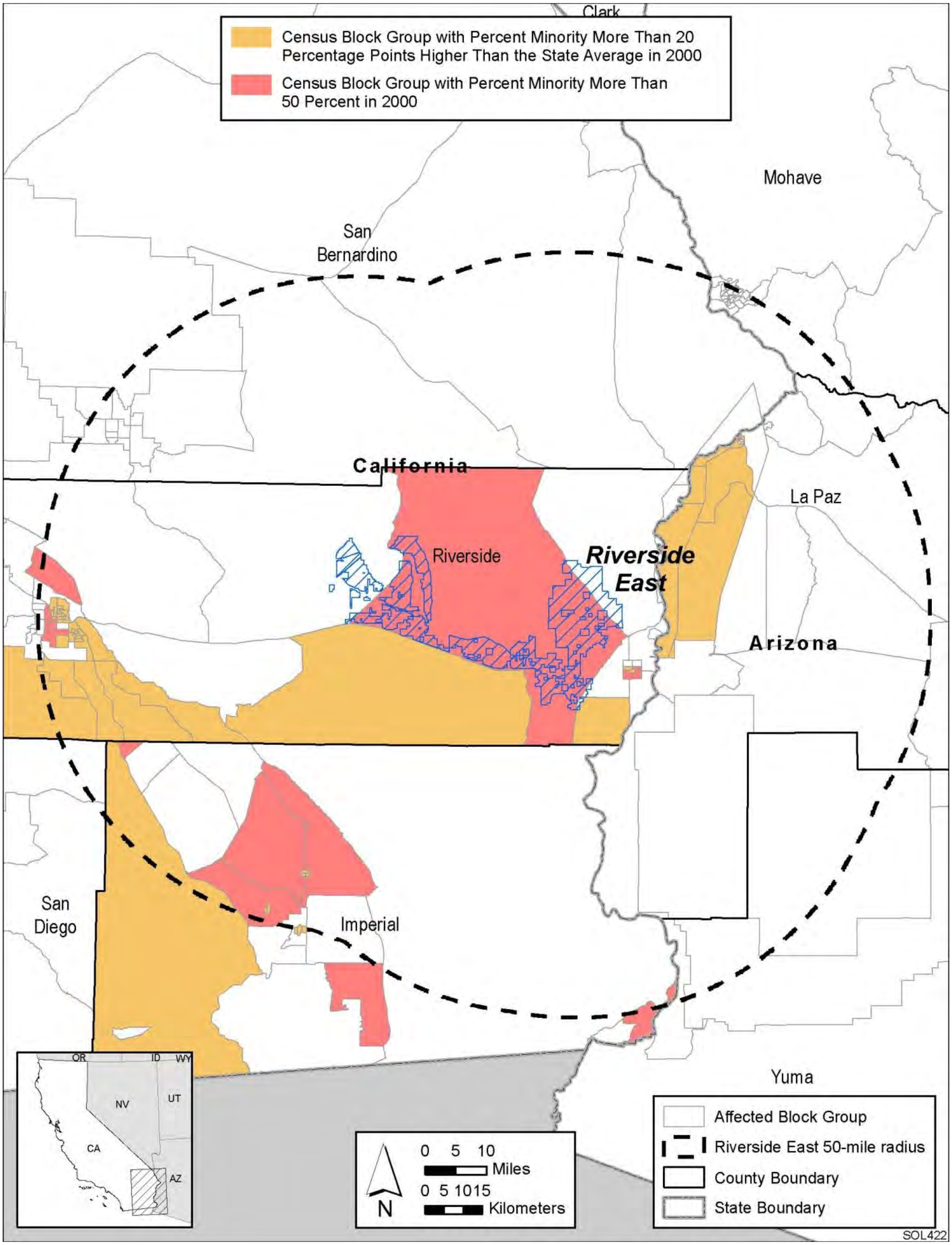

FIGURE 9.4.20.1-1 Minority Population Groups within the 50-mi (80-km) Radius Surrounding the Proposed Riverside East SEZ as Revised

