NOTATION

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

GENERAL ACRONYMS AND ABBREVIATIONS

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

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

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

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

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

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

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

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

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

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

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

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

CHEMICALS

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

UNITS OF MEASURE

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

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

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

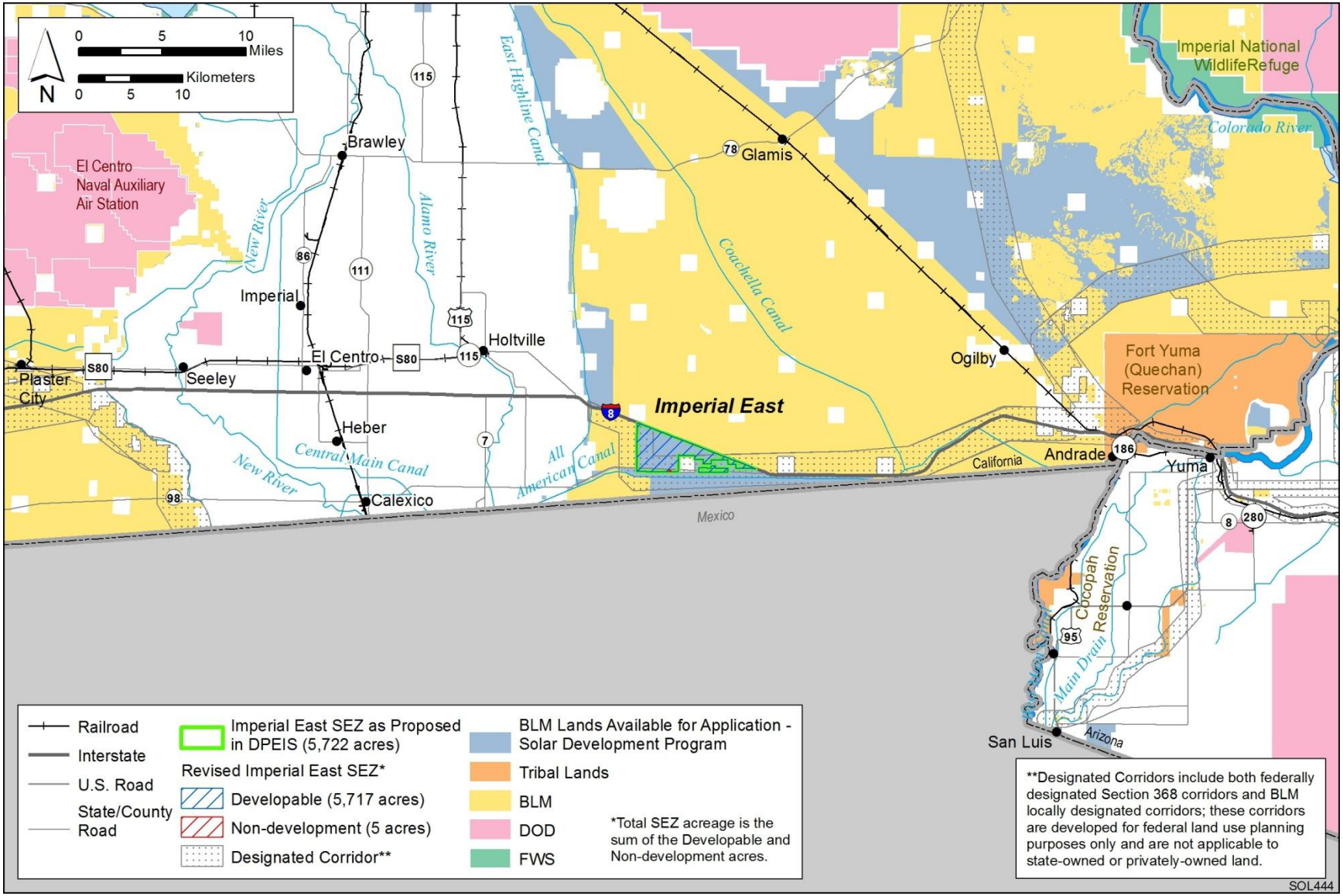

FIGURE 9.1.1.1-1 Proposed Imperial East SEZ as Revised

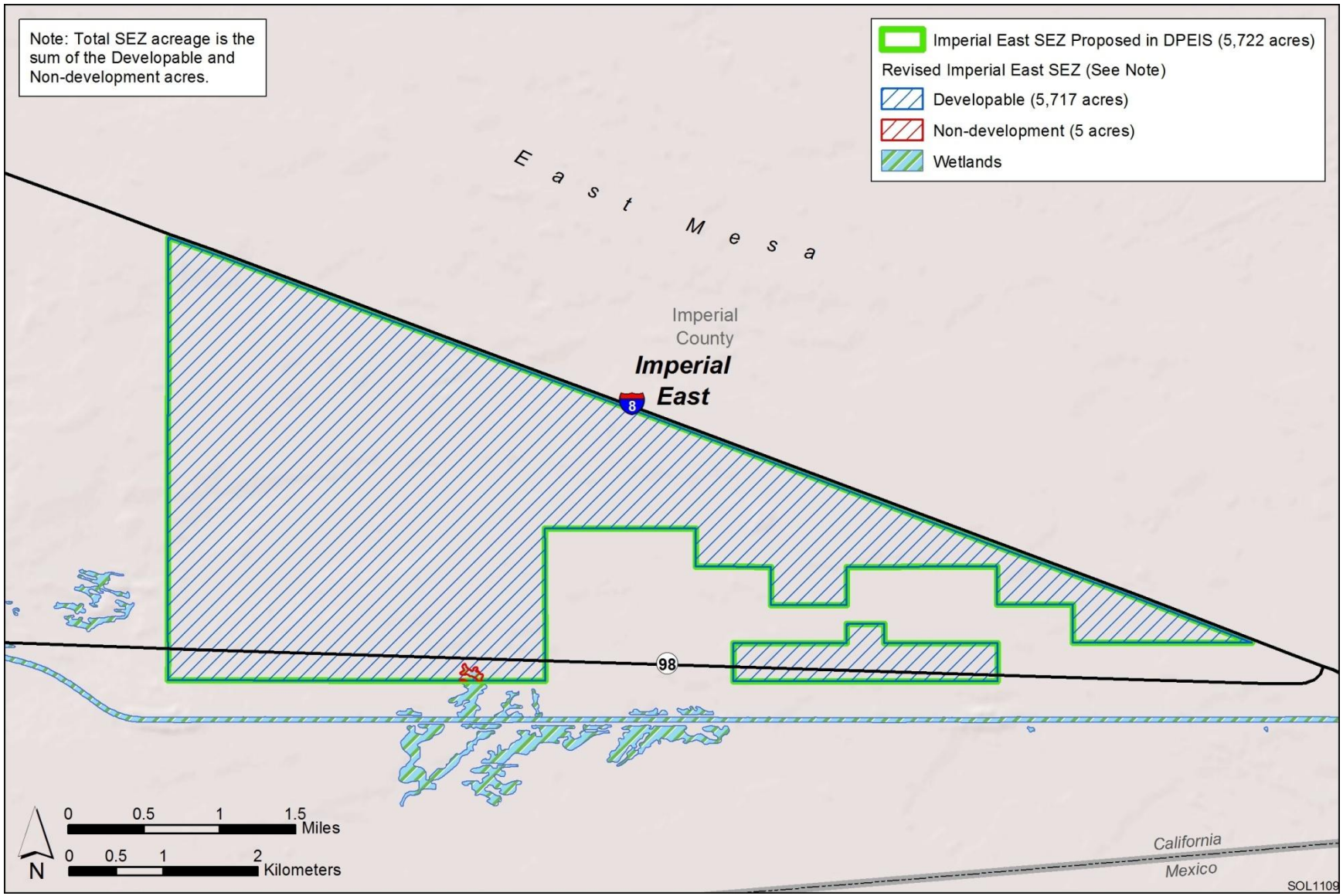

FIGURE 9.1.1.1-2 Developable and Non-development Areas for the Proposed Imperial East SEZ as Revised

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.

[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		Description	Area in Acres[d] (percentage of SEZ)
		Water[b]	Wind[c]		
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.

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

Parameter	Station (USGS ID)		
	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

Parameter	Station (USGS ID)[a] 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,

