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)

10 UPDATE TO AFFECTED ENVIRONMENT AND IMPACT ASSESSMENT FOR PROPOSED SOLAR ENERGY ZONES IN COLORADO

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 Colorado—Antonito Southeast, De Tilla Gulch, Fourmile East, and Los Mogotes East. The SEZ-specific analyses provide documentation from which the BLM will tier future project authorizations, thereby limiting the required scope and effort of project-specific National Environmental Policy Act of 1969 (NEPA) analyses.

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

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

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

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

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

This chapter is an update to the information on Colorado SEZs presented in the Draft Solar PEIS. The information presented in this chapter supplements and updates, but does not replace, the information provided in the corresponding Chapter 10 on proposed SEZs in Colorado in the Draft Solar PEIS. Corrections to incorrect information in Sections 10.1, 10.2, 10.3, and 10.4 of the Draft Solar PEIS and in Sections C.3.1, C.3.2, C.3.3, and C.3.4 of the Supplement to the Draft are provided in Sections 10.1.26, 10.2.26, 10.3.26, and 10.4.26 of this Final Solar PEIS.

10.4 LOS MOGOTES EAST

10.4.1 Background and Summary of Impacts

10.4.1.1 General Information

The proposed Los Mogotes East SEZ is located in Conejos County in south-central Colorado, about 12 mi (19 km) north of the New Mexico border. In 2008, the county population was 8,745, while the four-county region surrounding the SEZ—Alamosa, Conejos, Costilla, and Rio Grande Counties—had a total population of 39,759. The largest nearby town is Alamosa, which had a 2008 population of 8,745 and is located about 22 mi (35 km) to the northeast on U.S. 285. This highway is located about 3 mi (5 km) east of the SEZ. The town of Romeo is located about 3 mi (5 km) directly to the east of the SEZ on U.S. 285. The SLRG Railroad serves the area. As of October 28, 2011, there were no pending solar project applications within or adjacent to the SEZ.

As published in the Draft Solar PEIS (BLM and DOE 2010), the proposed Los Mogotes East SEZ had a total area of 5,918 acres (24 km^2) (see Figure 10.4.1.1-1). In the Supplement to the Draft Solar PEIS (BLM and DOE 2011), the SEZ boundaries were revised, eliminating more than half of the area, that is, 3,268 acres (13.2 km^2) on the western side of the SEZ (see Figure 10.4.1.1-2). Excluding this area will avoid or minimize impacts on significant cultural resources; grazing allotments; an important riparian area; Gunnison prairie dog, burrowing owl, ferruginous hawk, mountain plover, pronghorn birthing and winter habitat; and visual resources. The remaining SEZ area is 2,650 acres (10.7 km^2). No additional areas for non-development were identified within the SEZ.

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

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

10.4.1.2 Development Assumptions for the Impact Analysis

Maximum development of the proposed Los Mogotes East SEZ is assumed to be 80% of the total SEZ area over a period of 20 years, a maximum of 2,120 acres (8.58 km^2) (Table 10.4.1.2-1). Full development of the Los Mogotes East SEZ would allow development of facilities with an estimated total of between 236 MW (dish engine or PV technologies, 9 acres/MW [0.04 km^2/MW]) and 424 MW (solar trough technologies, 5 acres/MW [0.02 km^2/MW]) of electrical power capacity.

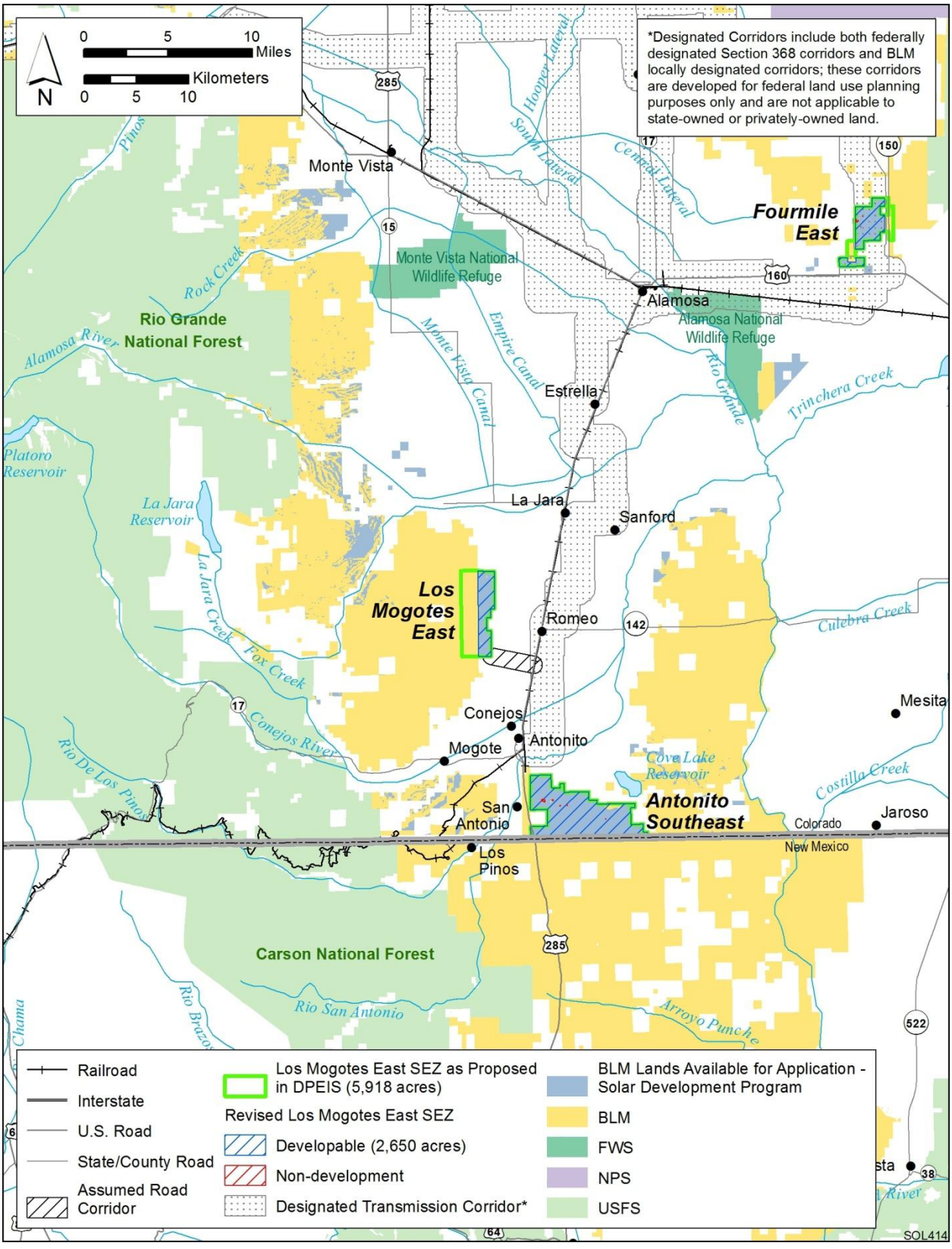

FIGURE 10.4.1.1-1 Proposed Los Mogotes East SEZ as Revised

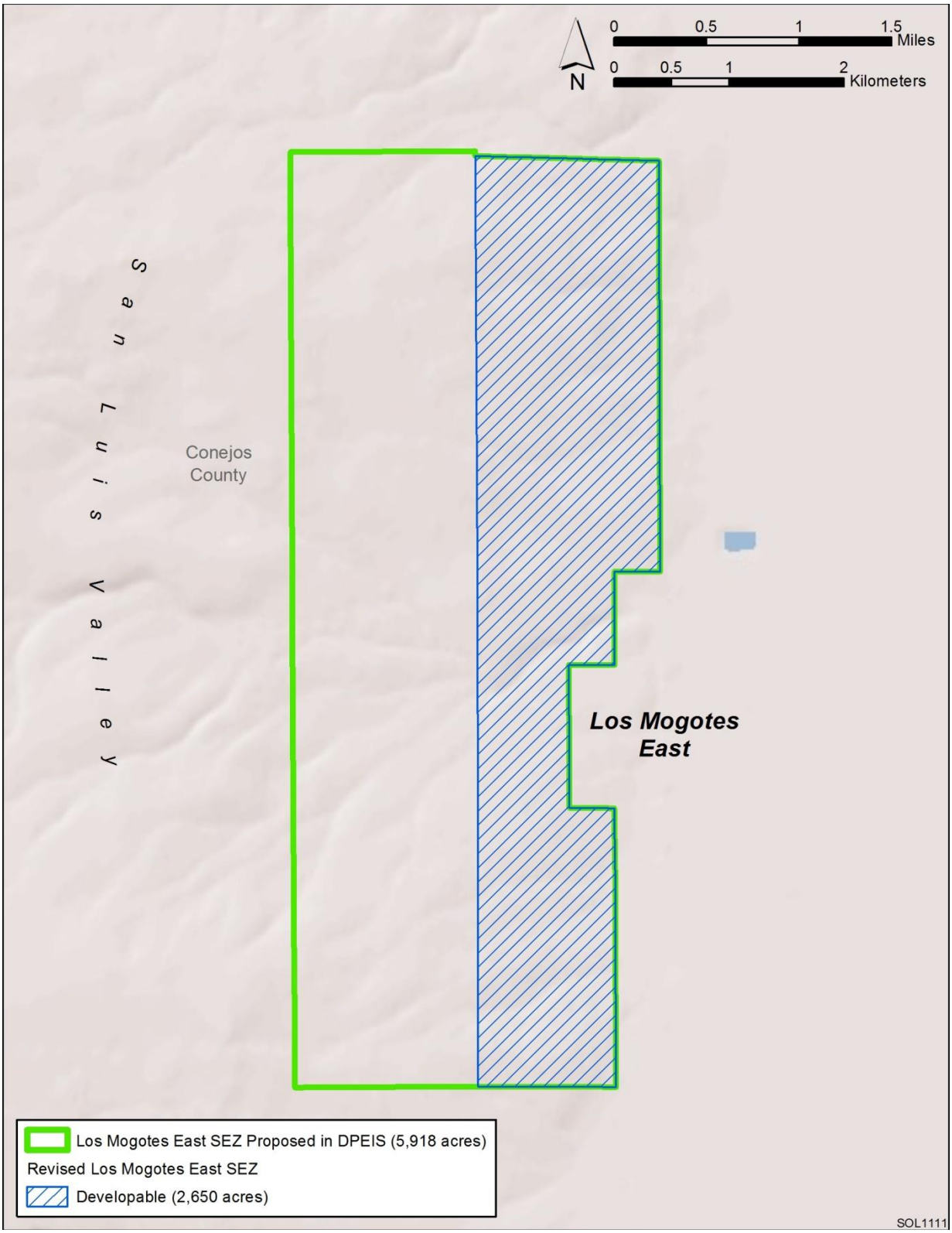

FIGURE 10.4.1.1-2 Developable and Non-development Areas for the Proposed Los Mogotes East SEZ as Revised

TABLE 10.4.1.2-1 Assumed Development Acreages, Solar MW Output, and Nearest Major Access Road and Transmission Line for the Proposed Los Mogotes East SEZ as Revised

Total Developable Acreage and Assumed Development 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 BLM Designated Corridor[e]
2,650 acres[a] and 2,120 acres	236 MW[b] 424 MW[c]	3 mi[d] (U.S. 285)	Adjacent and 69 kV	22 acres	NA[f]

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

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

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

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

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

[f] NA = no BLM-designated corridor is near the proposed Los Mogotes East SEZ.

Availability of transmission from SEZs to load centers will be an important consideration for future development in SEZs. For the proposed Los Mogotes East SEZ, updated data indicate that the nearest existing transmission line is a 69-kV line located about 3 mi (5 km) to the east of the SEZ (the Draft Solar PEIS had indicated that there was a 69-kV transmission line adjacent to the proposed SEZ). It is possible that this existing line could be used to provide access from the SEZ to the transmission grid, but the 69-kV capacity of the existing line would not be adequate for 236 to 424 MW of new capacity. Therefore, at full build-out capacity, new transmission lines and possibly upgrades of existing transmission lines would be required to bring electricity from the proposed Los Mogotes East SEZ to load centers. An assessment of the most likely load center destinations for power generated at the Los Mogotes East SEZ and a general assessment of the impacts of constructing and operating new transmission facilities to those load centers is provided in Section 10.4.23. In addition, the generic impacts of transmission and associated infrastructure construction and of line upgrades for various resources are discussed in Chapter 5 of this Final Solar PEIS. Project-specific analyses would also be required to identify the specific impacts of new transmission construction and line upgrades for any projects proposed within the SEZ.

For the proposed Los Mogotes East SEZ, U.S. 285 runs north–south about 3 mi (5 km) to the east of the SEZ. Assuming construction of a new access road to reach U.S. 285 would be needed to support construction and operation of solar facilities, approximately 22 acres (0.09 km^2) of land disturbance would occur (a 60-ft [18.3-m] wide ROW was assumed), as summarized in Table 10.4.1.2-1.

10.4.1.3 Programmatic and SEZ-Specific Design Features

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

The discussions below addressing potential impacts of solar energy development on specific resource areas (Sections 10.4.2 through 10.4.22) also provide an assessment of the effectiveness of the programmatic design features in mitigating adverse impacts from solar development within the SEZ. SEZ-specific design features to address impacts specific to the proposed Los Mogotes East SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Los Mogotes 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 Solar PEIS and the Supplement to the Draft. All applicable SEZ-specific design features identified to date (including those from the Draft Solar PEIS that are still applicable) are presented in Sections 10.4.2 through 10.4.22.

10.4.2 Lands and Realty

10.4.2.1 Affected Environment

The proposed Los Mogotes East SEZ has been reduced in size to 2,650 acres (10.7 km^2) by moving the western boundary of the SEZ to the east. Three county roads provide access to the SEZ, and two roads cross the area and provide access to a well-blocked area of public land west of the proposed SEZ. Two sections of state-owned land abut the SEZ, one on the north and one on the south.