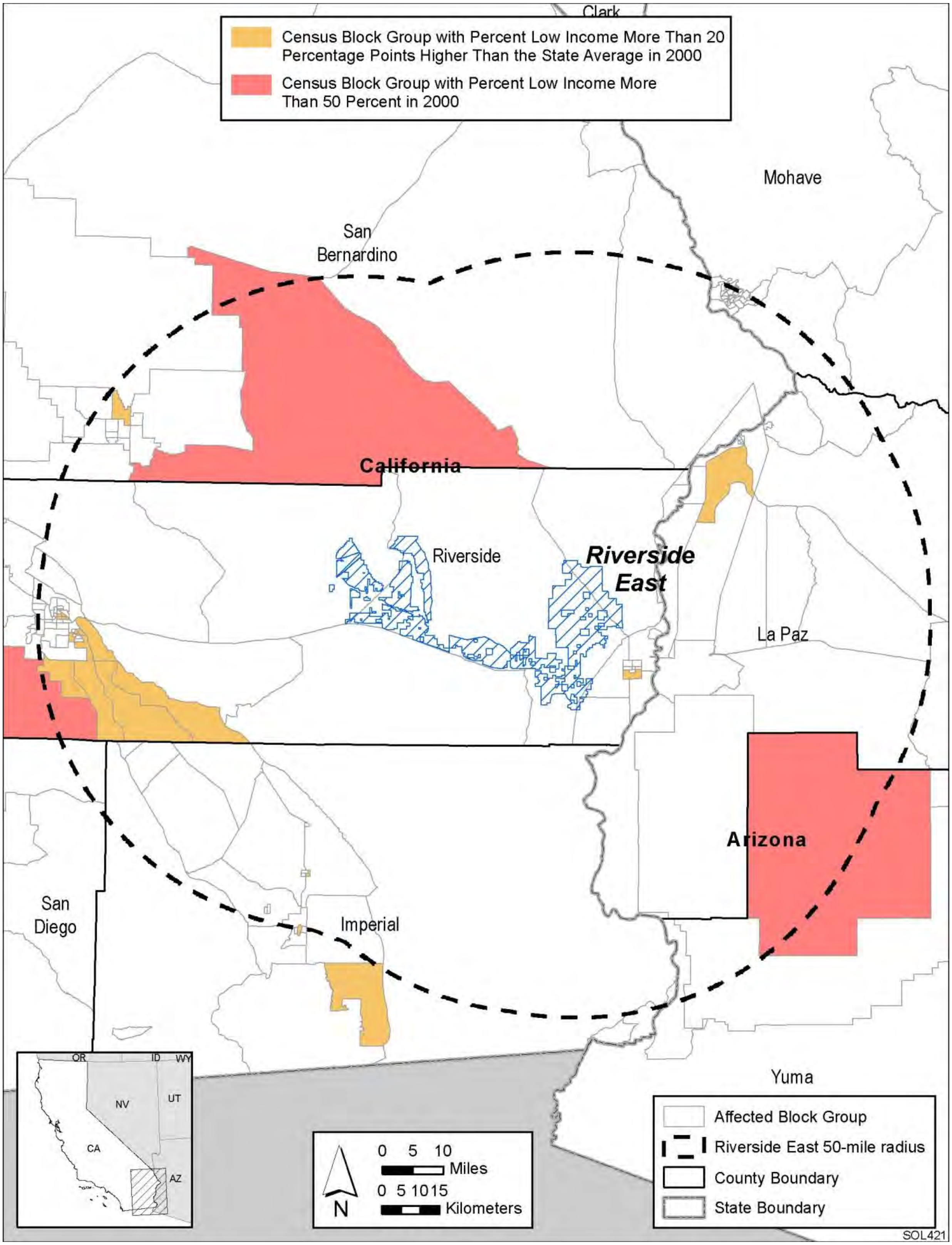

FIGURE 9.4.20.1-2 Low-Income Population Groups within the 50-mi (80-km) Radius Surrounding the Proposed Riverside East SEZ as Revised

the county, in the Colorado River Indian Reservation, and in the vicinity of the City of Victorville.

9.4.20.2 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 Riverside East SEZ include noise and dust during the construction of solar facilities; noise and EMF effects associated with solar project operations; the 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. Although impacts are likely to be small, there are minority populations defined by CEQ guidelines (see Section 9.4.20.1 of the Draft Solar PEIS) within the 50-mi (80-km) radius around the boundary of the SEZ; that is, any adverse impacts of solar projects could disproportionately affect minority populations. Because there are no low-income populations within the 50-mi (80-km) radius, according to CEQ guidelines, there would be no impacts on low-income populations.

9.4.20.3 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.

9.4.21 Transportation

9.4.21.1 Affected Environment

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

9.4.21.2 Impacts

As stated in the Draft Solar PEIS, primary transportation impacts in the SEZ are anticipated to come from commuting worker traffic. I-10, a regional traffic corridor, would experience small impacts for single projects that may have up to 1,000 daily workers, with an additional 2,000 vehicle trips per day (maximum). Such an increase is less than 10% of the current traffic on I-10. However, the exits on I-10 might experience moderate impacts with some congestion. Local road improvements would be necessary in any portion of the SEZ near I-10 that might be developed in order not to overwhelm the local roads near any site access point(s). Similarly, any access to portions of the SEZ using State Route 177 or U.S. 95 may require road improvements on those roads and on local access roads.

If up to three large projects with approximately 1,000 daily workers each were under development simultaneously within the SEZ, an additional 6,000 vehicle trips per day could be added to I-10 in the vicinity of the SEZ, assuming ride-sharing was not implemented and all access to the SEZs was funneled through I-10 (i.e., no workers commuted to work via State Route 177 from State Route 62 to the north or via local roads from U.S. 95 to the east). This would be an increase of about 25% of the current average daily traffic on most segments of I-10 near the SEZ, and could have moderate impacts on traffic flow during peak commute times. The extent of the problem would depend on the relative locations of the projects within the SEZ, where the worker populations originate, and work schedules. Affected exits on I-10 would experience moderate impacts with some congestion. Local road improvements would be necessary in any portion of the SEZ near I-10 that might be developed in order not to overwhelm the local roads near any site access point(s). Similarly, any access to portions of the SEZ that use State Route 177 or U.S. 95 may also require road improvements on State Route 177 or U.S. 95 and local access roads, depending on the percentage of worker commuter traffic using those routes.

Solar development within the SEZ would affect public access along OHV routes designated open and available for public use. Several routes are designated as open within the proposed SEZ. 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.

9.4.21.3 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, will 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 Riverside East 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.

9.4.22 Cumulative Impacts

The analysis of potential impacts in the vicinity of the proposed Riverside East SEZ presented in the Draft Solar PEIS is still generally applicable for this Final Solar PEIS, although the impacts would decrease because the size of the developable area of the proposed SEZ has been reduced from 202,896 acres (821 km^2) to 147,910 acres (599 km^2). In addition, several previously pending projects have been dropped, and some additional projects within 50 mi (80 km) of the SEZ have been proposed, started construction, or begun operations. The following sections include an update to the information presented in the Draft Solar PEIS regarding cumulative effects for the proposed Riverside East SEZ.

9.4.22.1 Geographic Extent of the Cumulative Impact 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 Riverside East SEZ are administered by the BLM, the NPS, or the DoD; the BLM administers approximately 58% of the lands within a 50-mi (80-km) radius of the SEZ.

9.4.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The Draft Solar PEIS included three other proposed SEZs in Southern California. Two of these, Iron Mountain and Pisgah, have been removed from further consideration.

Two projects (the Blythe and Genesis Solar Projects) totaling 1,250 MW and about 9,000 acres have been authorized within the proposed Riverside East SEZ. Although the Blythe project has an authorized ROW application, it will require additional case processing and environmental review to consider a post-authorization request to change technology to PV. The Desert Sunlight 550-MW PV facility is an additional authorized project that is under construction adjacent to the western boundary of the SEZ. There are seven additional solar project applications pending in the SEZ.

There are approximately 13 pending ROW applications for solar facilities within 50 mi (80 km) of the Riverside East SEZ (including pending applications within the SEZ) that could generate up to about 6,400 MW on public lands in Arizona and California (see the 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. Since the release of the Draft Solar PEIS, only three additional projects (the Desert Harvest Solar Project, the McCoy Solar Energy Project, and the Quartzsite Solar Energy Project, all described below), 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 near the proposed Riverside East SEZ has been updated and is presented in Table 9.4.22.2-1. These projects are grouped into two categories: (1) actions that relate to energy production and distribution (Section 9.4.22.2.1), and (2) other ongoing and reasonably foreseeable actions, including those related to mining and mineral processing, grazing management, transportation, recreation, water management, and conservation (Section 9.4.22.2.2). Together, these actions have the potential to affect human and environmental receptors within the geographic range of potential impacts over the next 20 years.

9.4.22.2.1 Energy Production and Distribution

Reasonably foreseeable future actions related to energy production and distribution and other major actions within a 50-mi (80-km) radius from the center of the Riverside East SEZ, which includes portions of Riverside, San Bernardino, and Imperial Counties in California, and La Paz and Yuma Counties in Arizona, are identified in Table 9.4.22.2-1. Projects listed in the tables are shown in Figure 9.4.22.2-1.

Projects not previously described in the Draft Solar PEIS are described in the following sections.

Solar Energy Projects

Solar energy projects not previously described in the Draft Solar PEIS are summarized below. The locations of these projects are shown in Figure 9.4.22.2-1.