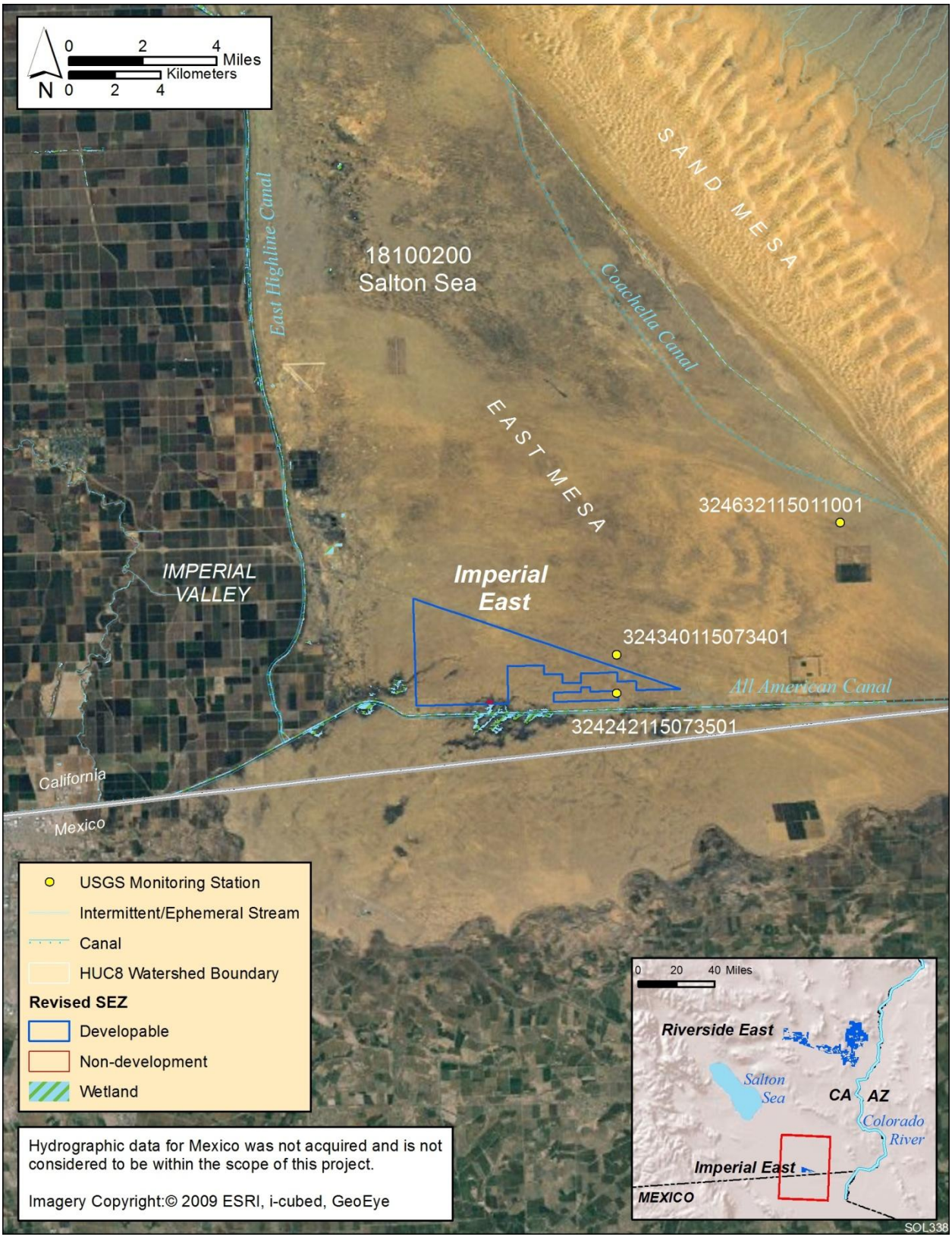

FIGURE 9.1.9.1-1 Water Features near the Proposed Imperial East SEZ as Revised

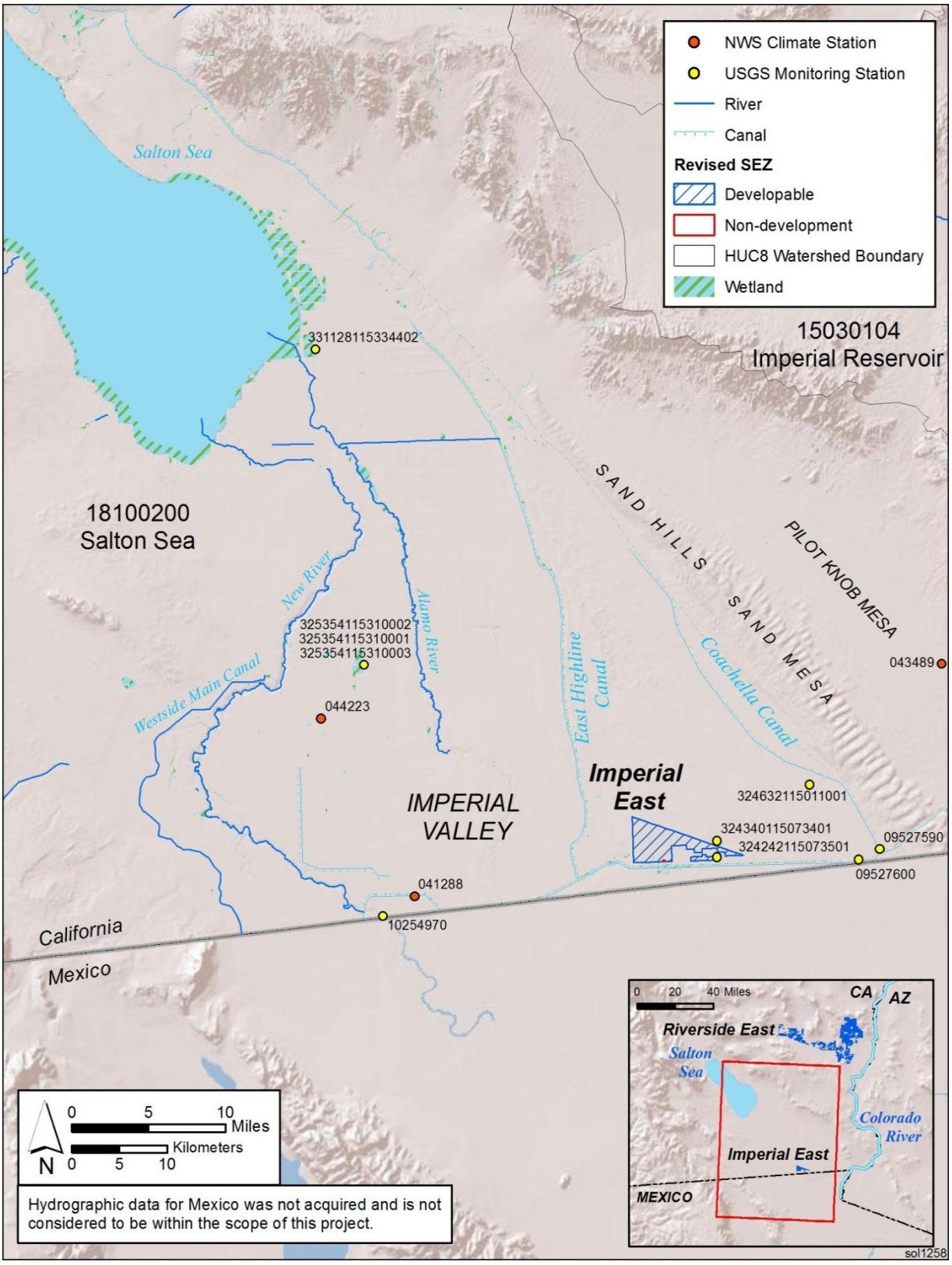

FIGURE 9.1.9.1-2 Water Features within the Salton Sea Watershed, Which Includes the Proposed Imperial East SEZ as Revised