10.4.2.2 Impacts

Solar development in the proposed SEZ would establish a large industrial area that would exclude many existing and potential uses of the land, perhaps in perpetuity. Because the SEZ is undeveloped and rural, utility-scale solar energy development would introduce a new and discordant land use in the area. Access routes to lands west of the SEZ could be affected by solar energy development if legal access through the SEZ is not maintained. If the public lands are developed for solar energy production, similar development could be induced on neighboring state and private lands with landowner agreement.

10.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on lands and realty activities are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some mitigation for identified impacts but will not mitigate all adverse impacts. For example, impacts related to the exclusion of many existing and potential uses of the public land; the visual impact of an industrial-type solar facility within an otherwise rural area; and induced land use changes, if any, on nearby or adjacent state and private lands 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 Los Mogotes East SEZ through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

10.4.3 Specially Designated Areas and Lands with Wilderness Characteristics

10.4.3.1 Affected Environment

There are six categories of specially designated areas within 25 mi (40 km) of the proposed Los Mogotes East SEZ. The affected environment section of the Draft Solar PEIS accurately describes these areas with one addition. A recently maintained inventory of wilderness characteristics determined that public lands within the proposed SEZ do not contain wilderness characteristics.

10.4.3.2 Impacts

Solar energy development of the SEZ will still result in the development of a very large industrial site in an area that otherwise is currently rural and undeveloped. The level of visual impacts on specially designated areas would be affected by the types of solar technologies deployed within the SEZ. Shorter facilities, facilities with less reflectivity, and facilities that do not use wet cooling would be expected to have less potential for adverse visual impact on these areas.

Elevated viewpoints such as the slightly elevated portions of the CTSR or nearby viewpoints such as the West Fork of the North Branch of the Old Spanish Trail or the Los Caminos Antiguos Scenic Byway would have significant views of development within the SEZ and would likely be adversely affected. Site-specific analysis, including consideration of the potential for visible glint and glare from solar panels, and the visibility of structures, will need to be completed before impacts can be fully assessed and potential mitigation measures considered. Travelers coming north or west on the Los Caminos Antiguos Scenic Byway would be looking directly into the SEZ, and development within the SEZ would be very visible, having the potential to detract from the visitor experience. The route of a portion of the West Fork of the

North Branch of the Old Spanish Trail parallels and passes within 1.0 mi (1.6 km) of the SEZ. Solar development in the SEZ may have a major impact on the historic and visual integrity of the Trail, depending on the determination of the integrity and historical significance of the portion of the Trail from which solar development could be seen. Development within the SEZ also may be inconsistent with the purposes for which the Sangre de Cristo NHA was designated.

The Los Mogotes ACEC, which is located 2 mi (3.2 km) west of the ACEC, is designated for protection of wildlife resources. Development of solar energy facilities in the SEZ has the potential to introduce additional vehicular and human presence in or near the ACEC that could impair its overall value to wildlife.

10.4.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on specially designated areas are described in Section A.2.2 of Appendix A of this Final Solar PEIS (design features for specially designated areas, cultural resources, and visual resources would address impacts). Implementing the programmatic design features will provide some mitigation for the identified impacts but would not eliminate potential impacts on the Los Caminos Antiguos Scenic Byway. Impacts on the Sangre de Cristo National Heritage Area also may not be mitigated by the programmatic design features. Programmatic design features will be applied to address SEZ-specific resources and conditions, for example:

- For projects in the Los Mogotes SEZ that are located within the viewshed of the West Fork of the North Branch of the Old Spanish Trail, a National Trail inventory will be required to determine the area of possible adverse impact on resources, qualities, values, and associated settings of the Trail; to prevent substantial interference; and to determine any areas unsuitable for development. Residual impacts will be avoided, minimized, and/or mitigated to the extent practicable according to program policy standards. Programmatic design features have been included in BLM's Solar Energy Program to address impacts on National Historic Trails (see Section A.2.2.23 of Appendix A).

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

- Early consultation should be initiated with the entity responsible for developing the management plan for the Sangre de Cristo NHA to understand how development of the SEZ could be consistent with NHA plans and goals.

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.

10.4.4 Rangeland Resources

10.4.4.1 Livestock Grazing

10.4.4.1.1 Affected Environment

Although the proposed SEZ has been reduced in size, it still includes portions of three seasonal grazing allotments: Ciscom Flat (#14212), Capulin (#14207), and Little Mogotes (#24222). The allotments are used by four permittees and support a total forage production of 2,337 AUMs per year. There are livestock management facilities, including fences and watering places in the SEZ. Table 10.4.4.1-1 summarizes key acreage and production data for these allotments.

10.4.4.1.2 Impacts

Should utility-scale solar development occur within the SEZ, grazing would be excluded from the areas developed, as provided for in the BLM grazing regulations (43 CFR Part 4100). The reduction in the size of the proposed SEZ has reduced the potential impact on all three allotments, especially on the Ciscom Flat allotment. Even with the reduction in the size of the SEZ, there still would be a major impact on the Ciscom Flat allotment that may have serious long-term consequences for this operation. The impact on the other two allotments would be substantially less, but the actual significance of their losses is undetermined at this time. While the specific situation of each of the grazing permittees is not known, loss of a portion of their grazing permit would be an adverse impact on them. Economic losses would not be limited to the value of the lost grazing opportunity but would extend also to the value of the overall ranch operations including any private lands tied to the grazing operations. While permittees would be reimbursed for their portion of the value of range improvements on their permits, this would not cover their economic loss. By using the simplified methodology utilized in the Draft Solar PEIS, the estimated losses by allotment are shown in Table 10.4.4.1-1 Actual losses would be determined based on the amount of actual forage lost on the lands excluded from the grazing permits, not on the percentage of the allotment that is lost.

10.4.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on livestock grazing are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some mitigation for identified impacts, but they would not mitigate the loss of livestock AUMs or the loss of value in ranching operations including private land values.

TABLE 10.4.4.1-1 Grazing Allotments within the Proposed Los Mogotes East SEZ as Revised

Allotment	Total Acres[a]	Percentage Total in SEZ[b]	Active BLM AUMs	Estimated Loss of AUMs	No. of Permittees
Ciscom Flat	4,320	38	191	73	1
Capulin	8,790	3.4	742	25	1
Little Mogotes	13,803	6.4	1,404	90	2

[a] Total acreage, including public and state land, and AUMs, is from the BLM Rangeland Administration System report (BLM 2008). To convert acres to km^2, multiply by 0.004047.

[b] Represents the percentage of public land in the allotment, within the SEZ.

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

10.4.4.2 Wild Horses and Burros

10.4.4.2.1 Affected Environment

As presented in the Draft Solar PEIS, no wild horse or burro HMAs occur within the proposed Los Mogotes East SEZ or in proximity to it. The reduction of the SEZ to less than half its original size does not alter these data.

10.4.4.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the proposed Los Mogotes East SEZ would not affect wild horses and burros. The reduction in size of the SEZ does not affect this conclusion.

10.4.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

10.4.5 Recreation

10.4.5.1 Affected Environment

The area of the proposed Los Mogotes East SEZ has been reduced by about 55%, to 2,650 acres (10.7 km^2) by moving the western boundary of the SEZ to the east.

Commentors have pointed out that most of the recreation discussion in the Draft Solar PEIS focused internally within the SEZ and did not address the larger part that public and other federal lands play in the landscape and tourism economy of the San Luis Valley. A summary of the better known attractions within the valley includes Great Sand Dunes National Park and Preserve, the Old Spanish Trail, two scenic railroads, the Los Caminos Antiguos Scenic Byway, the Sangre de Cristo Mountains, three national wildlife refuges, and numerous designated wilderness areas; these are among the highlights of the recreational and tourism opportunities in the area. The Los Mogotes East SEZ is adjacent to U.S. 285, which is the major access route into the Valley from the south and which is a part of the Los Caminos Antiguos Scenic Byway. Tourism is an important part of the Valley economy and is an important focus for future economic growth.

While the public land within the proposed Los Mogotes East SEZ is flat and generally unremarkable, it is also large and conspicuous because it is undeveloped and is readily accessible to recreational users. It also adjoins a large block of public lands to the west. As described in the Draft Solar PEIS, the area supports a range of dispersed recreation activities, although it is believed that levels of recreational use are low. The CDOW has commented the area is important habitat for pronghorn antelope, an important species for hunting in the area. More detailed information on impacts on these species can be found in Section 10.4.11.3.2 of the Draft Solar PEIS.

10.4.5.2 Impacts

Solar development of the proposed Los Mogotes East SEZ still will be readily visible to travelers on U.S. 285 and on the Los Caminos Antiguos Scenic Byway. Since the proposed SEZ is large, solar development of the area has the potential to influence the impressions of recreational and tourism visitors entering the San Luis Valley via routes near the SEZ. Whether there would be a potential impact on recreation and tourism in the valley because of the solar development along these access routes is unknown. There may be potential to provide interpretive activities focused on solar energy and development that would be of interest to travelers.

Because the route of the Old Spanish Trail is so near the SEZ, it is anticipated that the viewshed of the Trail would be adversely affected by solar development within the SEZ and may reduce the potential future recreational attraction of the Trail. However, the integrity and historical significance of the portion of the Trail near to the proposed SEZ remain undetermined.

Visual impacts on surrounding recreational use areas would be greater with taller solar facilities such as power towers and facilities with wet cooling. Visitors to areas located at higher elevations than the SEZ (e.g., San Luis Hills ACEC and WSA, CTSR) will see the solar development within the SEZ, but the impact on recreational use of these areas is unknown at this time. The types of solar technologies employed and whether there is significant glint or glare from reflective surfaces of solar facilities would play a large role in the extent of visibility of solar development. The focus and intent of the relatively new Sangre de Cristo NHA is not yet well defined, so it has not been possible to assess how solar development may interact with the objectives of the NHA.

The CDOW has commented there is a specific concern about the loss of pronghorn antelope habitat in Game Management Unit (GMU) 81, where the SEZ is located. There are limited antelope hunting permits issued in the GMU, and reductions in habitat that would occur due to solar development within the SEZ could result in a reduction in antelope hunting opportunities. However, the overall impact on pronghorn was estimated to be small in this assessment (see Section 10.4.11.4.2 of the Draft Solar PEIS), because only a small portion of the available habitat in the valley occurs within the proposed SEZ.

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.

10.4.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreational resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS (design features for both specially designated areas and visual resources also would address some impacts). Some additional SEZ-specific design features may be established when specific projects are being considered within the SEZ. Implementing the programmatic design features will provide some mitigation for the identified impacts but will not mitigate the loss of recreational access to public lands developed for solar energy production. Likewise, a loss of wildlife-related hunting recreation would not be mitigated.

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

- Tourism is an important economic growth area for the San Luis Valley, and the proposed Los Mogotes East SEZ is located in a visible location adjacent to a principal highway route into the Valley. Because of the location of the SEZ, there is potential to influence visitors' perception of the tourism climate in the

Valley. As projects are proposed for the SEZ, the potential impacts on tourism should be considered and reviewed with local community leaders.

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.

10.4.6 Military and Civilian Aviation

10.4.6.1 Affected Environment

There are no identified military or civilian aviation uses in close proximity to the proposed Los Mogotes East SEZ.

10.4.6.2 Impacts

There are no identified impacts on military or civilian aviation facilities associated with the proposed Los Mogotes East SEZ.

10.4.6.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on military and civilian aviation are described in Section A.2.2 of Appendix A of this Final Solar PEIS. The programmatic design features require early coordination with the DoD to identify and mitigate, if possible, any 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, no SEZ-specific design features to protect military or civilian airspace for the proposed Los Mogotes East SEZ have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

10.4.7 Geologic Setting and Soil Resources

10.4.7.1 Affected Environment

10.4.7.1.1 Geologic Setting

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

- The terrain of the proposed Los Mogotes East SEZ is relatively flat with a gentle dip to the east (Figure 10.4.7.1-1). The boundaries of the SEZ have been changed to eliminate more than half of the area, 3,268 acres (13.2 km^2), on the western side of the site. Based on these changes, the elevations range from about 7,850 ft (2,393 m) along the new western site boundary to about 7,710 ft (2,350 m) along its eastern boundary.

10.4.7.1.2 Soil Resources

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

- Soils within the proposed Los Mogotes East SEZ as revised are predominantly the very stony and cobbly loams of the Travelers and Garita Series, which now make up about 95% of the soil coverage at the site.

- Soil unit coverage at the proposed Los Mogotes East SEZ as revised is shown in Figure 10.4.7.1-2. The new SEZ boundaries eliminate 2,333 acres (9.4 km^2) of the Travelers very stony loam (1 to 3% slopes), 465 acres (1.9 km^2) of the Garita cobbly loam (3 to 25% slopes), 454 acres (1.8 km^2; all) of the Travelers very stony loam (3 to 25%), and 4 acres (0.016 km^2) of the Monte loam (0 to 1% slopes) (Table 10.4.7.1-1).

10.4.7.2 Impacts

Impacts on soil resources would occur mainly as a result of ground-disturbing activities (e.g., grading, excavating, and drilling), especially during the construction phase of a solar project. The assessment provided in the Draft Solar PEIS remains valid, with the following update:

- Impacts related to wind erodibility are reduced because the new SEZ boundaries eliminate 469 acres (1.9 km^2) of moderately erodible soils from development.