Desert Harvest Solar Project. enXco proposes to construct and operate a 100-MW PV solar electric generation facility on approximately 930 acres (3.8 km^2) of BLM land. The site is located about 6 mi (10 km) north of the community of Desert Center, California (BLM 2011e).

Electricity will be transmitted by using either the First Solar Desert Sunlight generator tie-line or a planned Red Bluff Substation that would connect to Southern California Edison's regional transmission grid.

Rio Mesa Solar Electric Generating Facility. BrightSource Energy, Inc., proposes to construct and operate three 250-MW power tower plants on approximately 5,750 acres

TABLE 9.4.22.2-1 Ongoing and Reasonably Foreseeable Future Actions Related to Energy Development and Distribution and Other Major Actions near the Proposed Riverside East SEZ as Revised[a,b]

Description	Status	Resources Affected	Primary Impact Location
Solar Energy Projects on Private or County Lands			
Rice Solar Energy, 150-MW power tower facility, 5,750 total acres[c] (on private land, transmission ROW crosses BLM-administered land)	**FEIS June 10, 2011[d]; ROD December 20, 2011; approved December 8, 2011[e]**	Land use, visual, terrestrial habitats, wildlife, groundwater	About 15 mi[f] north of the eastern part of Riverside East SEZ, adjacent to and south of State Route 62
Rio Mesa Solar Electric Generating Facility, three 250-MW power towers (each 750 ft), 5,750 acres (mostly private land)	**CA Energy Commission accepts Application for Certification December 14, 2011[g]; construction 2013–2016**	**Land use, visual, terrestrial habitats, wildlife, groundwater**	**About 13 mi southwest of Blythe**
Tessera Solar, up to 500-MW dish engine facility (on county land)	**Appears to be cancelled or on hold**	Land use, visual, terrestrial habitats, wildlife, groundwater	Riverside County
Approved and Priority Solar Energy Projects on BLM-Administered Land [h]			
First Solar Desert Sunlight (CACA 48649), 550-MW PV facility, **4,165 BLM acres**	**FEIS April 15, 2011[i]; ROD August 10, 2011; under construction**	Land use, visual, terrestrial habitats, wildlife, groundwater	**Adjacent to the northwestern part of the Riverside East SEZ**
Solar Millennium Palen Solar Project (CACA 48810), **484-MW originally planned as parabolic trough facility, converting to PV, 3,119 BLM acres**	**FEIS May 13, 2011[j]; BLM decision on hold pending receipt of revised data**	Land use, visual, terrestrial habitats, wildlife, groundwater	West-central part of Riverside East SEZ
Solar Millennium Blythe Solar Project (CACA 48811), **1,000-MW originally planned as parabolic trough facility, converting to PV, 7,025 total acres**	**ROD October 22, 2010; construction started February 2011; construction on hold pending receipt of revised data[k]**	Land use, visual, terrestrial habitats, wildlife, groundwater	Eastern part of the Riverside East SEZ

TABLE 9.4.22.2-1 (Cont.)

Description	Status	Resources Affected	Primary Impact Location
Approved and Priority Solar Energy Projects on BLM-Administered Land[h] (Cont.)			
Genesis Solar Energy Project (**formerly** NextEra Genesis Ford Dry Lake Solar Project (CACA 48880), 250-MW parabolic trough facility, 4,640 acres[k]	**ROD November 4, 2010[l]; Notice to Proceed August 24, 2011[m]; under construction**	Land use, visual, terrestrial habitats, wildlife, groundwater	**Western** part of the Riverside East SEZ
Desert Harvest Solar Project (CACA 49491), 100-MW PV, 930 BLM acres	**NOI September 15, 2011[n]**	**Land use, visual, terrestrial habitats, wildlife**	**Western part of the Riverside East SEZ**
McCoy Solar Energy Project (CACA 48728), 750-MW PV, 7,754 BLM acres	**NOI August 29, 2011**	**Land use, visual, terrestrial habitats, wildlife**	**Eastern part of the Riverside East SEZ**
Quartzsite Solar Energy Project (AZA 34 666), 100-MW power tower, 1,500 BLM acres	**NOI January 1, 2010; DEIS November 10, 2011**	**Land use, visual, terrestrial habitats, wildlife**	**20 mi east of the Riverside East SEZ**
Renewable Energy Projects			
Orresource Geothermal (CACA 6217, CACA 6218, CACA 17568)	Ongoing	Land use, terrestrial habitats, visual	About 50 mi south of the Riverside East SEZ, within the East Mesa Known Geothermal Resource Area
Geothermal Power Project (CACA 18092X)	Authorized	Land use, terrestrial habitats, visual	About 50 mi south of the Riverside East SEZ, within the East Mesa Known Geothermal Resource Area
Geothermal Power Project (CACA 29853X)	Authorized	Land use, terrestrial habitats, visual	About 45 mi southwest of the Riverside East SEZ
Transmission and Distribution			
Blythe Energy Project Transmission Line Modifications	Under way	Land use, terrestrial habitats, visual	Riverside County

TABLE 9.4.22.2-1 (Cont.)

Description	Status	Resources Affected	Primary Impact Location
Transmission and Distribution (Cont.)			
Devers to Palo Verde No. 2	**ROD July 14, 2011[o]**	Land use, terrestrial habitats, visual	Riverside County
Other Projects			
Cadiz Valley Dry Year Supply Project	**Draft EIR December 2011[p]**	Disturbed areas, terrestrial habitats along railroad ROW	Areas adjacent to ARZC Railroad ROW in southern portion of the Iron Mountain SEZ, about 40 mi north of the Riverside East SEZ
Proposed West Chocolate Mountains Renewable Energy Evaluation Area	**DEIS June 2011[q]**	Land use, visual, terrestrial habitats, wildlife, groundwater	About 20 mi southwest of the Riverside East SEZ
Eagle Crest Hydroelectric Plant **1,300-MW Pumped Storage**	**DEIS December 2010[r]**	Land use, surface water	Eagle Mountain Mine, near northwest portion of the Riverside East SEZ
Grazing Lease Rice Valley Allotment	EA Issuance of 10-year Grazing Lease, January 2007 (CA-660-EA06-55)	Land use, surface water	Riverside County

[a] Projects in later stages of agency environmental review and project development.

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

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

[d] See Western (2011) for details.

[e] See DOI (2011) for details.

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

[g] See CEC (2011a) for details.

[h] See BLM (2012a) for details.

[i] See BLM (2011a) for details.

[j] See BLM (2011b) for details.

[k] See BLM (2011c) for details.

[l] BLM (2010d) for details.

Footnotes continued on next page.

[m] See BLM (2011d) for details. The approved area for the Genesis Solar Energy project is 1,950 acres (BLM 2011i).

[n] See BLM (2011e) for details.

[o] See BLM (2011f) for details.

[p] See Santa Margarita Water District (2011) for details.

[q] See BLM (2011g) for details.