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

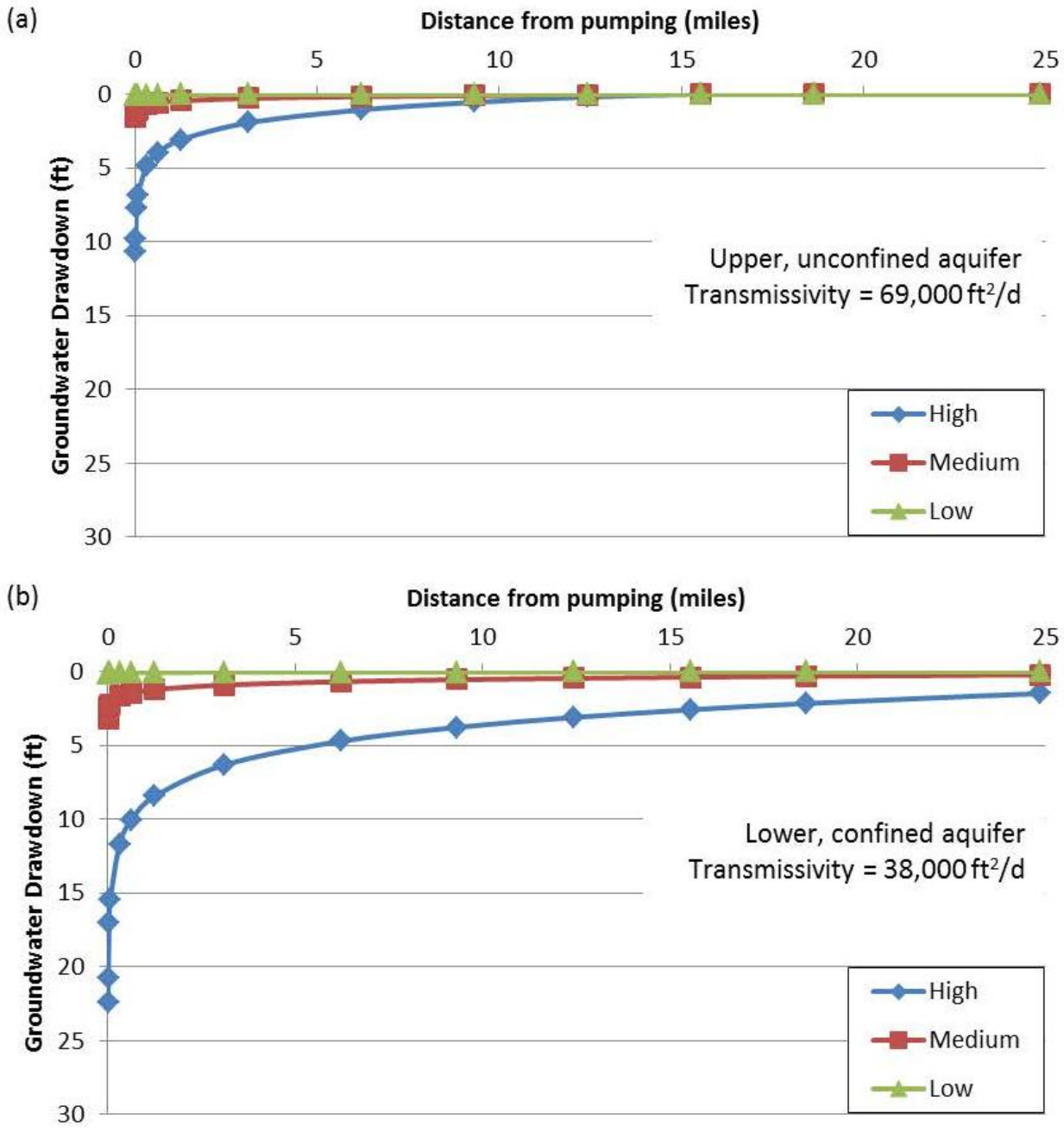

FIGURE 9.1.9.2-2 Estimated One-Dimensional Groundwater Drawdown in the (a) Upper Unconfined Aquifer and (b) Lower Confined Aquifer Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Imperial East SEZ as Revised