10.4.7.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and considering comments received as applicable, no SEZ-specific design features were identified for soil resources at the proposed

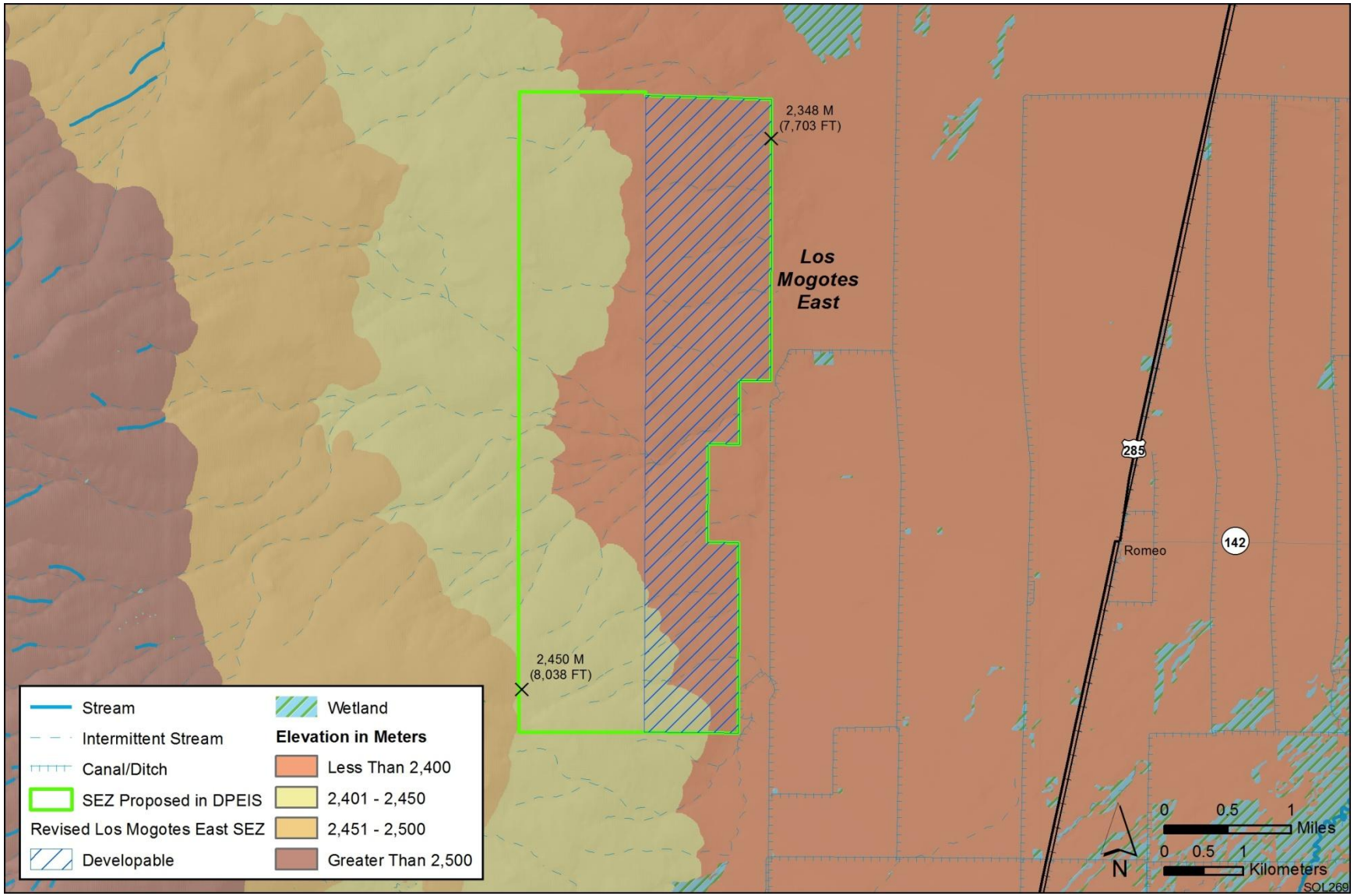

FIGURE 10.4.7.1-1 General Terrain of the Proposed Los Mogotes East SEZ as Revised

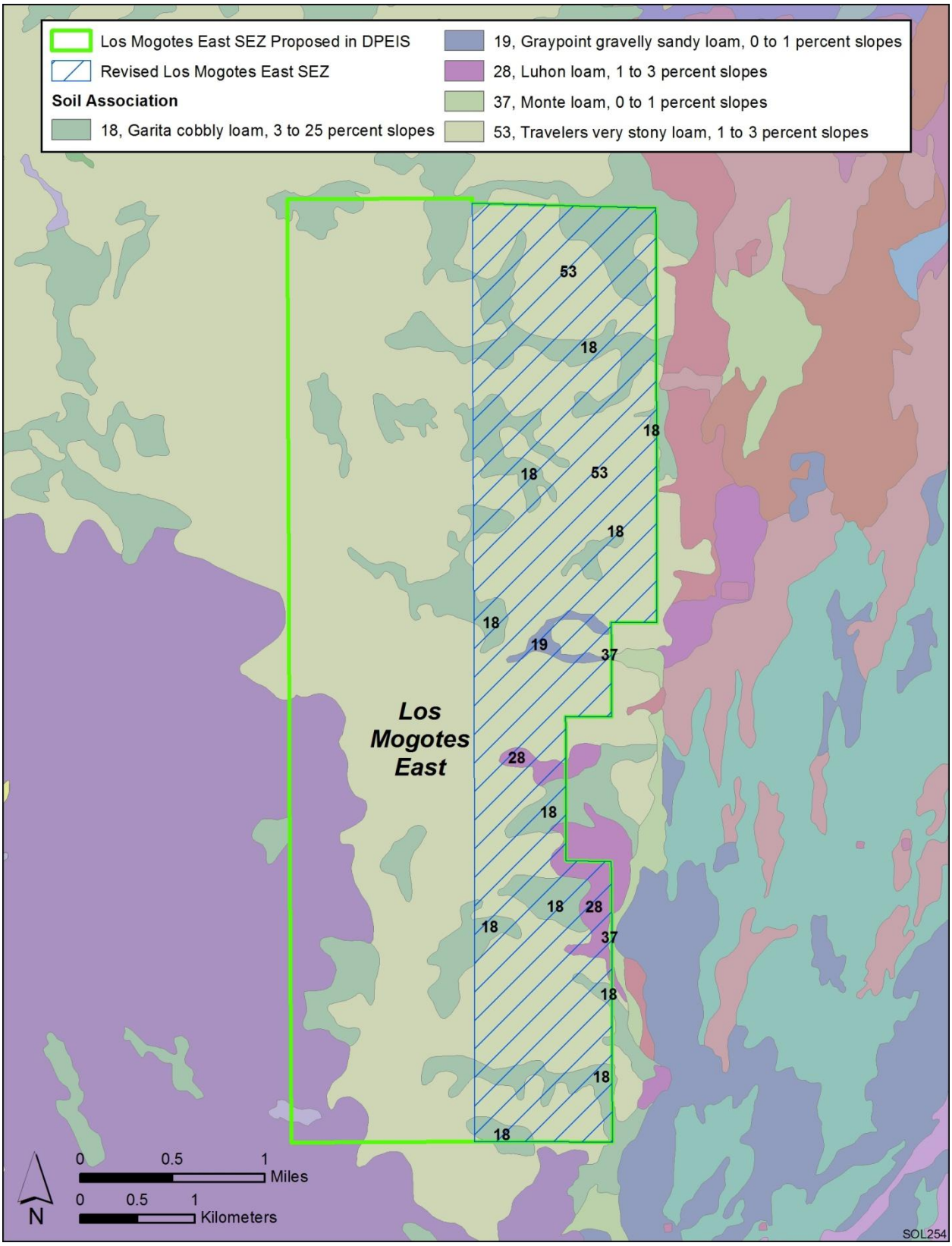

FIGURE 10.4.7.1-2 Soil Map for the Proposed Los Mogotes East SEZ as Revised (NRCS 2008)

TABLE 10.4.7.1-1 Summary of Soil Map Units within the Proposed Los Mogotes East SEZ as Revised

Map Unit Symbol	Map Unit Name	Erosion Potential		Description	Area in Acres[c] (percentage of SEZ)
		Water[a]	Wind[b]		
53	Travelers very stony loam (1 to 3%)	Slight	Low (WEG 8)[d]	Nearly level soils on mesas and hillslopes capped by basalts, andesite, and/or rhyolite. Parent material consists of thin calcareous sediments weathered from basalt. Shallow and well to somewhat excessively drained, with high surface-runoff potential (low infiltration rate) and moderate to moderately rapid permeability. Available water capacity is very low. Used mainly as rangeland. Susceptible to compaction.	1,916 (72.3)
18	Garita cobbly loam (3 to 25%)	Slight	Moderate (WEG 4)	Nearly level to gently sloping soils on alluvial fans and fan terraces. Parent material consists of thick calcareous and gravelly alluvium derived from basalt. Deep and well drained, with moderate surface-runoff potential and moderate permeability. Available water capacity is low. Used mainly as native pastureland. Susceptible to compaction.	610 (23.01)
53	Travelers very stony loam (3 to 25%)	Slight	Low (WEG 8)	Nearly level to gently sloping soils on mesas and hill slopes capped by basalts, andesite, and/or rhyolite. Parent material consists of thin calcareous material weathered from basalt. Shallow and well to somewhat excessively drained, with high surface-runoff potential (low infiltration rate) and moderate to moderately rapid permeability. Available water capacity is very low. Used mainly as rangeland. Susceptible to compaction.	454 (8)
28	Luhon loam (1 to 3%)	Slight	Moderate (WEG 4)	Nearly level soils on alluvial fans and valley side slopes. Parent material consists of mixed calcareous alluvium. Deep and well drained with moderate surface-runoff potential and moderate permeability. Available water capacity is high. Used mainly as native pastureland; prime farmland if irrigated.[e] Susceptible to compaction; severe rutting hazard.	90 (3.4)

TABLE 10.4.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Erosion Potential		Description	Area in Acres[c] (percentage of SEZ)
		Water[a]	Wind[b]		
19	Graypoint gravelly sandy loam (0 to 1%)	Slight	Moderate (WEG 4)	Nearly level soils on broad fans and fan terraces. Formed in alluvium derived from basalt. Deep and somewhat poorly drained, with moderate surface-runoff potential and moderate permeability. Shrink-swell potential is low to moderate. Available water capacity is low. Used mainly as rangeland and irrigated cropland, pasture, and hay land. Susceptible to compaction.	32 (1.2)
37, 38	Monte loam (0 to 3%)	Slight	Moderate (WEG 4)	Nearly level soils on alluvial fans and floodplains. Parent material consists of alluvium derived from rhyolite and latite. Soils are deep and well drained, with moderate surface-runoff potential and moderate permeability. Available water capacity is high. Used mainly for native rangeland and irrigated cropland; prime farmland if irrigated. Susceptible to compaction; severe rutting hazard.	3 (<1)

[a] Water erosion potential rates the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K 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.

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

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

[d] WEGs are based on soil texture, content of organic matter, effervescence of carbonates, content of rock fragments, and mineralogy, and also take into account soil moisture, surface cover, soil surface roughness, wind velocity and direction, and the length of unsheltered distance (USDA 2004). Groups range in value from 1 (most susceptible to wind erosion) to 8 (least susceptible to wind erosion). The NRCS provides a wind erodibility index, expressed as an erosion rate in tons per acre (4,000 m^2) per year, for each of the wind erodibility groups: WEG 1, 220 tons (200 metric tons) per acre (4,000 m^2) per year (average); WEG 2, 134 tons (122 metric tons) per acre (4,000 m^2) per year; WEGs 3 and 4 (and 4L), 86 tons (78 metric tons) per acre (4,000 m^2) per year; WEG 5, 56 tons (51 metric tons) per acre (4,000 m^2) per year; WEG 6, 48 tons (44 metric tons) per acre (4,000 m^2) per year; WEG 7, 38 tons (34 metric tons) per acre (4,000 m^2) per year; and WEG 8, 0 tons (0 metric tons) per acre (4,000 m^2) per year.

[e] 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.

Source: NRCS (2009).

Los Mogotes East SEZ. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

10.4.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Los Mogotes 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 10.4.24.

10.4.8.1 Affected Environment

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

10.4.8.2 Impacts

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

10.4.8.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

10.4.9 Water Resources

10.4.9.1 Affected Environment

The overall size of the Los Mogotes East SEZ has been reduced by 55% from the area described in the Draft Solar PEIS, resulting in a total area of 2,650 acres (10.7 km^2). The

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

The Los Mogotes East SEZ is within the Rio Grande Headwaters subbasin of the Rio Grande hydrologic region. The SEZ is located in the southern portion of the San Luis Valley bounded by the San Juan Mountains to the west and the Sangre de Cristo Mountains to the east. Precipitation and snowfall in the southern part of the valley is about 7 in./yr (18 cm/yr) and 25 in./yr (64 cm/yr), respectively, with much greater amounts in the surrounding mountains. Pan evaporation rates are estimated to be on the order of 54 in./yr (137 cm/yr). No permanent surface water features or wetlands have been identified within the SEZ. There are several intermittent/ephemeral washes within the SEZ that drain across the site from the west to east. Flood hazards have not been identified, but intermittent flooding may occur along the intermittent/ephemeral washes. Groundwater in the San Luis Valley is primarily in basin-fill deposits with an upper unconfined aquifer and a lower confined aquifer, which are separated by a series of confining clay layers and unfractured volcanic rocks. There are no confining clay layers in the vicinity of the Los Mogotes East SEZ; however, a basalt layer that is near the surface acts as a confining unit over the basin-fill aquifer. Groundwater monitoring wells near the SEZ have reported depths to groundwater ranging from 15 to 35 ft (5 to 11 m) and indicate a groundwater flow from west to east. Water quality in the aquifers of the San Luis Valley varies, but total dissolved solids concentrations in the southern portion of the valley are generally below maximum contaminant levels.

The Los Mogotes East SEZ is located in the Colorado Division 3 management zone (Rio Grande Basin) of the Colorado DWR, where both surface water and groundwater rights are overappropriated. The Rio Grande Compact of 1938 obligates Colorado to meet water delivery schedules to New Mexico and governs much of the water management decision making in the San Luis Valley. In order to balance water uses within the San Luis Valley and to meet treaty obligations, several water management mechanisms have been developed that affect existing water rights and water rights transfers. The two primary water management considerations affecting solar energy development are the need for an augmentation water plan and the rules set by the recently formed Special Improvement District Number 1 (Subdistrict #1). Augmentation water plans were described in the Draft Solar PEIS (Section 10.4.9.1.3), but they essentially require junior water rights holders to have additional water reserves to ensure that more senior water rights are not hindered. The water management plan for Subdistrict #1 was ruled on in June 2010 and places restrictions on groundwater withdrawals in an effort to restore groundwater levels in the unconfined aquifer. None of the Colorado SEZs are located within the boundaries of Subdistrict #1, which primarily includes central portions of the San Luis Valley currently used for agriculture. However, because water rights are overappropriated in the San Luis Valley and largely clustered within Subdistrict #1, it is likely that any new water diversions and water rights transfers would involve these new groundwater management considerations.