[r] See FERC (2010) for details.

(23.3 km^2) of mostly private land owned by the Metropolitan Water District of Southern California with some BLM land. The site is about 13 mi (21 km) southwest of the City of Blythe, near the southeastern portion of the Riverside East SEZ (BrightSource 2011; CEC 2011b).

Each plant will utilize a solar power boiler at the top of a 750-ft (230-m) tower, surrounded by approximately 85,000 heliostat (mirror) fields that focus the solar energy on the solar power boiler. Each plant will also have five natural gas–fired auxiliary boilers operating in parallel with the solar field during partial load conditions, during daily start-up of power generation equipment, and nighttime preservation. A 119-acre (0.8-km^2) common area will include administration, control, and maintenance facilities and a substation servicing all three plants.

Electricity will be transmitted on a common generator tie-line from the switchyard to Southern California Edison's Colorado River Substation, approximately 9.7 mi (15.5 km) northwest of the site.

The proposed facility would have an estimated peak water requirement of 400 ac-ft/yr (494,000 m^3/yr) during the construction period and 260 ac-ft/yr (321,000 m^3/yr) thereafter for operation. The water would be drawn from on-site wells. Construction of the facility will require more than 2,500 workers at the peak of construction. Operation and maintenance will employ about 150 workers.

McCoy Solar Energy Project. McCoy Solar, LLC, proposes to construct and operate an up to 750-MW PV solar facility. Unit 1 will be 250 MW; Unit 2 will provide the additional 500 MW; and construction will begin following commercial operation of Unit 1. The proposed site is located on about 7,700 acres (31.2 km^2) of BLM land in the Riverside East SEZ (but the Solar Plant Site will utilize only about 5,363 acres (22.8 km^2) of BLM land) and 470 acres (1.9 km^2) of private land. The site is about 13 mi (21 km) northwest of the City of Blythe (BLM 2011j).

The project substation, approximately 14 acres (0.057 km^2), will be connected to Southern California Edison's Colorado River Substation.

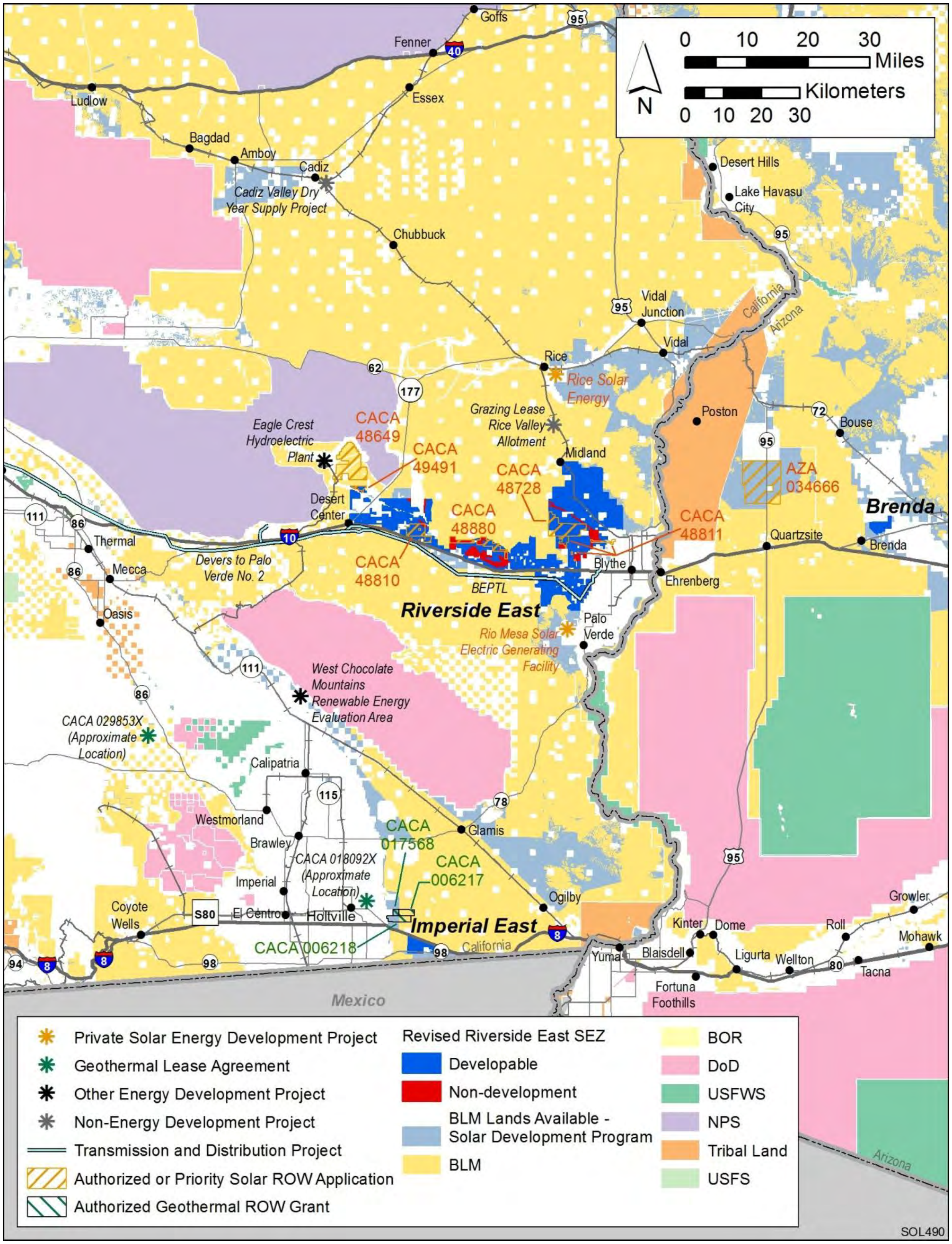

FIGURE 9.4.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Riverside East SEZ as Revised

Total water consumption during construction is estimated to be between 650 ac-ft (802,000 m^3) and 750 ac-ft (925,000 m^3). Water required for operation and maintenance is estimated to be 30 ac-ft/yr (37,000 m^3/yr). Water will be provided from on-site wells. Construction of the facility will require about 600 workers at the peak of construction. Operation and maintenance will employ up to 20 workers.

Quartzsite Solar Energy Project. Quartzsite Solar, LLC, proposes to construct a 100-MW power tower solar facility. The proposed site is located on about 1,500 acres (6.1 km^2) of BLM land, approximately 10 mi (16 km) north of Quartzsite, Arizona, and 20 mi (32 km) east of the Riverside East SEZ. The facility will interconnect to Western's transmission system through the existing Bouse–Kofa transmission line (BLM 2011h).

The plant will utilize a solar power boiler at the top of a 538-ft (164-m) tower, surrounded by approximately 17,500 heliostat (mirror) fields that focus the solar energy on the solar power boiler. The receiver would be composed of tube panels through which liquid salt flows.