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

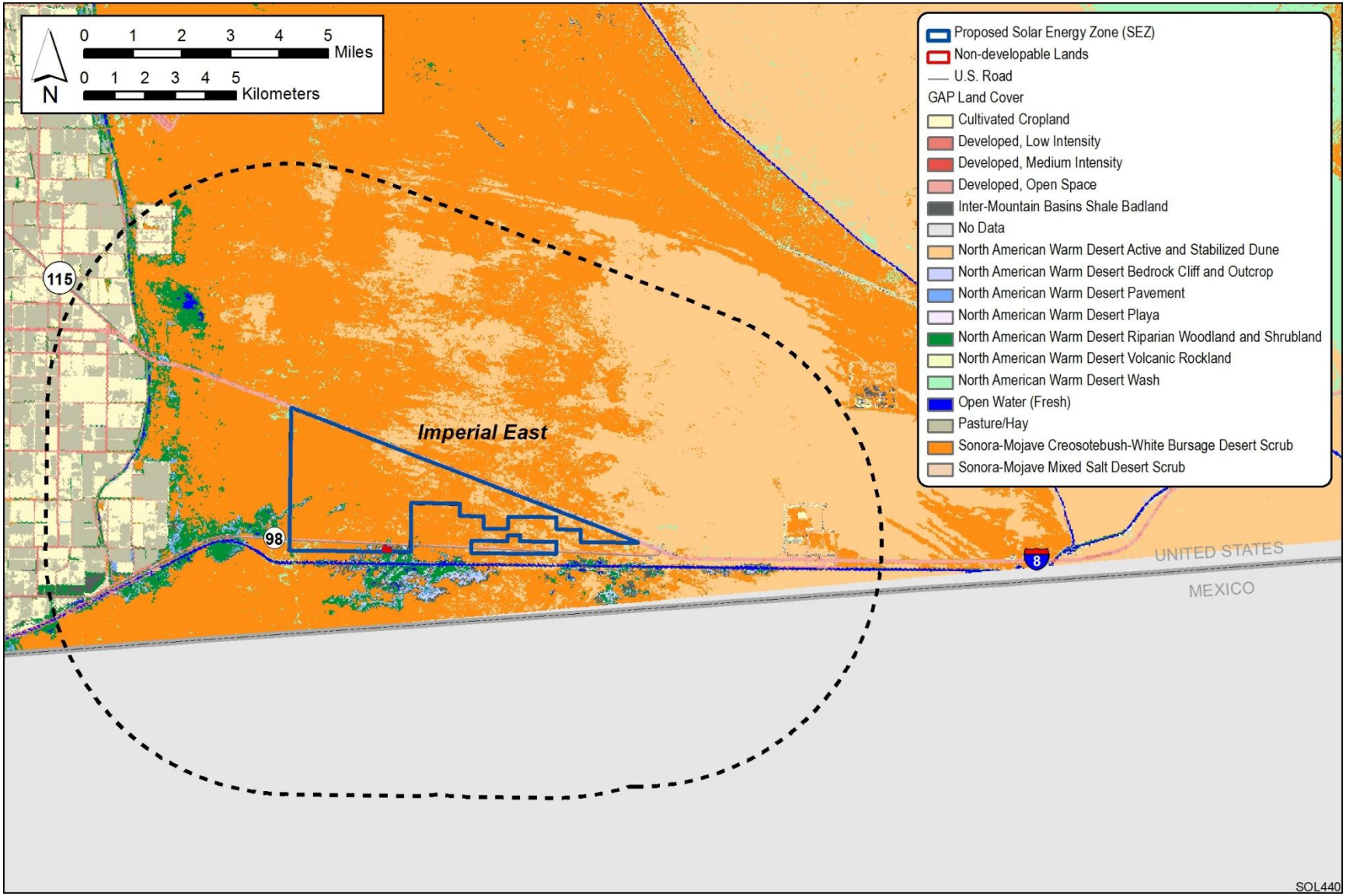

FIGURE 9.1.10.1-1 Land Cover Types within the Proposed Imperial East SEZ as Revised

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

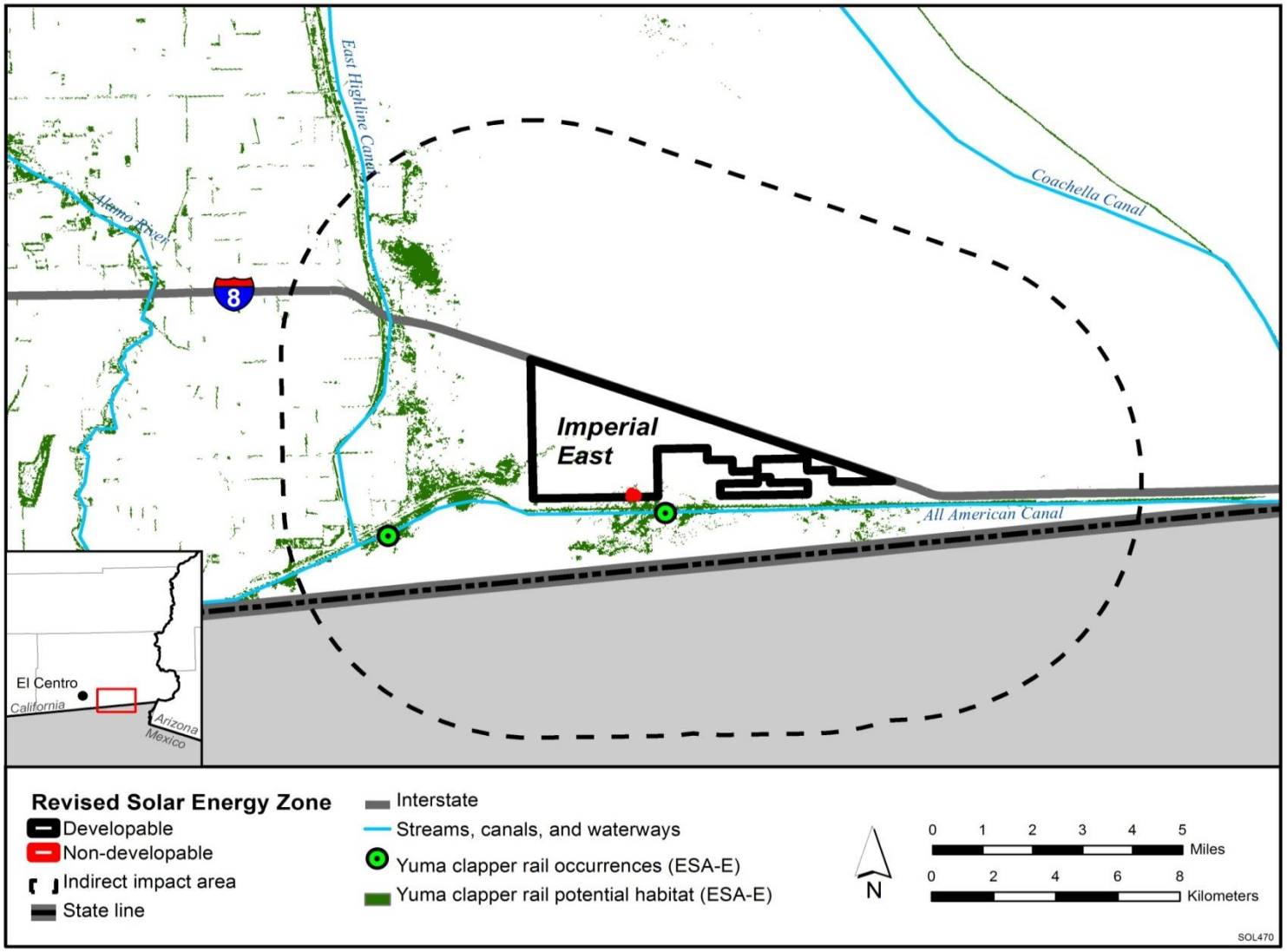

FIGURE 9.1.12.1-1 Proposed Imperial East SEZ as Revised and Distribution of Potentially Suitable Habitat for Species Listed under the Endangered Species Act

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.