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 Los Mogotes East SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 10.4.9.1-1 through 10.4.9.1-7 and in Figures 10.4.9.1-1 and 10.4.9.1-2.

TABLE 10.4.9.1-1 Watershed and Water Management Basin Information Relevant to the Proposed Los Mogotes East SEZ as Revised

Basin	Name	Area (acres)[b]
Subregion (HUC4)[a]	Rio Grande Headwaters (1301)	4,888,552
Cataloging unit (HUC8)	Alamosa–Trinchera (13010002)	1,647,652
Groundwater basin	San Luis Valley	2,000,000
SEZ	Los Mogotes East	2,650

[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 10.4.9.1-2 Climate Station Information Relevant to the Proposed Los Mogotes 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.)
Conejos 3 NNW, Colorado (051816)	7,907	9	1904–1960	7.93	21.40
Manassa, Colorado (055322)	7,690	11	1893–2011	7.27	24.80
Platoro, Colorado (056559)	9,834	27	1949–1991	27.10	237.30
Waverly 1W, Colorado (058860)	7,603	17	2004–2011	7.61	31.90

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

[b] Surface elevations for the proposed Los Mogotes East SEZ range from 7,710 to 8,030 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 10.4.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ Scale Relevant to the Proposed Los Mogotes East SEZ as Revised

Water Feature	Subregion, HUC4 (ft)[a]	Cataloging Unit, HUC8 (ft)	SEZ (ft)
Unclassified streams	19,502	6,556	0
Perennial streams	14,694,407	3,488,426	0
Intermittent/ephemeral streams	94,288,163	30,056,019	46,981
Canals	12,151,458	5,521,867	0

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

Source: USGS (2012a).

TABLE 10.4.9.1-4 Stream Discharge Information Relevant to the Proposed Los Mogotes East SEZ as Revised

Parameter	Station (USGS ID)		
	La Jara Creek at Gallegos Ranch, near Capulin, Colorado (08238000)	La Jara Creek near Capulin, Colorado (08238010)	Conejos River near Mogote, Colorado (08246500)
Period of record	1916–1982	1925–1935	1903–2010
No. of observations	54	10	102
Discharge, median (ft^3/s)[a]	254	211	2,260
Discharge, range (ft^3/s)	30–653	93–670	441–9,000
Discharge, most recent observation (ft^3/s)	166	111	2,330
Distance to SEZ (mi)[b]	8	7	12

[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 10.4.9.1-5 Surface Water Quality Data Relevant to the Proposed Los Mogotes East SEZ as Revised

Parameter	Station (USGS ID)[a]		
	08238000	08246500	371634106092301
Period of record	1978–1981	1967–2002	1995–1996
No. of records	67	209	13
Temperature (°C)[b]	6.5 (0–19)	6 (0–19.5)	14 (0–21)
Total dissolved solids (mg/L)	NA[c]	70 (37–77)	NA
Dissolved oxygen (mg/L)	NA	8.4	8.6 (6.2–11)
pH	NA	7.15 (6.8–8.3)	8.4 (6.2–8.8)
Total nitrogen (mg/L)	NA	<0.14	NA
Phosphorus (mg/L as P)	NA	0.015	NA
Organic carbon (mg/L)	NA	1.8	NA
Calcium (mg/L)	NA	12.5 (6–16)	NA
Magnesium (mg/L)	NA	1.795 (1–2.7)	NA
Sodium (mg/L)	NA	2.7 (1–3.2)	NA
Chloride (mg/L)	NA	1.1 (0.5–2.5)	NA
Sulfate (mg/L)	NA	4.1 (2.41–5)	NA
Arsenic (μg/L)	NA	1	NA
Copper (μg/L)	NA	0.3	NA
Zinc (μg/L)	NA	< 1.0	NA
Nickel (μg/L)	NA	0.47)	NA

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

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

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

Source: USGS (2012b).

Fieldwork and hydrologic analyses needed to determine 100-year floodplains and jurisdictional water bodies would need to be coordinated with appropriate federal, state, and local agencies. Areas within the Los Mogotes East SEZ that are found to be within a 100-year floodplain will be identified as non-development areas. Any water features within the Los Mogotes East SEZ determined to be jurisdictional will be subject to the permitting process described in the CWA.

10.4.9.2 Impacts

10.4.9.2.1 Land Disturbance Impacts on Water Resources

The discussion of land disturbance effects on water resources in the Draft Solar PEIS remains valid. As stated in the Draft Solar PEIS, land disturbance impacts in the vicinity of the proposed Los Mogotes East SEZ could potentially affect drainage patterns and groundwater recharge. The alteration of natural drainage pathways during construction can lead to impacts

TABLE 10.4.9.1-6 Water Quality Data from Groundwater Samples Relevant to the Proposed Los Mogotes East SEZ as Revised

	Station (USGS ID)[a]	
Parameter	370936106010501	371330105564601
Period of record	1993–2000	1981
No. of records	2	1
Temperature (°C)[b]	15.25 (15–15.5)	15
Total dissolved solids (mg/L)	67	NA[c]
Dissolved oxygen (mg/L)	6.6	NA
pH	7.3 (7.2–7.4)	NA
Nitrate + nitrite (mg/L as N)	0.07	0.35
Phosphate (mg/L)	0.199	NA
Organic carbon (mg/L)	0.8	NA
Calcium (mg/L)	11.6	17
Magnesium (mg/L)	1.7	3.1
Sodium (mg/L)	2.1	7.7
Chloride (mg/L)	0.29	NA
Sulfate (mg/L)	1.81	NA
Arsenic (µg/L)	NA	NA

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

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

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

Source: USGS (2012b).

TABLE 10.4.9.1-7 Groundwater Surface Elevations Relevant to the Proposed Los Mogotes East SEZ as Revised

	Station (USGS ID)		
Parameter	371330106002101	370936106010501	371612106023501
Period of record	1980–2011	1993–2005	1969–2011
No. of observations	369	9	39
Surface elevation (ft)[a]	7,655	7,782	7,677
Well depth (ft)	32	25	22
Depth to water, median (ft)	4.99	14.92	6
Depth to water, range (ft)	1.4–9.96	8.77–17.7	4.42–9.73
Depth to water, most recent observation (ft)	6.1	15.25	6.82
Distance to SEZ (mi)[b]	3	3	5

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

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

Source: USGS (2012b).

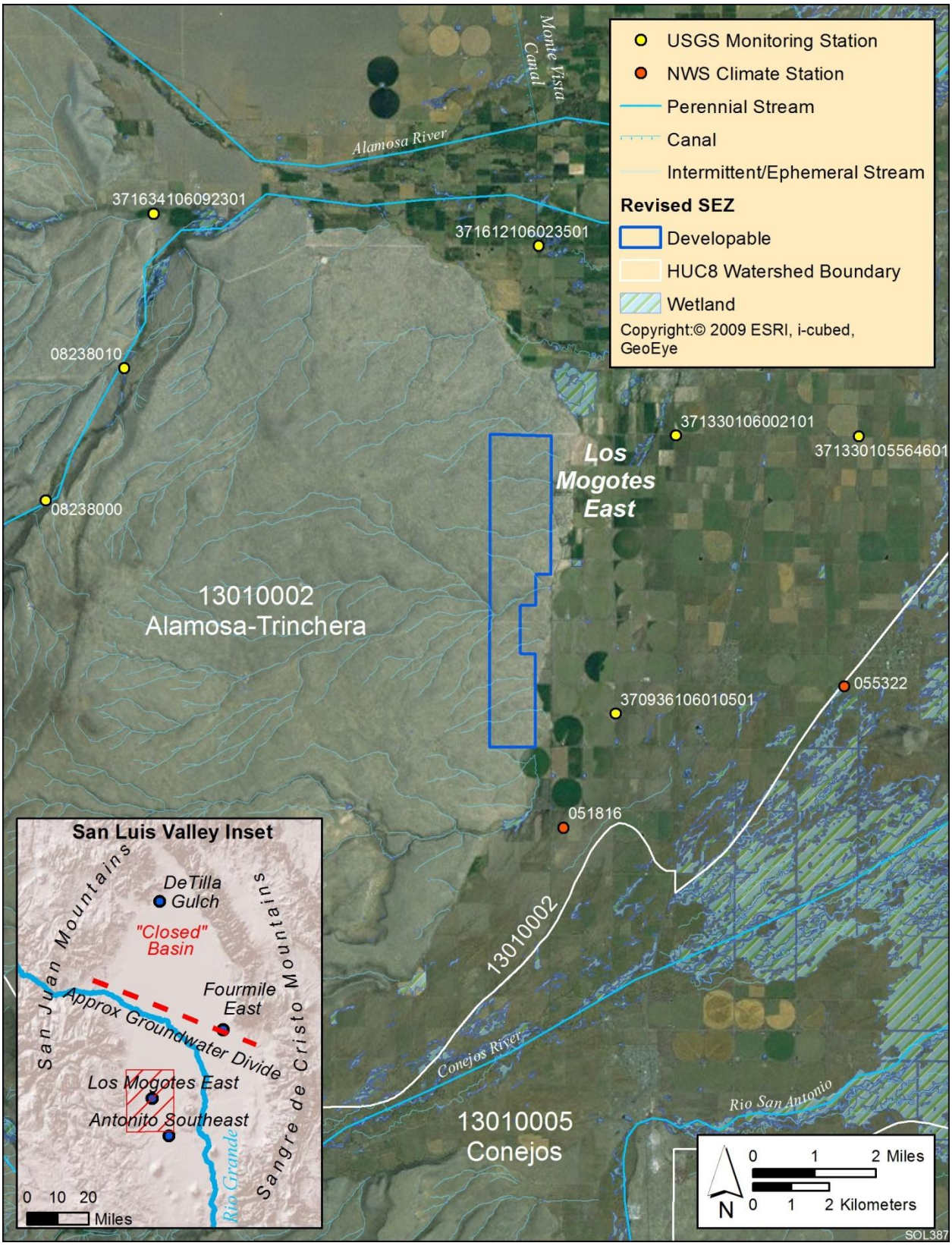

FIGURE 10.4.9.1-1 Surface Water Features near the Proposed Los Mogotes East SEZ as Revised

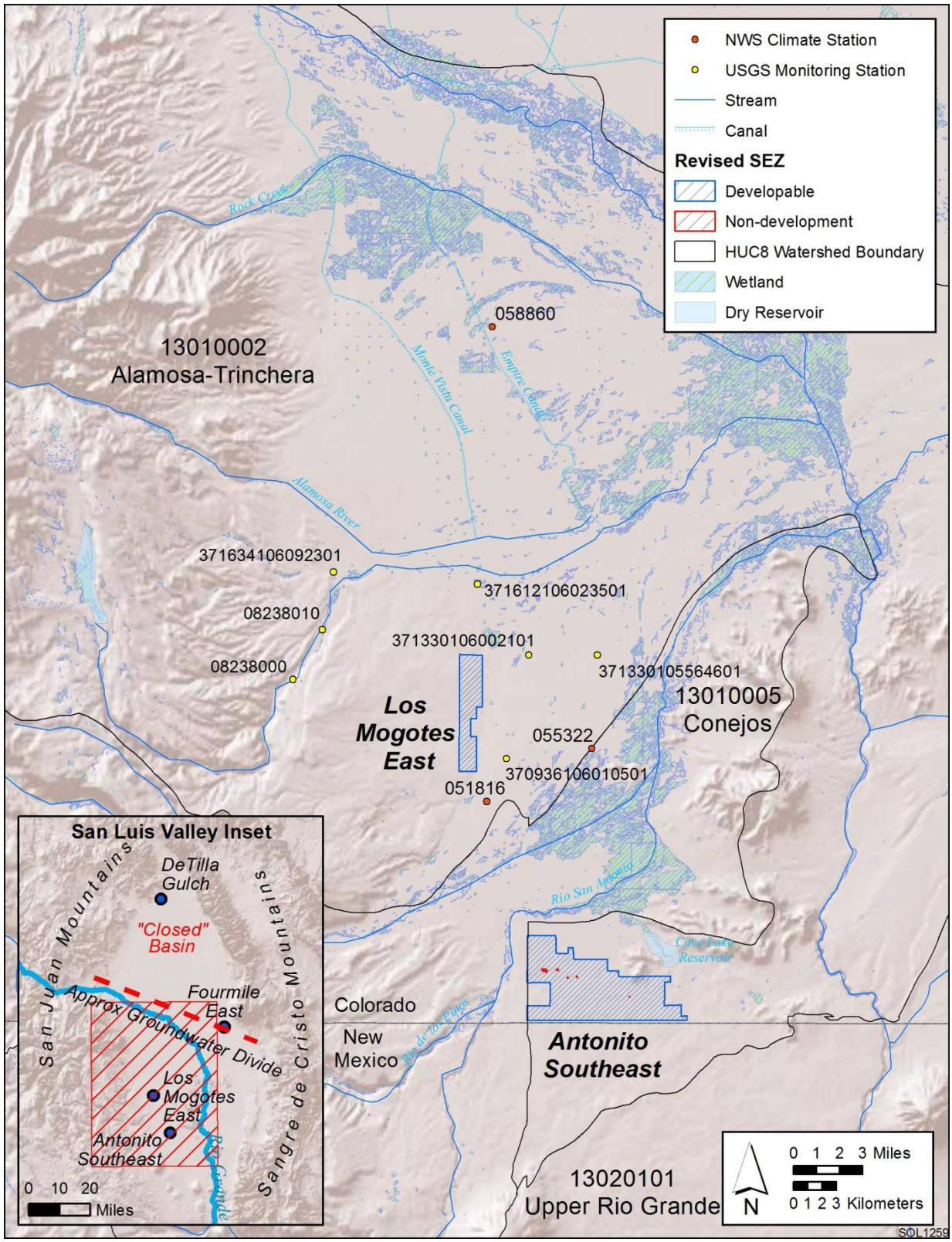

FIGURE 10.4.9.1-2 Surface Water and Groundwater Features within the Rio Grande Basin, Which Includes the Proposed Los Mogotes East SEZ as Revised

related to flooding, loss of water delivery to downstream regions, and changes to riparian vegetation and habitats. The alteration of the SEZ boundaries removed several intermittent/ephemeral stream reaches, which reduces the potential for adverse impacts associated with land disturbance activities.