The cooling system will be dry cooling. Approximately 1,000 ac-ft (1,233,000 m^3) of water will be required during the first year of construction. An estimated 150 ac-ft (185,000 m^3) would be required during the remaining construction. Approximately 200 ac-ft/yr (250,000 m^3) of water would be required during operation. Water will be provided from on-site wells. Construction of the facility will require about 400 to 500 workers at the peak of construction. Operation and maintenance will employ up to 47 workers.

Wind, Geothermal, and Transmission and Distribution Projects

With the exception of the following transmission line project, no substantive changes have been made to the projects listed in the Draft Solar PEIS.

Devers to Palo Verde No.2 Transmission Line Project. The BLM and the USFS have issued a ROD to authorize an amended ROW grant and USFS special use easement for the construction, operation, maintenance, and decommissioning of a 500-kV transmission line on an alignment that begins at the Colorado River Substation located near Blythe, California, and extends to the Devers Substation in Palm Springs, California, spanning 115 mi (185 mi). A portion of the line continues from the Devers Substation to the Valley Substation, located in unincorporated Romoland in Riverside County, spanning 41.6 mi (66.9 km) (BLM 2011f). Construction began in June 2011 (PUC 2011).

9.4.22.2.2 Other Actions

There is one addition to the projects listed in the Draft Solar PEIS.

Marine Corps Air Ground Combat Center Expansion

The U.S. Marine Corps proposes the establishment of a large-scale training range facility at the Marine Corps Air Ground Combat Center at Twentynine Palms, California, that would accommodate sustained, combined-arms, live-fire, and maneuver training for all elements of a Marine Expeditionary Brigade (MEB). To implement the proposed action, the Marine Corps would acquire additional land adjacent to the Combat Center, establish and modify military SUA above the proposed MEB-sized training range, and conduct the specified MEB training.

The proposed action includes the following:

- Acquisition of land contiguous to the existing Combat Center to provide a sufficient area for realistic MEB-sized sustained, combined-arms, live-fire, and maneuver training that meets at least a minimum threshold level of MEB training requirements within appropriate margins of safety;

- Modification and establishment of SUA to enable full integration of MEB-sized Aviation Combat Element operations and both air- and ground-delivered live-fire ordnance use within appropriate margins of safety; and

- Expanded training implemented as a full-scale MEB Exercise conducted twice per year for 24 continuous days each.

The proposed action is expected be implemented sometime in the 2014 to 2015 time frame. Construction of facilities or infrastructure would be minimal. The estimated increase in military and civilian personnel at the Combat Center would range from a low of 59 to a high of 77. During each proposed exercise, an estimated 10,000 to 15,000 Marines would reside at the existing Exercise Support Base within the Combat Center (Marine Corps 2011).

9.4.22.3 General Trends

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

9.4.22.4 Cumulative Impacts on Resources

Total disturbance in the proposed Riverside East SEZ over 20 years is assumed to be about 118,328 acres (478.8 km^2), or 80% of the developable area of the 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 Riverside East SEZ may include impacts on water quantity and quality, air quality, ecological resources such as habitat and species, cultural and visual resources, and specially designated lands.

Activities in the region that will contribute to cumulative impacts include four additional solar projects within the SEZ or within 50 mi (80 km) of the proposed Riverside East SEZ that were not known or considered foreseeable at the time the Draft Solar PEIS was prepared: the Desert Harvest Solar Project (100 MW), Rio Mesa Solar Electric Generating Facility (750 MW), McCoy Solar Energy Project (750 MW), and Quartzsite Solar Energy Project (100 MW). Two other reasonably foreseeable projects on BLM-administered lands will require additional case processing and environmental review prior to authorization to consider requests to change technology from CSP to PV (Blythe and Palen Solar Projects originally proposed as totaling almost 1,500 MW). The change in technology for these projects is expected to result in lower MW capacity and in lower water use. In addition, the expansion of the Marine Corps Air Ground Combat Center at Twentynine Palms, California, will represent further contributions to cumulative impacts in this region.

Authorized solar projects (the Desert Sunlight, Genesis, and Blythe projects) within and adjacent to the proposed Riverside East SEZ would have a combined capacity of 1,800 MW and encompass approximately 13,000 acres. The total capacity and land required for six additional reasonably foreseeable solar projects would be about 2,300 MW and 25,000 acres (101 km^2), respectively (see Table 9.4.22.2-1). In total, these reasonably foreseeable solar projects would affect about 38,000 acres (154 km^2). In addition, the proposed expansion of the Marine Corps Air Ground Combat Center would involve the acquisition of 167,971 acres (680 km^2) of federal, nonfederal, and state lands; potential take of 154 to 714 adult desert tortoises; and loss of access to and use of the majority of the Johnson Valley OHV Area (Marine Corps 2011).

However, the elimination of the nearby formerly proposed Iron Mountain SEZ from consideration means it will not be contributing to the cumulative impacts in the region. Also, because the technology for a substantial amount of the reasonably foreseeable development has been changed from CSP to PV, the projected water use impacts in the region are expected to be lower than those projected in the Draft Solar PEIS.

Overall, the incremental cumulative impacts associated with development in the proposed Riverside East SEZ during construction, operation, and decommissioning are expected to be about the same or less than those projected in the Draft Solar PEIS. This is because the size of the Riverside East SEZ has decreased by approximately 20%, thereby reducing the incremental contribution to cumulative impacts from the SEZ.

9.4.23 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 Riverside East SEZ, including the identification of potential load areas to be served by power generated at the SEZ and the results of the DLT analysis. Unlike Sections 9.4.2 through 9.4.22, this section is not an update of previous analysis for the Riverside East 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.

The Riverside East SEZ represents the most complex case because of the SEZ's potential to generate a very large amount of solar power. 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 Riverside East SEZ is estimated to have the potential to generate 23,666 MW of marketable solar power at full build-out.

9.4.23.1 Identification and Characterization of Load Areas

The primary candidates for Riverside East SEZ load areas are the major surrounding cities. Figure 9.4.23.1-1 shows the possible load areas for the Riverside East SEZ and the estimated portion of their market that could be served by solar generation. With the very large amount of marketable power assumed to be generated at the proposed Riverside East SEZ, the convention of developing two cases (for sensitivity purposes) was not followed. Because of the wide dispersal of power to many load areas, the base case for this site does not contain a clear "primary market," or "primary pathway," that would offer logical exclusion criteria for creating a secondary solution. In addition, because there were significant challenges in identifying sufficient loads to satisfy the SEZ generation potential, introducing any artificial exclusion criteria would make it likely that the remaining candidate areas and pathways would not be able to fully distribute and absorb the SEZ's capacity.