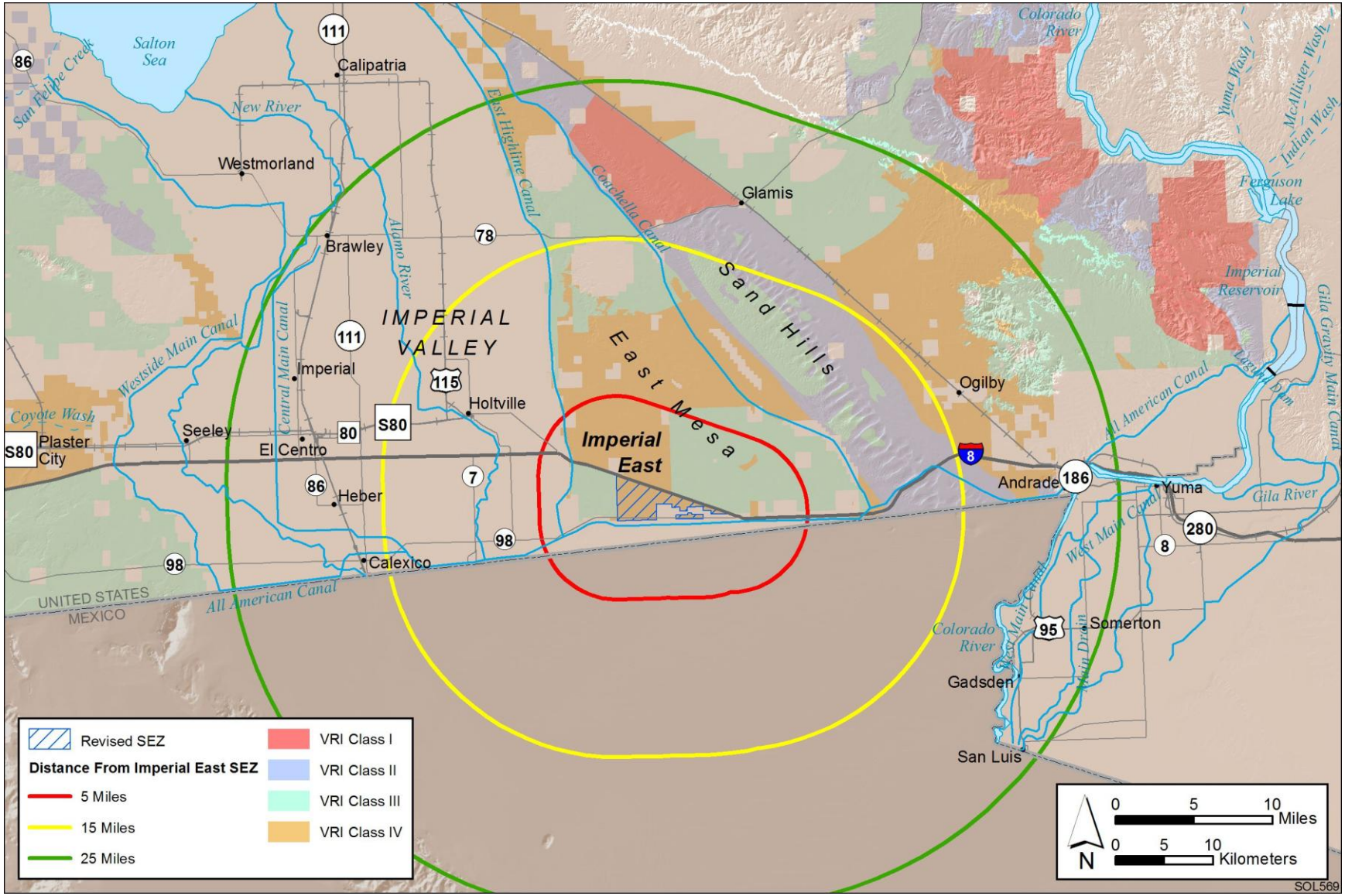

FIGURE 9.1.14.1-1 Visual Resource Inventory Values for the Proposed Imperial East SEZ as Revised

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.