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

The study region considered for the intermittent/ephemeral stream evaluation relevant to the Los Mogotes East SEZ is a subset of the Alamosa–Trinchera watershed (HUC8), for which information regarding stream channels is presented in Tables 10.4.9.1-3 and 10.4.9.1-4 of this Final Solar PEIS. The results of the intermittent/ephemeral stream evaluation are shown in Figure 10.4.9.2-1, which depicts flow lines from the National Hydrography Dataset (USGS 2012a) labeled as low, moderate, and high sensitivity to land disturbance. Within the study area, 83% of the intermittent/ephemeral stream channels had low sensitivity and 17% had moderate sensitivity to land disturbance. All the intermittent/ephemeral channel reaches within the Los Mogotes East SEZ were classified as having low sensitivity to land disturbance, but some of these channels transition to having moderate sensitivity to land disturbance immediately down-gradient of the SEZ.

10.4.9.2.2 Water Use Requirements for Solar Energy Technologies

Changes in the Los Mogotes East SEZ boundaries resulted in changes to the estimated water use requirements and a reduction in the land affected by surface disturbances. This section presents changes in water use estimates for the reduced SEZ area and additional analyses pertaining to groundwater. The additional analyses of groundwater include a basin-scale water budget and a simplified, one-dimensional groundwater model of potential groundwater drawdown. Only a summary of the results from these groundwater analyses is presented in this section; more information on methods and results is presented in Appendix O.

Table 10.4.9.2-1 presents the revised estimates of water requirements for both construction and operation of solar facilities at the Los Mogotes East SEZ, assuming full build-out of the SEZ and accounting for its decreased size. The reduction in area of 55% has resulted in an approximately equal reduction in total water use requirements.

The Los Mogotes East SEZ is located in the San Luis Valley, where both surface waters and groundwater are managed conjunctively. Previous studies on water resources in the San Luis Valley typically present a basin-scale water balance, which considers inputs and

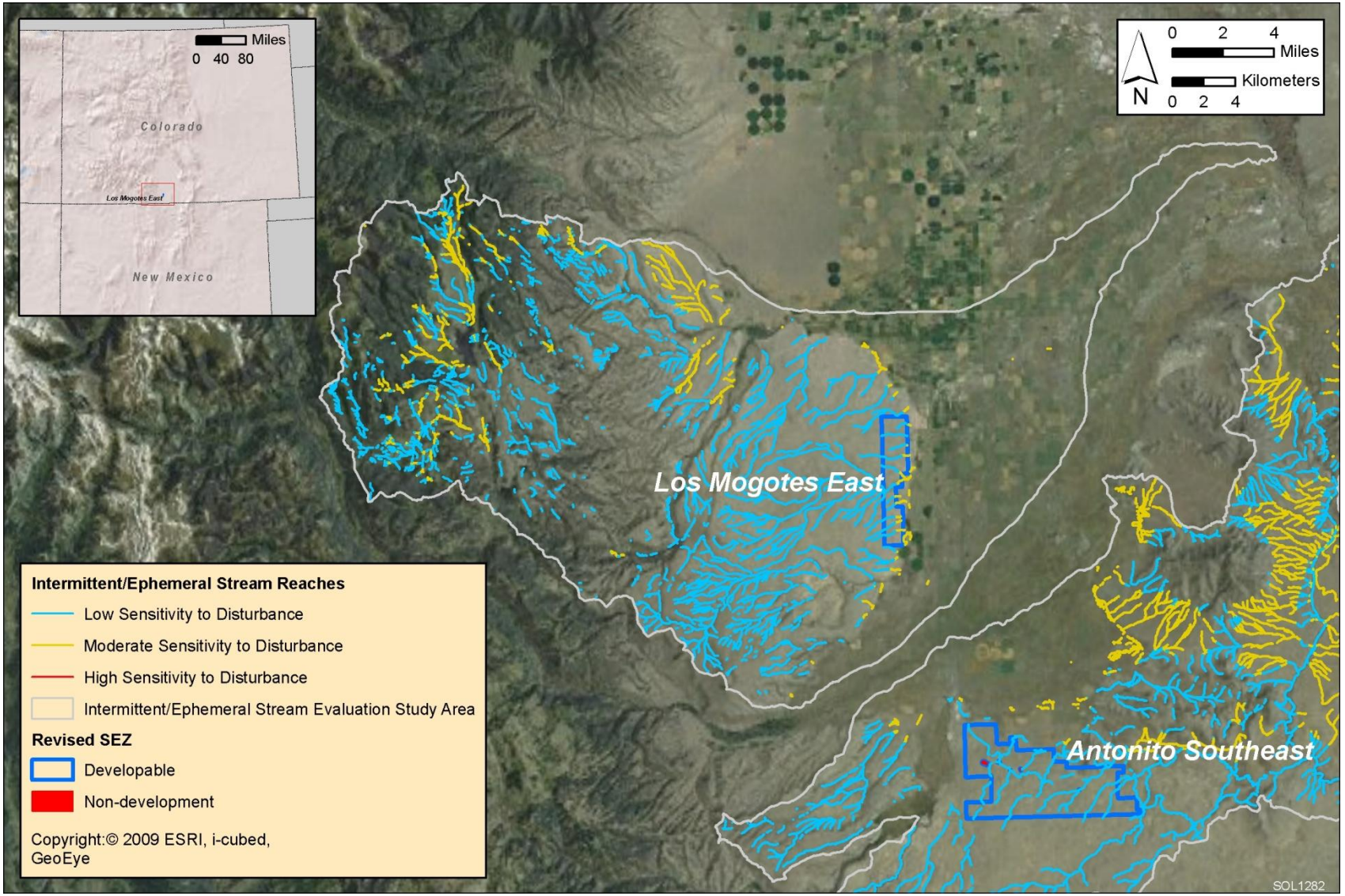

FIGURE 10.4.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Proposed Los Mogotes East SEZ as Revised

TABLE 10.4.9.2-1 Estimated Water Requirements for the Proposed Los Mogotes East SEZ as Revised[a]

Activity	Parabolic Trough	Power Tower	Dish Engine	PV
Construction—Peak Year				
Water use requirements				
Fugitive dust control (ac-ft)[b]	612	649	649	649
Potable supply for workforce (ac-ft)	74	32	13	7
Total water use requirements (ac-ft)	686	681	662	656
Wastewater generated				
Sanitary wastewater (ac-ft)	74	32	13	7
Operations				
Water use requirements				
Mirror/panel washing (ac-ft/yr)	212	118	118	12
Potable supply for workforce (ac-ft/yr)	6	3	3	<1
Dry cooling (ac-ft/yr)	85–424	47–236	NA	NA
Wet cooling (ac-ft/yr)	1,908–6,148	1,060–3,416	NA	NA
Total water use requirements				
Non-cooled technologies (ac-ft/yr)	NA[c]	NA	121	12
Dry-cooled technologies (ac-ft/yr)	303–642	168–357	NA	NA
Wet-cooled technologies (ac-ft/yr)	2,126–6,366	1,181–3,537	NA	NA
Wastewater generated				
Blowdown (ac-ft/yr)	120	67	NA	NA
Sanitary wastewater (ac-ft/yr)	6	3	3	<1

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

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

[c] NA = not applicable.

outputs of water via precipitation, surface water flows, and groundwater (e.g., Mayo et al. 2007). Table 10.4.9.2-2 presents an example water balance for the San Luis Valley that considers all water inputs and outputs from the valley. As noted by Mayo et al. (2007), it is difficult to reconcile some of the historical water budgets presented for the San Luis Valley; however, it can generally be stated that the water budget is predominately a balance of precipitation and stream flow inputs with output dominated by evapotranspiration by agricultural lands, riparian areas, and meadows.

The estimated total water use requirements during the peak construction year are as high as 686 ac-ft/yr (846,200 m^3/yr), which does not constitute a significant amount given the short duration of this water demand relative to water resources within 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

TABLE 10.4.9.2-2 Water Budget for the San Luis Valley, Which Includes the Proposed Los Mogotes East SEZ as Revised

Process	Amount
Inputs	
Precipitation (ac-ft/yr)[a]	1,086,356
Streams draining Sangre de Cristo Mts. (ac-ft/yr)	214,839
Streams draining San Juan Mts. (ac-ft/yr)	1,321,463
Groundwater underflow (ac-ft/yr)	721,535
Outputs	
Evapotranspiration (ac-ft/yr)	2,245,676
Rio Grande discharge (ac-ft/yr)	332,392
Groundwater underflow (ac-ft/yr)	72,964
Groundwater pumping (ac-ft/yr)[b]	641,214
Groundwater Storage	
Storage (ac-ft)	2,026,783

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

[b] Colorado DWR (2004).

Source: Mayo et al. (2007).

represent full build-out of the SEZ, assuming PV, dry-cooled parabolic trough, and wet-cooled parabolic trough, respectively (a 30% operational time was considered for all solar facility types on the basis of operations estimates for proposed utility-scale solar energy facilities). The low, medium, and high pumping scenarios result in groundwater withdrawals that range from 12 to 2,126 ac-ft/yr (14,800 to 2.6 million m^3/yr), or 240 to 42,520 ac-ft (296,000 to 52.4 million m^3) over the 20-year operational period. From a groundwater budgeting perspective, the high pumping scenario over the 20-year analysis period represents 2% of the groundwater storage, and its annual pumping rate is on the order of 0.3% of the current annual groundwater withdrawals in the basin. The amounts of estimated groundwater withdrawals for the low and medium pumping scenarios do not represent significant quantities in comparison to the water budget of the San Luis Valley.

Examining groundwater withdrawals with respect to a basin-scale water budget allows for an assessment of potential impacts only to an order of magnitude approximation of basin-scale estimates of complex groundwater processes. In addition, a water budget approach 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, considering pumping from

the upper unconfined aquifer and lower confined aquifer separately. A detailed discussion of the groundwater modeling analysis is presented in Appendix O. It should be noted, however, that the aquifer parameters used for the one-dimensional groundwater model (Table 10.4.9.2-3) represent available literature data, and that the model aggregates these value ranges into a simplistic representation of the aquifers.

Depth to groundwater in the unconfined aquifer is typically on the order of 15 to 35 ft (5 to 11 m) in the vicinity of the Los Mogotes East SEZ, and the confined aquifer is on the order of 200 to 300 ft (61 to 91 m) below the surface. The one-dimensional groundwater modeling results for the upper unconfined aquifer suggest that groundwater drawdown in the vicinity of the SEZ (approximately a 2-mi [3.2-km] radius) ranges from up to 15 ft (5 m) for the high pumping scenario, up to 3 ft (1 m) for the medium pumping scenario, and less than 1 ft (0.3 m) for the low pumping scenario (Figure 10.4.9.2-2). The extent of groundwater drawdown is primarily restricted to the vicinity of the SEZ for all pumping scenarios. The modeling results for the lower confined aquifer suggest significant groundwater drawdown occurs for the high pumping scenario, ranging from 7 to 25 ft (9 to 24 m) and extending more than 50 mi (80 km) from the

TABLE 10.4.9.2-3 Aquifer Characteristics and Assumptions Used in the One-Dimensional Groundwater Model for the Proposed Los Mogotes East SEZ as Revised

Parameter	Value
Upper, unconfined aquifer	
Aquifer type/conditions	Unconfined/basin fill
Aquifer thickness (ft)[a,b]	100
Hydraulic conductivity (ft/day)	200
Transmissivity (ft^2/day)	20,000
Specific yield	0.24
Lower, confined aquifer	
Aquifer type/conditions	Confined/basin fill
Aquifer thickness (ft)	500
Hydraulic conductivity (ft/day)	50
Transmissivity (ft^2/day)	25,000
Storage coefficient	0.0000025
Upper and lower aquifer	
Analysis period (yr)	20
High pumping scenario (ac-ft/yr)[c]	2,126
Medium pumping scenario (ac-ft/yr)	303
Low pumping scenario (ac-ft/yr)	12

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

[b] Mayo et al. (2007).

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

Source: Colorado DWR (2004).