As a result, only one load area group was modeled, as follows:

- Riverside County, San Bernardino–Riverside County load I, San Bernardino–Riverside County load II, Los Angeles, San Francisco Bay load I, San Francisco Bay load II, Sacramento, San Diego, and San Diego County, California; Yuma, Phoenix, and Tucson, Arizona; Las Cruces, Albuquerque, and Farmington, New Mexico; Denver, Colorado; Salt Lake City, Utah; El Paso, Dallas, Austin, and San Antonio, Texas; and Reno and Las Vegas, Nevada.

Figure 9.4.23.1-2 shows the transmission scheme considered for the Riverside East SEZ. The group provided for linking loads along alternative routes so that the SEZ's output of 23,666 MW could be fully allocated.

Table 9.4.23.1-1 summarizes the load area according to its associated transmission scheme and provides details on how the megawatt load was estimated.

9.4.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the Riverside East SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The new transmission

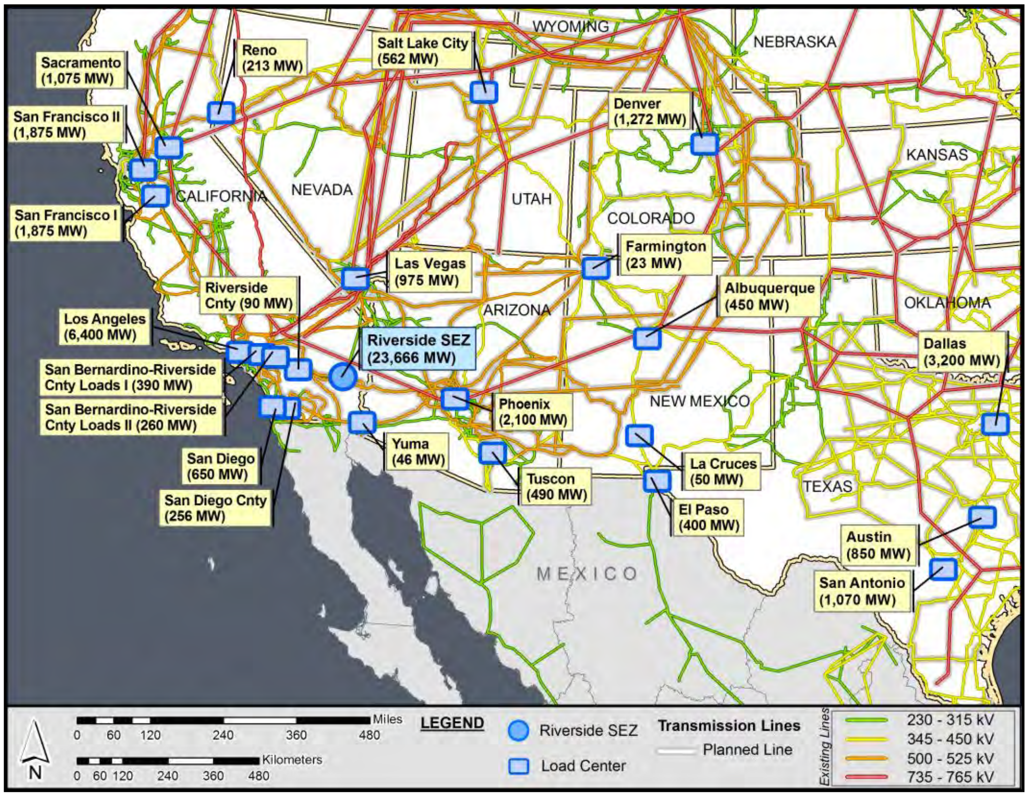

FIGURE 9.4.23.1-1 Location of the Proposed Riverside East SEZ and Possible Load Areas (Source for background map: Platts 2011)

lines(s) would directly convey the 23,666-MW output of the Riverside East SEZ to the prospective load areas for the proposed transmission scheme. The approach also assumes that all existing transmission lines in the WECC region are saturated and have little or no available capacity to accommodate the SEZ's output throughout the entire 10-year study horizon. Figure 9.4.23.1-2 displays the pathways that new dedicated lines might follow to distribute solar power generated at Riverside East SEZ via the identified transmission scheme described in Table 9.4.23.2-1. 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.

For the first component of the transmission scheme presented here, new lines would be constructed to connect with Los Angeles (6,400 MW) and nearby counties (740 MW), the San Francisco Bay area (3,750 MW), Sacramento (1,075 MW), and Reno (213 MW), so that part of the 23,666-MW output of the Riverside East SEZ could be fully utilized (Figure 9.4.23.1-2). The second component of the scheme would require new transmission lines to Phoenix (2,100 MW) and Las Vegas (975 MW). The third component would serve the cities of Yuma (46 MW), San Diego County (256 MW), and San Diego (650 MW) in the southwest. The fourth component would require additional new lines to Tucson (490 MW), La Cruces (50 MW), Albuquerque (450 MW), Farmington (23 MW), Denver (1,272 MW), and Salt Lake City (562 MW). The fifth and final component would require new lines to El Paso (400 MW), Dallas (3,200 MW), Austin

FIGURE 9.4.23.1-2 Transmission Scheme for the Proposed Riverside East SEZ (Source for background map: Platts 2011)

Load Center Descriptions:

1 - Riverside Cnty Loads (90 MW)
2 - San Bernardino -Riverside Cnty Loads I (390 MW)
3 - San Bernardino-Riverside Cnty Loads II (260 MW)
4 - Los Angeles Metro (6,400 MW)
5 - San Francisco Bay Loads II (1,875 MW)
6 - San Francisco Bay Loads I (1,875 MW)
7 - Sacramento Metro (1,075 MW)
8 - Reno Metro (213 MW)
9 - Las Vegas Metro (975 MW)
10 - Salt Lake Metro (562 Mw)
11 - San Diego City (650 MW)
12 - San Diego County (256 MW)
13 - Yuma (46 MW)
14 - Phoenix Metro (2,100 MW)
15 - Tucson Metro (490 MW)
16 - Farmington (23 MW)
17 - Albuquerque Metro (450 MW)
18 - Denver (1,272 MW)
19 - Dallas Metro (3,200 MW)
20 - Austin Metro (850 MW)
21 - San Antonio (1,070 MW)
22 - La Cruces (50 MW)
23 - El Paso Metro (400 MW)

FIGURE 9.4.23.1-2 (Cont.)

(850 MW), and San Antonio (1,075 MW). In general, the transmission configuration options for each of the segments in each component were determined by using the line "loadability" curve 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.

Table 9.4.23.2-1 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 total rating of at least 23,666 MW (to match the plant's output), while the combined load substations would have a similar total rating of 23,666 MW. Where branching of the lines is required, 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 9.4.23.2-2 provides an estimate of the total land area disturbed for construction of new transmission facilities under the scheme evaluated. The scheme presented is estimated to potentially disturb about 144,973 acres (587 km^2) of land.