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

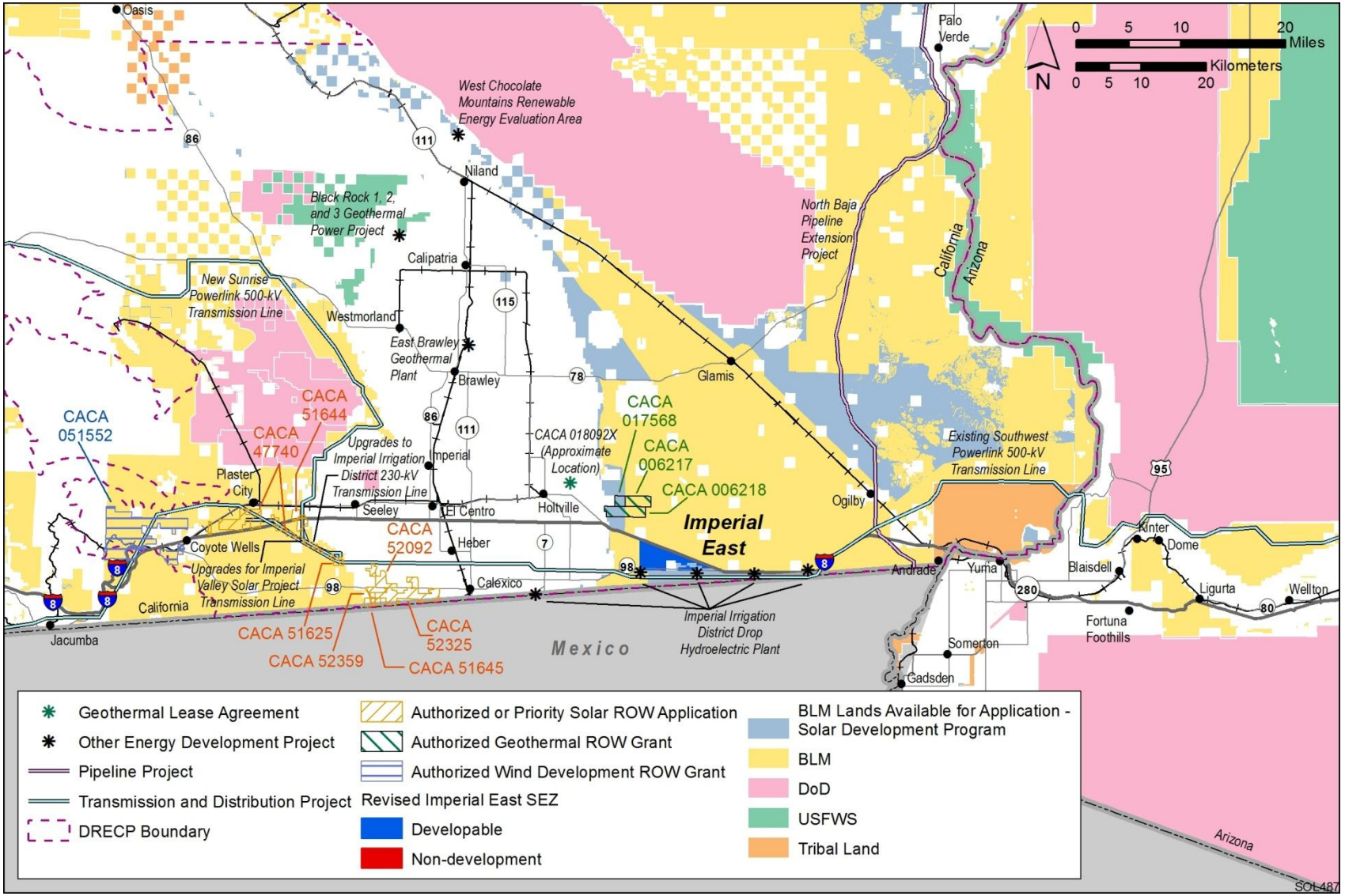

FIGURE 9.1.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Imperial East SEZ as Revised

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.

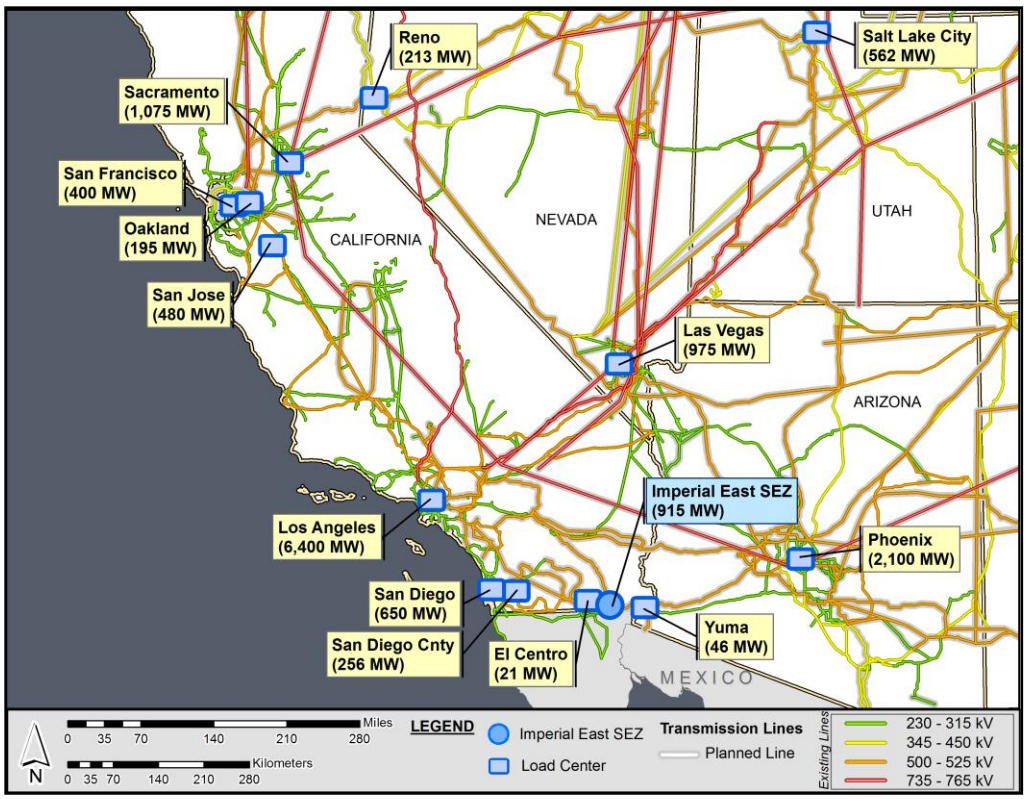

FIGURE 9.1.23.1-1 Location of the Proposed Imperial East SEZ and Possible Load Areas (Source for background map: Platts 2011)

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.