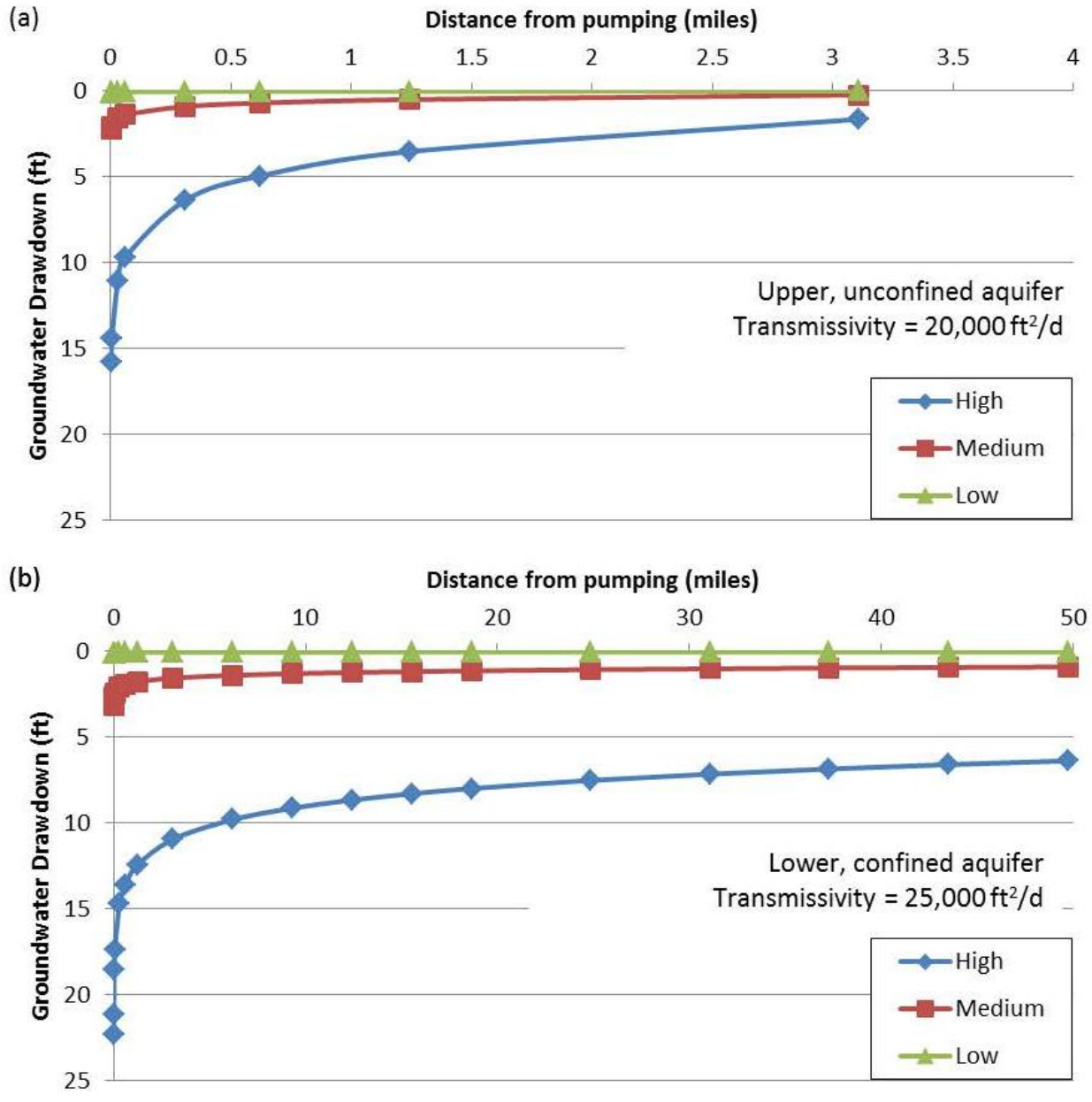

FIGURE 10.4.9.2-2 Estimated One-Dimensional Groundwater Drawdown in (a) Upper Unconfined Aquifer and (b) Lower Confined Aquifer Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Los Mogotes East SEZ as Revised

SEZ (Figure 10.4.9.2-2). The low and medium pumping scenarios have a much lower impact on groundwater drawdown, from 0 to 3 ft (0 to 1 m).

The comparison of water use requirements to the basin-scale water budget and the one-dimensional groundwater modeling gives mixed results. From a groundwater budgeting perspective, the three pumping scenarios considered are not significant relative to the amounts of water moved through the San Luis Valley. Groundwater modeling results suggest that the high pumping scenario would have a localized groundwater drawdown effect if groundwater were extracted from the unconfined aquifer, but a more significant impact extending more than 50 mi (80 km) away from the SEZ if withdrawn from the confined aquifer. As stated in Section 10.4.9.1, water management of the San Luis Valley is restrictive, given its overappropriated nature in water rights and its obligations to maintain flows in the Rio Grande. Ultimately, any proposed groundwater withdrawals for solar energy facilities would be reviewed for impacts by the Colorado DWR and would be subject to the rules and court decisions outlined in Case Numbers 06CV64 and 07CW52 (Colorado District Court 2010).

10.4.9.2.3 Off-Site Impacts: Roads and Transmission Lines

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

10.4.9.2.4 Summary of Impacts on Water Resources

The additional information and analyses of water resources presented in this update agree with the information provided in the Draft Solar PEIS, which indicates that the San Luis Valley is a high-elevation basin, with predominately agricultural land use, and is the headwaters of the Rio Grande, where surface water and groundwater processes are coupled and managed jointly. Groundwater in the San Luis Valley is found in both the upper unconfined aquifer and lower confined aquifer, and historical diversions of both surface water and groundwater for irrigation have affected streamflows and groundwater levels. Water management plays a significant role in the San Luis Valley, because it pertains to ensuring river flows in the Rio Grande according to the Rio Grande Compact, which is the primary responsibility of the Colorado DWR.

Disturbance to intermittent/ephemeral stream channels within the Los Mogotes East SEZ should not have a significant impact on the critical functions of groundwater recharge, sediment transport, flood conveyance, and ecological habitat, given the relatively small footprint of the SEZ with respect to the study area along with the low sensitivity to land disturbances of identified intermittent/ephemeral streams. Several short reaches of intermittent/ephemeral stream

channels with moderate sensitivity to land disturbance are located immediately downgradient of the SEZ; thus reducing off-site impacts associated with runoff is an important consideration for siting and construction phases. Groundwater withdrawals pose the greatest threat to water resources in the San Luis Valley. The water budgeting and groundwater modeling analyses suggest that significant groundwater drawdown could occur both locally and off-site under the high pumping scenario if groundwater were extracted from either the unconfined or confined aquifer. The low and medium pumping scenarios are preferable, because estimated groundwater drawdown is much less. Ultimately, the process of transferring water rights established by the Colorado DWR will determine how much water can be used by proposed solar facilities. As stated in the Draft Solar PEIS, given the restrictive nature of water rights and the need for augmentation water reserves, it would be difficult for any projects seeking more than 1,000 ac-ft/yr (1.2 million m^3/yr) of water to be successful in obtaining the needed water rights (McDermott 2010).

Predicting impacts associated with groundwater withdrawals is often difficult, given the heterogeneity of aquifer characteristics, the long time period between the onset of pumping and its effects, and limited data. Another consideration relevant to the San Luis Valley is that the transfer of water rights will likely come from the purchase of existing irrigation water rights, which will result in a change in the location of the point of diversion and a change in land use patterns in the basin, both of which can affect groundwater processes. 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 a combination of monitoring and modeling to fully identify the temporal and spatial extent of potential impacts. Water management in the San Luis Valley relies on several water monitoring and modeling tools developed by the Colorado DWR and the CWCB that are a part of the Colorado's Decision Support Systems (available at http://cdss.state.co.us/Pages/CDSSHome.aspx), and these tools should be implemented with respect to long-term monitoring and adaptive management strategies for solar energy development occurring within the San Luis Valley.

10.4.9.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

- Groundwater analyses suggest full build-out of wet-cooled technologies is not feasible; for mixed-technology development scenarios, any proposed wet-cooled projects would have to reduce water requirements to less than

approximately 1,000 ac-ft/yr (1.2 million m^3/yr) in order to secure water rights and comply with water management in the San Luis Valley.

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.

10.4.10 Vegetation

10.4.10.1 Affected Environment

As presented in Section 10.4.10.1 of the Draft Solar PEIS, 5 cover types were identified within the area of the proposed Los Mogotes East SEZ, 12 cover types were identified within the access road corridor, and 26 cover types were identified within 5 mi (8 km) of the SEZ boundary (the indirect impact area). Sensitive habitats on the SEZ include ephemeral washes. Because of the SEZ boundary changes, the Inter-Mountain Basins Mixed Salt Desert Scrub cover type no longer occurs within the SEZ. Figure 10.4.10.1-1 shows the cover types within the affected area of the Los Mogotes East SEZ as revised.

10.4.10.2 Impacts

As presented in the Draft Solar PEIS, the construction of solar energy facilities within the proposed Los Mogotes 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 new configuration of the SEZ boundary, approximately 2,120 acres (8.58 km^2) would be cleared.

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

10.4.10.2.1 Impacts on Native Species

The analysis presented in the Draft Solar PEIS for the original Los Mogotes East SEZ developable area indicated that development would result in a moderate impact on one land cover type and a small impact on all other land cover types occurring within the SEZ (Table 10.4.10.1-1 in the Draft Solar PEIS). Development within the revised Los Mogotes East SEZ could still directly affect most of the cover types evaluated in the Draft Solar PEIS, with the exception of Inter-Mountain Basins Mixed Salt Desert Scrub (previously a moderate impact); the reduction in the developable area would result in reduced (and still small) impact levels on all other cover types in the affected area.

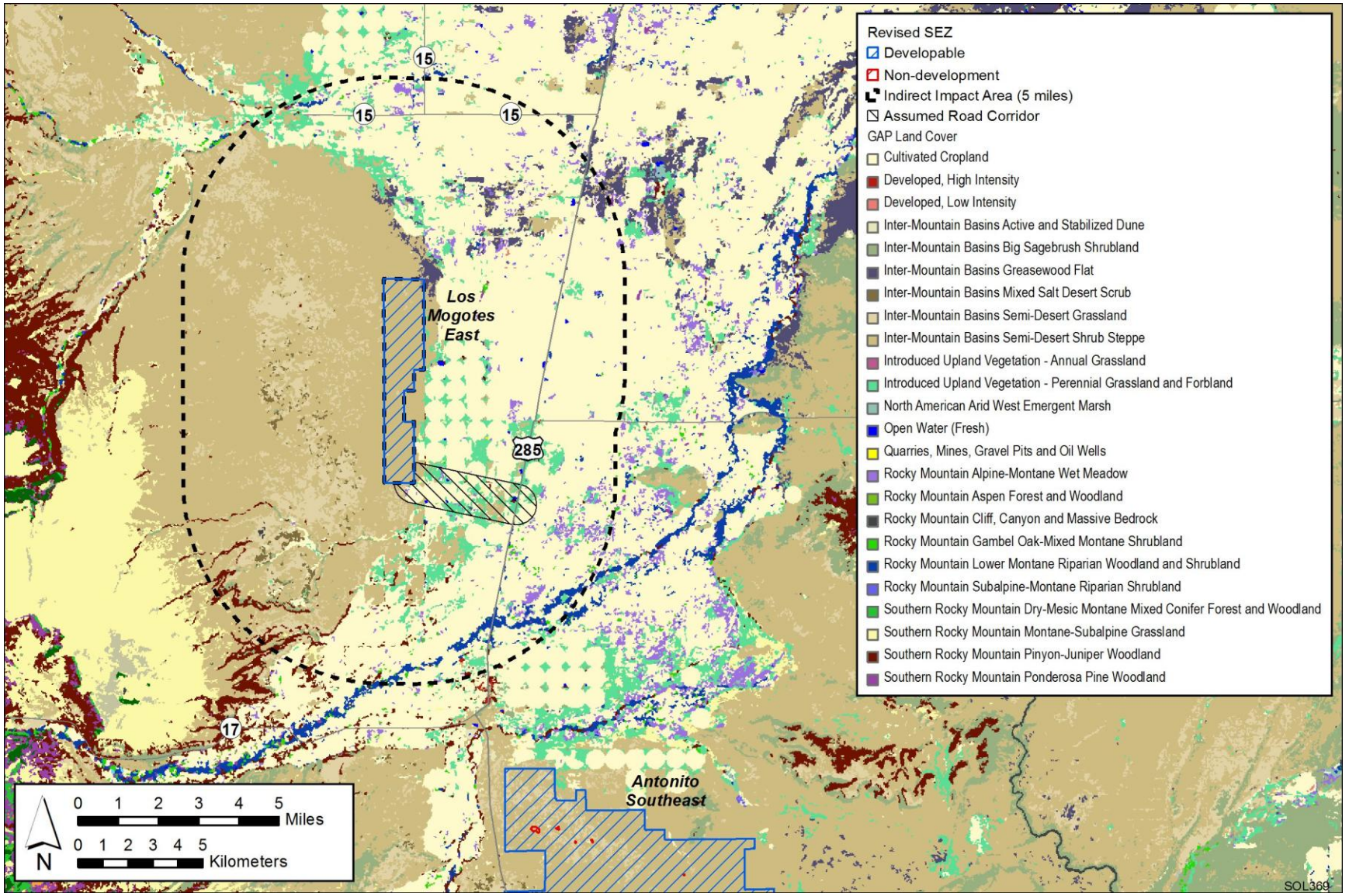

FIGURE 10.4.10.1-1 Land Cover Types within the Proposed Los Mogotes East SEZ as Revised

Direct impacts could still occur on unmapped wetlands within the remaining developable areas of the SEZ. In addition, indirect impacts on wetlands within or near the SEZ, as described in the Draft Solar PEIS, could occur.

10.4.10.2.2 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 Los Mogotes East SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 10.4.10.1 in the Draft Solar PEIS. Impacts, such as reduced restoration success and possible widespread habitat degradation, could still occur; however, a small reduction in the potential for such impacts would result from the reduced developable area of the SEZ.

10.4.10.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

- All dry wash habitats within the SEZ and all wetland and dry wash habitats within the assumed access road corridor shall be avoided to the extent practicable, and any impacts minimized and mitigated in consultation with appropriate agencies. A buffer area shall be maintained around wetlands and dry washes to reduce the potential for impacts on these habitats on or near the SEZ.

- Appropriate engineering controls shall be used to minimize impacts on wetland, dry wash, and riparian habitats, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Maintaining sediment and erosion controls along drainages would reduce the potential for impacts on wetlands near or downgradient from the SEZ. Appropriate buffers and engineering controls will be determined through agency consultation.

- Groundwater withdrawals shall be limited to reduce the potential for indirect impacts on wetland habitats or springs that are associated with groundwater discharge, such as the wetlands along the Conejos River.