1 **TABLE 9.4.23.1-1 Candidate Load Area Characteristics for the Proposed Riverside East SEZ**

Transmission Scheme	City/Load Area Name	Position Relative to SEZ	2010 Population[i]	Estimated Total Peak Load (MW)	Estimated Peak Solar Market (MW)
1	Riverside County load, California[a]	West	180,000	450	90
	San Bernardino–Riverside County load I, California[b]	West	780,000	1,950	390
	San Bernardino-Riverside County load II, California[c]	West	520,000	1,300	260
	Los Angeles, California[d]	West	12,800,000	32,000	6,400
	San Francisco Bay load II, California[e]	Northwest	3,750,000	9,375	1,875
	San Francisco Bay load I, California[f]	Northwest	3,750,000	9,375	1,875
	Sacramento, California[g]	Northwest	2,150,000	5,375	1,075
	Reno, Nevada[g]	Northwest	425,000	1,063	213
	Las Vegas, Nevada[g]	North	1,950,000	4,875	975
	Salt Lake City, Utah[g]	East	1,124,000	2,810	562
	San Diego, California[d]	Southwest	1,250,000	3,125	650
	San Diego County, California[h]	Southwest	514,000	1,284	256
	Yuma, Arizona[d]	Southwest	92,000	230	46
	Phoenix, Arizona[g]	East	4,200,000	10,500	2,100
	Tucson, Arizona[g]	Southwest	980,000	2,450	490
	Farmington, New Mexico[d]	Northeast	46,000	115	23
	Albuquerque, New Mexico[g]	Northeast	900,000	2,250	450
	Denver, Colorado[g]	Northeast	2,543,000	6,358	1,272
	Dallas, Texas[g]	East	6,400,000	16,000	3,200
	Austin, Texas[g]	East	1,700,000	4,250	850
	San Antonio, Texas[g]	East	2,140,000	5,350	1,070
	Las Cruces, New Mexico[d]	East	100,000	250	50
	El Paso, Texas[g]	East	800,000	2,000	400

[a] The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

[b] The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

[c] The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

[d] The load area represents the city named.

[e] The San Francisco Bay load II area is centered in San Jose and includes towns and cities within 3 mi to the north, 29 mi to the west, 33 mi to the northwest, 43 mi to the south, and 45 mi to the east.

[f] The San Francisco Bay load I area is centered in Oakland and includes towns and cities within 50 mi to the east of Oakland, 14 mi to the west, 40 mi to the north, and 15 mi to the southeast.

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

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TABLE 9.4.23.1-1 (Cont.)

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[h] The San Diego County load area includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[i] City and metropolitan area population data for all loads except those in the San Francisco Bay loads are from 2010 Census data (U.S. Bureau of the Census 2010). Population data for the San Francisco Bay loads are from a combination of sources including U.S. Bureau of the Census (2010), Platts (2011), and Onboard Informatics (2012).

Table 9.4.23.2-3 shows the estimated NPV of the transmission scheme 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 revenues more than offset investments. This calculation does not include the cost of producing electricity. The results of this analysis indicate that this transmission scheme is economically viable even at the base assumption of a 20% utilization factor.

Table 9.4.23.2-4 shows the effect of varying the value of the utilization factor on the NPV of the proposed transmission scheme. It also shows that as the utilization factor is increased, the economic viability of the lines 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 finding of the DLT analysis for the proposed Riverside East SEZ is as follows:

- Transmission scheme 1 represents a least-cost-investment scenario for the project and appears favorable in terms of NPV. It would result in new land disturbance of about 144,973 acres (587 km2). Other load area configurations are possible but would be less favorable than scheme 1 in terms of NPV and land use requirements.

9.4.23.3 Sensitivity to Solar-Eligible Load Assumption

This section briefly describes the results of a sensitivity analysis that was conducted in response to review comments and questions. The objective of this analysis was to examine the sensitivity of the results for Riverside East to the 20% solar-eligible load assumption (i.e., that loads eligible to be served by SEZs would be limited to 20% of the total load for each load area). This assumption was of particular interest for the Riverside East SEZ because the magnitude of solar capacity to be transmitted to various load areas is so large (23,666 MW) that the solution required connections with many load areas and transmission links covering long distances.

TABLE 9.4.23.2-1 Potential Transmission Scheme, Estimated Solar Markets, and Distances to Load Areas for the Proposed Riverside East SEZ

Transmission Scheme	City/Load Area Name	Estimated Peak Solar Market (MW)[i]	Total Solar Market (MW)	Sequential Distance (mi)[j]	Total Distance (mi)[c]	No. of Substations
1	Riverside County load, California[a]	90	24,547	84	4,264	31
	San Bernardino–Riverside County load I, California[b]	390		45		
	San Bernardino–Riverside County load II, California[c]	260		15		
	Los Angeles, California[d]	6,400		45		
	San Francisco Bay load II, California[e]	1,875		370		
	San Francisco Bay load I, California[f]	1,875		40		
	Sacramento, California[g]	1,075		121		
	Reno, Nevada[g]	213		104		
	Las Vegas, Nevada[g]	975		252		
	Salt Lake City, Utah[g]	562		307		
	San Diego, California[d]	650		129		
	San Diego County, California[h]	256		18		
	Yuma, Arizona[d]	46		121		
	Phoenix, Arizona[g]	2,100		55		
	Tucson, Arizona[g]	490		342		
	Farmington, New Mexico[d]	23		173		
	Albuquerque, New Mexico[g]	450		205		
	Denver, Colorado[g]	1,272		452		
	Dallas, Texas[g]	3,200		717		
	Austin, Texas[g]	850		193		
	San Antonio, Texas[g]	1,070		90		
	Las Cruces, New Mexico[d]	50		353		
	El Paso, Texas[g]	400		33		

[a] The Riverside County load area includes the communities of Indio, Cathedral City, and Palm Springs.

[b] The San Bernardino–Riverside County load I area includes the communities of Colton, Riverside, San Bernardino, Redlands, Highland, and Rialto.

[c] The San Bernardino–Riverside County load II area includes the communities of Fontana, Ontario, and Rancho Cucamonga.

[d] The load area represents the city named.

[e] The San Francisco Bay load II area is centered in San Jose and includes towns and cities within 3 mi to the north, 29 mi to the west, 33 mi to the northwest, 43 mi to the south, and 45 mi to the east.

Footnotes continued on next page

TABLE 9.4.23.2-1 (Cont.)

[f] The San Francisco Bay load I area is centered in Oakland and includes towns and cities within 50 mi to the east of Oakland, 14 mi to the west, 40 mi to the north, and 15 mi to the southeast.

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

[h] The San Diego County load area includes the cities of Imperial Beach, Spring Valley, National City, Chula Vista, La Mesa, and El Cajon.

[i] From Table 9.4.23.1-1.