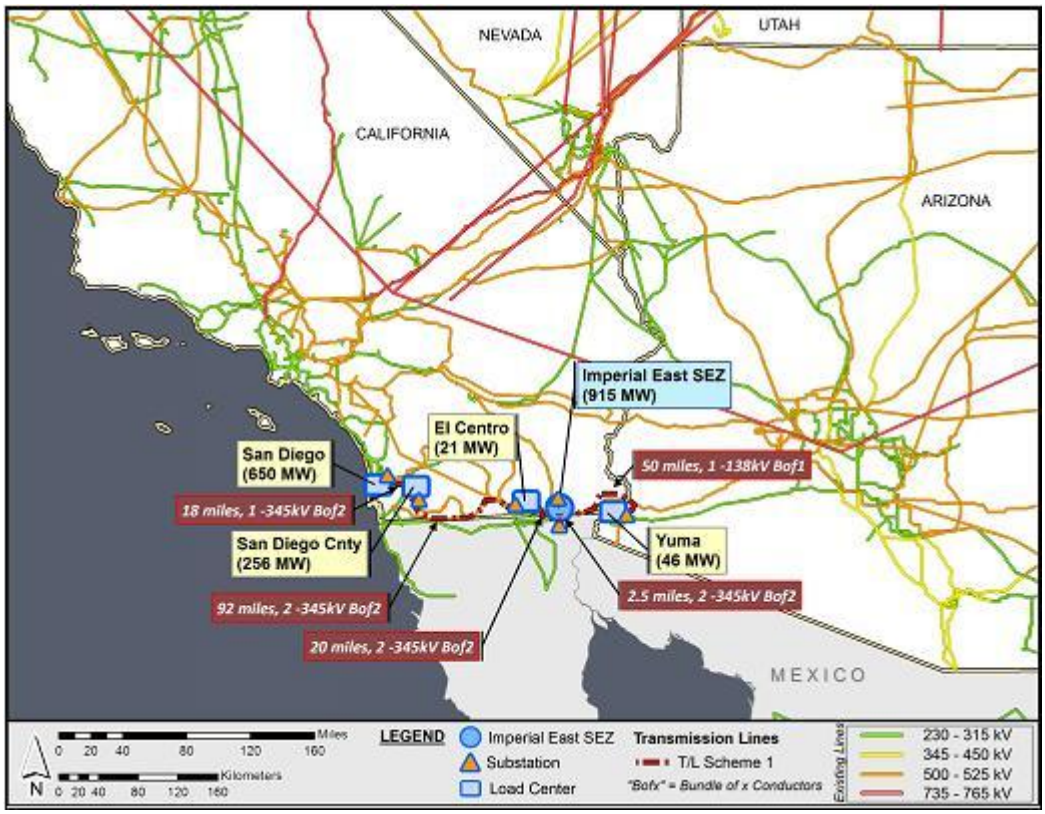

FIGURE 9.1.23.1-2 Transmission Scheme 1 for the Proposed Imperial East SEZ (Source for background map: Platts 2011)

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

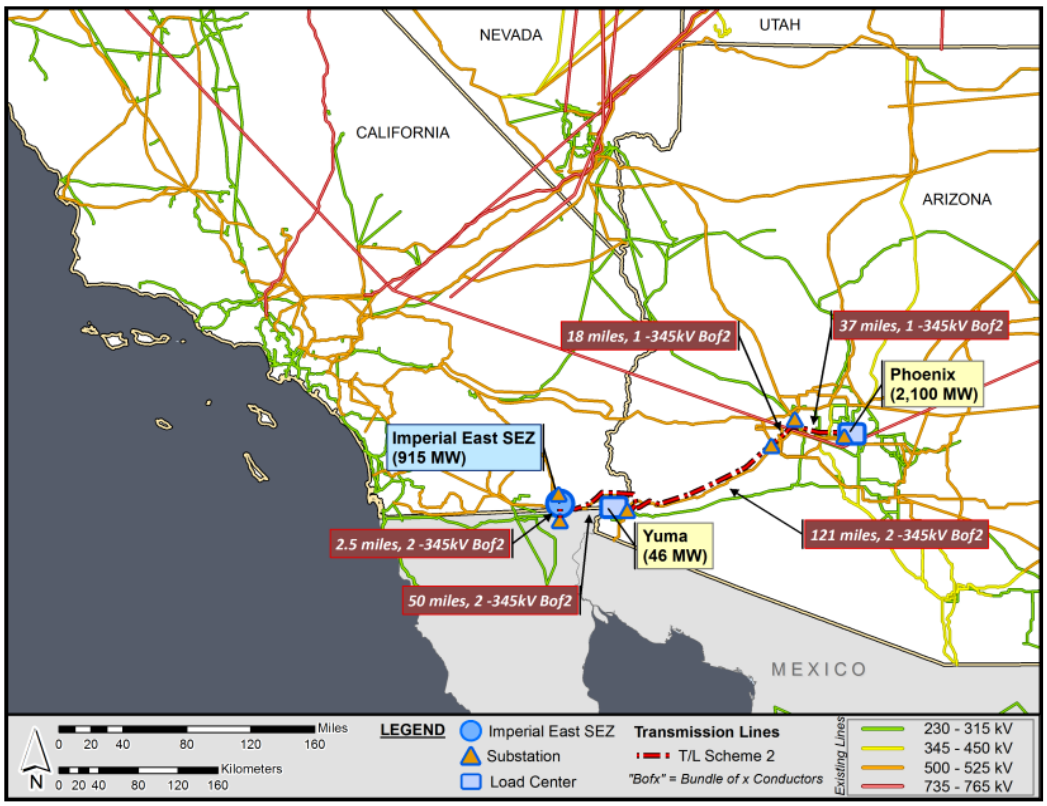

FIGURE 9.1.23.1-3 Transmission Scheme 2 for the Proposed Imperial East SEZ (Source for background map: Platts 2011)

(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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