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

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

10.4.11 Wildlife and Aquatic Biota

For the assessment of potential impacts on wildlife and aquatic biota, overall impact magnitude categories were based on professional judgment and include (1) *small*: a relatively small proportion (≤1%) of the species' habitat within the SEZ region would be lost; (2) *moderate*: an intermediate proportion (>1 but ≤10%) of the species' habitat would be lost; and (3) *large*: >10% of the species' habitat would be lost.

10.4.11.1 Amphibians and Reptiles

10.4.11.1.1 Affected Environment

As presented in the Draft Solar PEIS, representative amphibian and reptile species expected to occur within the Los Mogotes East SEZ include the Woodhouse's toad (*Bufo woodhousii*), fence lizard (*Sceloporus undulatus*), gopher snake (*Pituophis catenifer*), western rattlesnake (*Crotalus viridis*), short-horned lizard (*Phrynosoma hernandesi*), and western terrestrial garter snake (*Thamnophis elegans*). The reduction in the size of the Los Mogotes East SEZ does not alter the potential for these species to occur in the affected area.

10.4.11.1.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Los Mogotes East SEZ could affect potentially suitable habitats for several amphibian and reptile species. The analysis presented in the Draft Solar PEIS indicated that development would result in a small overall impact on representative amphibian and reptile species (Table 10.4.11.1-1 in the Draft Solar PEIS). Development within the revised boundaries of the Los Mogotes East SEZ could still affect the same species evaluated in the Draft Solar PEIS; however, the reduction in the developable area would result in reduced (and still small) impact levels compared to original estimates in the Draft Solar PEIS.

10.4.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that will reduce impacts on amphibian and reptile species are described in Section A.2.2 of Appendix A of this Final Solar PEIS. SEZ-specific

species and habitats will guide how programmatic design features for amphibians and reptiles are applied, for example:

- Wash habitats within the SEZ shall be avoided to the extent practicable.

- Appropriate engineering controls shall be used to minimize impacts on palustrine wetlands surrounding the SEZ resulting from surface water runoff, erosion, sedimentation, accidental spills, or fugitive dust deposition to these habitats.

With the implementation of required programmatic design features, impacts on amphibian and reptile species would be reduced.

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

- The access road should be sited and constructed to minimize impacts on wetlands (if present within the finalized access road location).

If SEZ-specific design features are implemented in addition to required programmatic design features, impacts on amphibian and reptile 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.

10.4.11.2 Birds

10.4.11.2.1 Affected Environment

As presented in the Draft Solar PEIS, a large number of bird species could occur or have potentially suitable habitat within the affected area of the proposed Los Mogotes East SEZ. Representative bird species identified in the Draft Solar PEIS included Brewer's blackbird (*Euphagus cyanocephalus*), Brewer's sparrow (*Spizella breweri*), common nighthawk (*Chordeiles minor*), horned lark (*Eremophila alpestris*), vesper sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsoni*), turkey vulture (*Cathartes aura*), and mourning dove (*Zenaida macroura*). The reduction in the size of the reconfigured Los Mogotes East SEZ does not alter the potential for these species or other bird species to occur in the affected area.

10.4.11.2.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Los Mogotes East SEZ could affect potentially suitable habitats of bird species. The analysis presented in the

Draft Solar PEIS for the original Los Mogotes East SEZ boundaries indicated that development would result in a small overall impact on the representative bird species (Table 10.4.11.2-1 in the Draft Solar PEIS). Development within the revised boundaries of the Los Mogotes East SEZ could still affect the same species evaluated in the Draft Solar PEIS; however, the reduction in the developable area would result in reduced (and still small) impact levels compared to original estimates in the Draft Solar PEIS.

10.4.11.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

- Appropriate engineering controls shall be used to minimize impacts resulting from surface water runoff, erosion, sedimentation, accidental spills, or fugitive dust deposition.

If the programmatic design features are implemented, impacts on bird species will be reduced.

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

- The access road should be sited and constructed to minimize impacts on wetlands and riparian areas (if present within the finalized access road location).

- If present, prairie dog colonies (which could provide habitat or a food source for some raptor species) should be avoided to the extent practicable. This design feature has been at least partly met as the revised SEZ now avoids known Gunnison prairie dog habitat.

If these 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.

10.4.11.3 Mammals

10.4.11.3.1 Affected Environment

As presented in the Draft Solar PEIS, a large number of mammal species were identified that could occur or have potentially suitable habitat within the affected area of the proposed

Los Mogotes East SEZ. Representative mammal species identified in the Draft Solar PEIS included (1) big game species: the American black bear (*Ursus americanus*), bighorn sheep (*Ovis canadensis*), cougar (*Puma concolor*), elk (*Cervis canadensis*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*); (2) furbearers and small game species: the American badger (*Taxidea taxus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), and white-tailed jackrabbit (*Lepus townsendii*); and (3) small nongame species: the big brown bat (*Eptesicus fuscus*), deer mouse (*Peromyscus maniculatus*), least chipmunk (*Tamias minimus*), little brown myotis (*Myotis lucifugus*), northern pocket gopher (*Thomomys talpoides*), Ord's kangaroo rat (*Dipodomys ordii*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), and western small-footed myotis (*Myotis ciliolabrum*). The reduction in the size of the Los Mogotes East SEZ does not alter the potential for these species or any additional mammal species to occur in the affected area.

10.4.11.3.2 Impacts

As presented in the Draft Solar PEIS, solar energy development within the Los Mogotes East SEZ could affect potentially suitable habitats of mammal species. The analysis presented in the Draft Solar PEIS for the original Los Mogotes East SEZ boundaries indicated that development would result in a small overall impact on all representative mammal species analyzed (Table 10.4.11.3-1 in the Draft Solar PEIS). Development within the revised boundaries of the Los Mogotes East SEZ could still affect the same representative mammal species evaluated in the Draft Solar PEIS; however, the reduction in the developable area would result in reduced (and still small) impact levels compared to original estimates in the Draft Solar PEIS.

Based on mapped activity areas, direct potential loss of overall range, winter range, and severe winter range for elk; overall range for mule deer; and overall range and severe winter range for pronghorn would be reduced from 4,734 acres (19.2 km^2) to 2,120 acres (8.6 km^2) for the revised Los Mogotes East SEZ. Impact levels for these activity areas would still be small, except for pronghorn severe winter range, where the impact would remain moderate. The 135 acres (0.5 km^2) of mule deer winter range and all or most of the 3,145 acres (12.7 km^2) of pronghorn winter concentration area potentially directly affected by solar development for the original Los Mogotes East SEZ boundaries in the Draft Solar PEIS would not be affected for the revised SEZ, because these activity areas are wholly or mostly within the acreage eliminated from the SEZ, respectively.

10.4.11.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

- Development in the 135-acre (0.55-km^2) portion of the SEZ that overlaps the mule deer winter range should be avoided. This design feature is no longer applicable as the revised SEZ now avoids this mule deer activity area.

- Prairie dog colonies should be avoided to the extent practicable to reduce impacts on species such as desert cottontail and thirteen-lined ground squirrel. This design feature has been at least partly met, as the revised SEZ now avoids known Gunnison prairie dog habitat.

- Construction should be curtailed during winter when big game species are present.

- Where big game winter ranges intersect or are close to the SEZ, motorized vehicles and other human disturbances should be controlled (e.g., through temporary road closures when big game are present).

- Loss of pronghorn winter concentration area should be minimized. This design feature has largely been met, as the revised SEZ now avoids all or most of this pronghorn activity area.

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.

10.4.11.4 Aquatic Biota

10.4.11.4.1 Affected Environment

There are no permanent water bodies or perennial streams within the boundaries of the proposed Los Mogotes East SEZ or the area of indirect effects, although rain events may give rise to ephemeral pools on occasion. A number of ephemeral washes pass through the SEZ but do not extend directly to nearby perennial streams. The boundaries of the Los Mogotes East SEZ have been reduced compared to the boundaries given in the Draft Solar PEIS. Based on these changes, updates to the Draft Solar PEIS include the following:

- Approximately 16 mi (26 km) of perennial stream habitat associated with three streams falls within the assumed area of indirect effects within 5 mi (8 km) of the SEZ, including approximately 7 mi (11 km) of the lower portion of La Jara Creek, a 5-mi (8-km) section of the Conejos River, and a 3-mi (5-km) segment of the lower Alamosa River.

- Outside of the area of indirect effects but within 50 mi (80 km) of the SEZ, there are approximately 869 mi (1,938 km) of perennial streams, 198 mi (319 km) of intermittent streams, and 177 mi (285 km) of canals.

- There are approximately 10,725 acres (4,340 km^2) of lake and reservoir habitat within 50 mi (80 km) of the SEZ. There are no lakes or reservoirs within the areas considered for analysis of direct or indirect effects. The nearest such habitat is La Jara Reservoir, approximately 11 mi (17 km) to the southeast of the SEZ.

Aquatic biota present the SEZ have not been characterized. As stated in Appendix C of the Supplement to the Draft Solar PEIS, site surveys can be conducted at the project-specific level to characterize the aquatic biota, if present, in washes, dry lakes, and wetlands within the SEZ.

10.4.11.4.2 Impacts

The types of impacts that could occur on aquatic habitats and biota from development of utility-scale solar energy facilities are identified in Section 5.10.2.4 of the Draft Solar PEIS and this Final Solar PEIS. Aquatic habitats present on or near the Los Mogotes 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 amount of surface water features within the SEZ and in the area of indirect effects that could potentially be affected by solar energy development is less because the size of the SEZ has been reduced.

10.4.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

- Undisturbed buffer areas and sediment and erosion controls shall be maintained around drainages associated with wetland areas located in the immediate vicinity of the SEZ.

It is anticipated that implementation of the programmatic design features will reduce impacts on aquatic biota, and if the utilization of water from groundwater or surface water sources is adequately controlled to maintain sufficient water levels in nearby aquatic habitats, the potential impacts on aquatic biota from solar energy development at the Los Mogotes East SEZ would be negligible.

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

10.4.12 Special Status Species

10.4.12.1 Affected Environment

There were 51 special status species identified in the Draft Solar PEIS that could occur or have potentially suitable habitat within the affected area of the proposed Los Mogotes East SEZ. The reduction in the size of the Los Mogotes East SEZ does not alter the potential for these species to occur in the affected area.

Since publication of the Draft Solar PEIS, three additional special status species have been identified—Mexican spotted owl (*Strix occidentalis lucida*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and fringed myotis (*Myotis thysanodes*)—that could occur in the affected area of the Los Mogotes East SEZ based on known occurrences and the presence of potentially suitable habitat. These three additional species are discussed in the remainder of this section.

Following the publication of the Draft Solar PEIS, the BLM conducted field surveys for special status bat species, as well as Gunnison prairie dog (*Cynomys gunnisoni*) and western burrowing owl (*Athene cunicularia*), in the Los Mogotes East SEZ. Surveys for bat species were conducted in the SEZ by using passive and active acoustic monitoring techniques at various times between June 16, 2011, and October 15, 2011 (Rodriguez 2011). The big free-tailed bat (*Nyctinomops macrotis*) was the only special status bat species recorded on the SEZ. However, the documented presence of the fringed myotis in the De Tilla Gulch SEZ suggests that the fringed myotis could occur throughout the San Luis Valley and potentially within the Los Mogotes East SEZ. No roosting habitat for this species was observed on the SEZ (Rodriguez 2011).

Field surveys for Gunnison prairie dog and western burrowing owl were conducted on July 26, 2011 (Garcia and Harvey 2011). No Gunnison prairie dog activity was recorded in any portion of the SEZ. However, there are established Gunnison prairie dog colonies within 2 mi (3 km) north of the SEZ. Burrowing owls were not recorded on the SEZ during the field surveys. However, burrowing owls were observed among prairie dog colonies on Colorado state land within 3 mi (2 km) north of the SEZ. On June 4, 2008, a burrowing owl was observed approximately 1 mi (1.6 km) west of the Los Mogotes East SEZ. On the basis of this information, the Los Mogotes East SEZ could be utilized by the western burrowing owl for either nesting or foraging habitat (Garcia and Harvey 2011).

Mexican Spotted Owl. The Mexican spotted owl was listed as a threatened species under the ESA on March 16, 1993 (USFWS 1993). Critical habitat for this species was designated on June 6, 1995 (USFWS 1995), but several court rulings resulted in the USFWS removing the critical habitat designation on March 25, 1998 (USFWS 1998). In March 2000, the USFWS was ordered by the courts to propose critical habitat, resulting in the current designation that includes 4.6 million acres (18,616 km^2) in Arizona, Colorado, New Mexico, and Utah on federal lands (USFWS 2004). A recovery plan for the Mexican spotted owl was published in December 1995 and later revised in June 2011 (USFWS 2011). At the time of federal listing in 1993, the total population of Mexican spotted owls was estimated at 2,100.

The Mexican spotted owl occurs from southern British Columbia, Canada, to central Mexico. The primary habitat of the spotted owl is steep rocky canyons, although mature coniferous forests are also important habitat. The spotted owl occupies closed canopy forests in steep canyons with uneven-aged tree stands with high basal area, with an abundance of snags and downed logs (NatureServe 2010; USFWS 2011).

The Mexican spotted owl feeds mainly on rodents but also consumes rabbits, birds, reptiles, and insects. Nest sites are in trees (typically those with broken tops), tree trunk cavities, and cliffs along canyon walls. Breeding takes place in the spring (March) with egg-laying in late March or early April. After a 30-day incubation period, hatching occurs and fledging takes place in 4 to 5 weeks. The young depend on the adults for food in the summer and eventually disperse from the nesting area in the fall (NatureServe 2010; USFWS 2011).

The Mexican spotted owl is known to occur in Conejos County, Colorado, and potentially suitable habitat for this species may occur in the affected area of the Los Mogotes East SEZ. Potentially suitable habitat for this species does not occur on the SEZ. However, the SWReGAP habitat suitability model for the spotted owl (*S. occidentalis*) identified approximately 14 acres (<0.1 km^2) of potentially suitable habitat within the assumed access road corridor and an additional 3,000 acres (12 km^2) of potentially suitable habitat within the area of indirect effects (Figure 10.4.12.1-1; Table 10.4.12.1-1). Designated critical habitat for the Mexican spotted owl does not occur in the affected area.