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

TABLE 9.4.23.2-2 Land Use Requirements for the Proposed Riverside East SEZ

				Land Use (acres)[b]		
Transmission Scheme	City/Load Area Name	Total Distance (mi)[a]	No. of Substations	Transmission Line	Substation	Total
1	See Table 9.4.23.1-1	4,264	31	144,405	567.7	144,973

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

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

TABLE 9.4.23.2-3 NPV (Base Case) for the Proposed Riverside East 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	See Table 9.4.23.1-1	98,128.8	1,562.0	4,146.3	32,016.5	1,325.7

TABLE 9.4.23.2-4 Effects of Varying the Utilization Factor on the NPV of the Transmission Scheme for the Proposed Riverside East SEZ

		NPV ($ million) at Different Utilization Factors					
Transmission Scheme	City/Load Area Name	20%	30%	40%	50%	60%	70%
1	See Table 9.4.23.1-1	1,326	17,334	33,342	49,350	65,359	81,367

The analysis consisted of increasing the solar-eligible load assumption from 20% to 30%. For example, Riverside County is estimated to have a total load of 450 MW, yielding 90 MW of solar-eligible load under the base case assumption of 20%. For the 30% sensitivity test, this load was increased to 135 MW. Load estimates for all other load areas were similarly increased for this analysis.

Results for the proposed Riverside East SEZ showed a high degree of sensitivity to the increase in the solar-eligible load assumption. In terms of load areas served, the 30% case was able to eliminate connections to major portions of the 20% case routings. With larger loads located closer to the SEZ, the 30% case eliminated links with Reno, Salt Lake City, Denver, Farmington, Albuquerque, Las Cruces, El Paso, Dallas, Austin, and San Antonio (see Figure 9.4.23.1-1 for relative locations of these load areas). Increased power deliveries to the remaining load areas allowed the full 23,666 MW to be accommodated in closer proximity to the SEZ.[3]

In terms of new transmission line distances, the 30% case yielded a total of 1,787 mi (2,876 km) for new lines, less than half of the 4,264 mi (6,862 km) needed in the 20% case. The number of substations was reduced from 31 in the 20% case to 19 in the 30% case. Land use showed similarly dramatic decreases, with the total disturbed land estimate dropping to 53,315 acres (216 km^2) in the 30% case (down from 144,973 acres [587 km^2] in the 20% case).

For cost comparisons, the shorter distances directly translated into substantial cost reductions. The 30% case yielded total transmission line and substation costs of $11.8 billion, compared with $30.7 billion for the 20% case. In addition, with lower costs for the 30% case, the NPV increased to $22.1 billion, compared with $4.1 billion for the 20% case.

9.4.24 Impacts of the Withdrawal

The BLM is proposing to withdraw the 159,457 acres (646 km^2) of public land comprising the proposed Riverside East 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.

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[3] Currently the achievability of 30% solar-eligible loads for the various load areas is unlikely. Advances in cost-effective energy storage capabilities over the 20-year study period may make solar-eligible loads of 30% or greater feasible.

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 Riverside East SEZ, impacts of the proposed withdrawal on mineral resources and related economic activity and employment are expected to be negligible to moderate, because the area contains known deposits of locatable minerals that were once mined along the northeastern boundary of the SEZ in the foothills of the Big Maria and Little Maria Mountains (currently, however, there is no mineral production within the SEZ) (BLM 2012c). The lands within the SEZ would remain open to mineral leasing, geothermal leasing, and mineral materials laws. Therefore, BLM could still elect to lease oil, gas, coal, or geothermal resources or to sell common-variety mineral materials, such as sand and gravel, at its discretion. The lands would also remain open to ROW authorizations.

For the Riverside East SEZ, the impacts of the proposed withdrawal on mineral resources and related economic activity and employment are expected to be negligible to moderate. Although the area contains known deposits of locatable minerals, currently there is no mineral production within the SEZ. 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).

9.4.25 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 EIS. 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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9.4.26 Errata for the Proposed Riverside East SEZ

This section presents corrections to material presented in the Draft Solar PEIS and the Supplement to the Draft Solar PEIS. 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 9.4.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

TABLE 9.4.26-1 Errata for the Proposed Riverside East SEZ (Section 9.4 of the Draft Solar PEIS and Section C.2.2 of the Supplement to the Draft Solar PEIS)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
9.4.7.1	9.4-51	5-6			The figure number called out in this line should be Figure 9.4.7.1-3.
9.4.9.2.2,	9.4-75	12–13			"The highest groundwater extraction rate in the Chuckwalla Valley was reported to be 9,100 ac-ft/yr (11.2 million m3/yr) in 1966," should read, "A representative basin-scale groundwater withdrawal rate associated with steady groundwater surface elevations was reported to be 9,100 ac-ft/yr (11.2 million m^3/yr) in 1966."
9.4.11	9.4-95	34			Delete "as well as the CRA."
9.4.11	9.4-95	35-36			Change to "…in the center of the SEZ (Figure 9.4.12.1-1)." This involves deletion of "The CRA is located along the western border of the SEZ."
9.4.11.1.1	9.4-96	12-16			Delete the last two sentences of the paragraph starting with "Several other amphibian species…"
9.4.11.1.1	9.4-97				For the habitat description of Couch's spadefoot in Table 9.4.11.1-1, change "Requires pools or potholes with water that lasts longer than 10 to 12 days for breeding sites." To "Requires pools or potholes with10 to 12 days of consecutive days of ponding for breeding sites."
9.4.11.1.3	9.4-103	35-36			Change "…dry lake, wetlands, and the CRA)." To "…dry lake, and wetlands)."
9.4.11.1.3	9.4-103	42-44			Delete the design feature related to the Colorado River Aqueduct (CRA).
9.4.11.1.3	9.4-119	2			Delete ", but occur within the area of the CRA just northwest of the SEZ."
9.4.11.2					All uses of the term "neotropical migrants" in the text and tables of this section should be replaced with the term "passerines."
9.4.11.2.2	9.4-121	8			Change "reptile species" to "bird species."

TABLE 9.4.26-1 (Cont.)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
9.4.11.2.3	9.4-121	18			Change "…Palen Lake, wetlands, and the CRA)." To "…Palen Lake, and wetlands)."
9.4.11.2.3	9.4-121	41			Change "…Palen Lake, wetlands, and the CRA." To "Palen Lake, and wetlands."
9.4.11.2.3	9.4-122	4-6			Delete the last sentence of the paragraph before the start of Section 9.4.11.3.
9.4.11.3.3	9.4-134	31			Change "…Lake, wetlands, and the CRA should be avoided." To "…Lake, and wetlands should be avoided."
C.2.2.3	C-59	NA	C.2.22		The legend to this figure gave the acreage of authorized solar projects within the SEZ as 27,542 acres. The acreage should have been given as approximately 9,000 acres.