Western Yellow-Billed Cuckoo. The western yellow-billed cuckoo is a candidate for listing under the ESA and has the potential to occur in the affected area. The western yellow-billed cuckoo is a neotropical migrant bird that inhabits large riparian woodlands in the western United States. This species is not known to occur in Conejos County, Colorado, but it has been documented in nearby counties such as La Plata and Rio Grande Counties, Colorado. Although the SWReGAP habitat suitability model for the western yellow-billed cuckoo does not identify any suitable habitat for this species within the SEZ or assumed access road corridor, approximately 215 acres (1 km^2) of potentially suitable riparian habitat occurs within the area of indirect effects along the Conejos River (Figure 10.4.12.1-1; Table 10.4.12.1-1). Potentially suitable habitat may also occur in the area of indirect effects along La Jara Creek. Additional basic information on life history, habitat needs, and threats to populations of this species is provided in Appendix J.

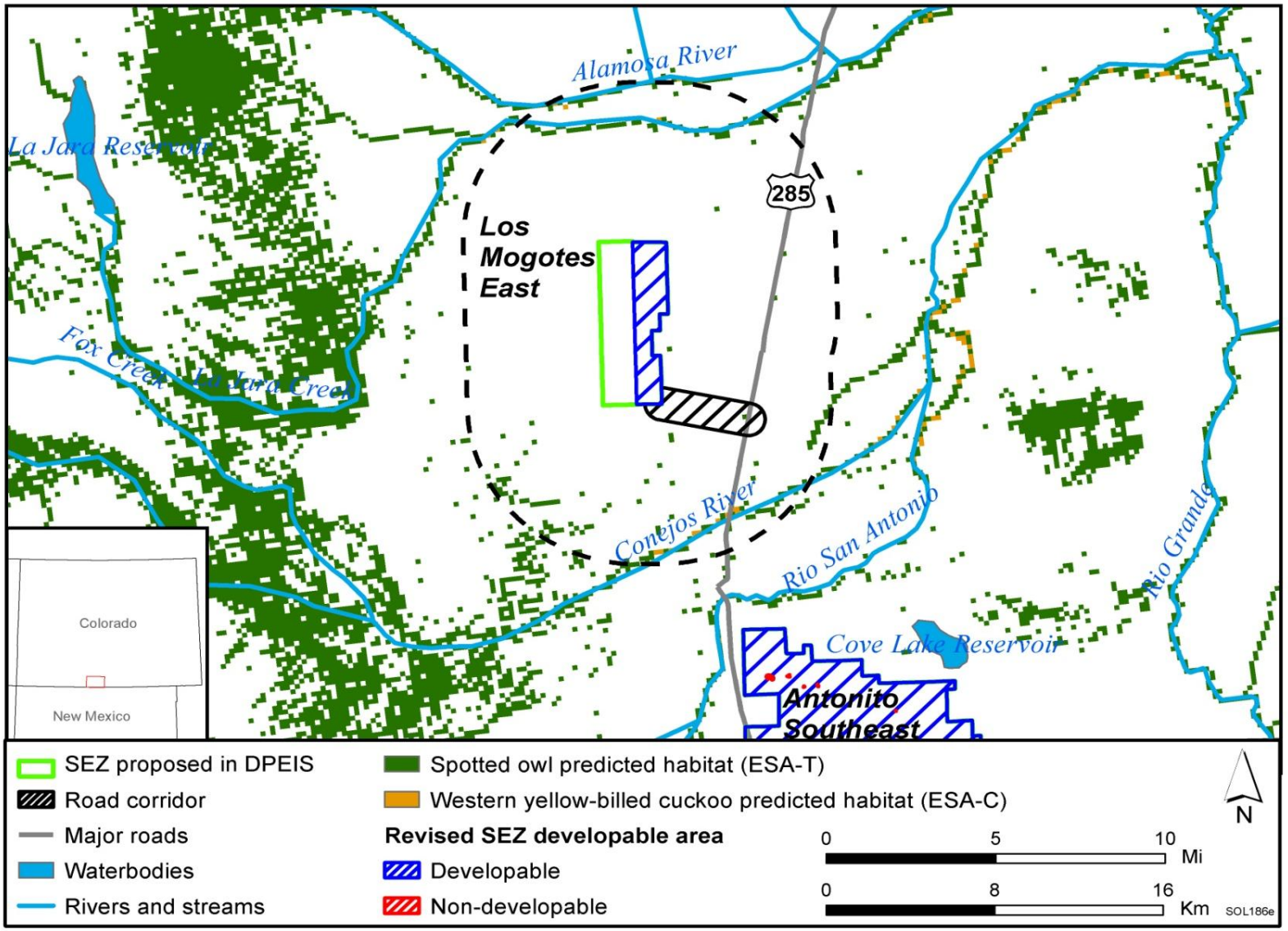

FIGURE 10.4.12.1-1 Developable Area for the Proposed Los Mogotes East SEZ as Revised and Distribution of Potentially Suitable Habitat for the Mexican Spotted Owl and Western Yellow-Billed Cuckoo

TABLE 10.4.12.1-1 Habitats, Potential Impacts, and Potential Mitigation for Additional Special Status Species That Could Be Affected by Solar Energy Development on the Proposed Los Mogotes East SEZ as Revised[a]

Common Name	Scientific Name	Listing Status[b]	Habitat[c]	Maximum Area of Potential Habitat Affected[d]			Overall Impact Magnitude[h] and Species-Specific Mitigation[i]
				Within SEZ (Direct Effects)[e]	Road Corridor (Direct Effects)[f]	Outside SEZ (Indirect Effects)[g]	
Birds							
Mexican spotted owl	*Strix occidentalis lucida*	ESA-T; CO-T; CO-S1	Inhabits deep, sheer-walled canyons in old-age, mixed coniferous forests. Known to occur in Conejos County, Colorado. About 679,500 acres[j] of potentially suitable habitat occurs in the SEZ region.	0 acres	14 acres of potentially suitable habitat lost (<0.1% of available potentially suitable habitat)	3,000 acres of potentially suitable habitat (0.4% of available potentially suitable habitat)	Small overall impact; no direct impact. No species-specific mitigation is warranted.
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	ESA-C	Breeds in scattered areas along the lower Colorado River and larger bodies of water in the southwestern United States. Primarily associated with riparian cottonwood and willow forests with dense understory foliage. Known to occur in Conejos County, Colorado. About 2,500 acres of potentially suitable habitat occurs in the SEZ region.	0 acres	0 acres	215 acres of potentially suitable habitat (8.6% of available potentially suitable habitat)	Small overall impact; no direct impact. Avoiding or limiting groundwater withdrawals for solar energy development on the SEZ could reduce impacts on this species.
Mammals							
Fringed myotis	*Myotis thysanodes*	BLM-S; FWS-SC	Summer or year-round resident in wide range of habitats, including woodland, riparian, and shrubland habitats. Roosts in caves, crevices, and buildings. About 3,484,000 acres of potentially suitable habitat occurs within the SEZ region.	2,650 acres of potentially suitable habitat lost (<0.1% of available potentially suitable habitat)	24 acres of potentially suitable habitat lost (<0.1% of available potentially suitable habitat)	86,500 acres of potentially suitable habitat (2.5% of available potentially suitable habitat)	Small overall impact; direct impact on foraging habitat only. Avoidance of direct impacts on foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.

TABLE 10.4.12.1-1 (Cont.)

[a] The species presented in this table represent new species identified following publication of the Draft Solar PEIS or a re-evaluation of those species that were determined to have moderate or large impacts in the Draft Solar PEIS. The other special status species for this SEZ are identified in Table 10.4.12.1-1 of the Draft Solar PEIS.

[b] BLM-S = listed as a sensitive species by the BLM; CO-S1 = ranked as S1 in the state of Colorado; CO-T = listed as threatened in the state of Colorado; ESA-C = candidate for listing under the ESA; ESA-T = listed as threatened under the ESA; FWS-SC = USFWS species of concern.

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

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

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

[f] For access road development, direct effects were estimated within a 60-ft (18-m) wide, 3-mi (5-km) long access road from the SEZ to the nearest state highway. Direct impacts within this area were determined from the proportion of potentially suitable habitat within the 1-mi (1.6-km) wide road corridor.

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

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

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

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

Fringed Myotis. The fringed myotis is a year-round resident in western Colorado, where it forages in a variety of habitats including ponderosa pine woodlands, greasewood flats, oakbrush, and shrublands. This species was not evaluated for the Los Mogotes East SEZ in the Draft Solar PEIS. The species roosts in caves, rock crevices, or buildings. The fringed myotis was not recorded on the Los Mogotes East SEZ during field surveys conducted in 2011 (Rodriguez 2011). However, fringed myotis was recorded on the De Tilla Gulch SEZ, suggesting that the species could occur elsewhere in the San Luis Valley and potentially within the Los Mogotes East SEZ. According to the SWReGAP habitat suitability model, potentially suitable foraging habitat for the fringed myotis could occur on the SEZ and throughout portions of the area of indirect effects (Table 10.4.12.1-1). There is no potentially suitable roosting habitat (rocky cliffs and outcrops) in the area of direct effects.

10.4.12.2 Impacts

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

As presented in the Draft Solar PEIS, solar energy development within the Los Mogotes East SEZ could affect potentially suitable habitats of special status species. The analysis presented in the Draft Solar PEIS for the original Los Mogotes East SEZ developable area indicated that development would result in no impact or a small overall impact on all special status species (Table 10.4.12.1-1 in the Draft Solar PEIS). Development within the revised Los Mogotes East SEZ could still affect the same 51 species evaluated in the Draft Solar PEIS; however, the reduction in the developable area would result in reduced (and still small) impact levels compared to original estimates in the Draft Solar PEIS.

Impacts on the Mexican spotted owl, western yellow-billed cuckoo, and fringed myotis, special status species identified since publication of the Draft Solar PEIS to potentially occur within the affected area of the Los Mogotes East SEZ, are discussed below and in Table 10.4.12.1-1. The impact assessment for these additional species was carried out in the same way as those species analyzed in the Draft Solar PEIS (Section 10.4.12.2 of the Draft Solar PEIS).

Mexican Spotted Owl. The Mexican spotted owl is known to occur in Conejos County, Colorado, and according to the SWReGAP habitat suitability model for the spotted owl, suitable habitat for the species does not occur anywhere within the Los Mogotes East SEZ. However, approximately 14 acres (<0.1 km^2) of potentially suitable year-round habitat in the assumed access road corridor could be directly affected by construction and operations (Table 10.4.12.1-1). This direct effects area represents less than 0.1% of available suitable habitat in the SEZ region. About 3,000 acres (12 km^2) of potentially suitable year-round habitat occurs within the area of indirect effects (Figure 10.4.12.1-1). The amount of potentially suitable

habitat within the indirect effects area represents about 0.4% of the available suitable habitat in the SEZ region (Table 10.4.12.1-1).

The overall impact on the Mexican spotted owl from construction, operation, and decommissioning of utility-scale solar energy facilities within the Los Mogotes East SEZ is considered small, because the amount of potentially suitable foraging and nesting habitat for this species in the area of direct effects represents less than 1% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels.

Western Yellow-Billed Cuckoo. The western yellow-billed cuckoo is known to occur in Conejos County, Colorado, and potentially suitable habitat occurs in the affected area of the Los Mogotes East SEZ. According to the SWReGAP habitat suitability model, suitable habitat for this species does not occur on the SEZ. However, the SWReGAP habitat suitability model indicates approximately 215 acres (1 km^2) of potentially suitable habitat in the area of indirect effects, primarily along the Conejos River (Figure 10.4.12.1-1). This indirect effects area represents about 8.6% of the available suitable habitat in the region (Table 10.4.12.1-1).

The overall impact on the western yellow-billed cuckoo from construction, operation, and decommissioning of utility-scale solar energy facilities within the Los Mogotes East SEZ is considered small, because no potentially suitable habitat for this species occurs in the area of direct effects, and only indirect effects are possible. The implementation of design features is expected to be sufficient to reduce indirect impacts to negligible levels.

Fringed Myotis. The fringed myotis is a year-round resident in southwestern Colorado and is known to occur within the San Luis Valley. Although this species is not known to occur in the proposed Los Mogotes East SEZ, field surveys conducted in 2011 documented the presence of this species in the De Tilla Gulch SEZ (Rodriguez 2011). According to the SWReGAP habitat suitability model, approximately 2,650 acres (11 km^2) of suitable foraging habitat in the revised Los Mogotes East SEZ may be directly affected by construction and operations (Table 10.4.12.1-1). This direct effects area represents less than 0.1% of potentially suitable habitat in the SEZ region. About 86,500 acres (350 km^2) of potentially suitable habitat occurs in the area of indirect effects; this area represents about 2.5% of the available suitable habitat in the region (Table 10.4.12.1-1). Most of the potentially suitable habitat in the affected area is foraging habitat represented by desert shrubland. There is no potentially suitable roosting habitat (rocky cliffs and outcrops) in the area of direct effects; however, it is possible for individuals to roost in nearby habitats within the area of indirect effects (Rodriguez 2011).

The overall impact on the fringed myotis from construction, operation, and decommissioning of utility-scale solar energy facilities within the revised Los Mogotes East SEZ is considered small, because the amount of potentially suitable foraging habitat for this species in the area of direct effects represents less than 1% of potentially suitable foraging habitat in the SEZ region. The implementation of design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels. Avoidance of all potentially suitable foraging

habitats is not feasible, because potentially suitable habitat is widespread throughout the area of direct effects and readily available in other portions of the SEZ region.

10.4.12.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features are described in 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 to determine the presence and abundance of special status species including those identified in Table 10.4.12.1-1 of the Draft Solar PEIS, as well as those identified in Table 10.4.12.1-1 of this Final Solar PEIS. Disturbance of occupied habitats for these species shall be avoided or minimized to the extent practicable. If avoiding or minimizing impacts on occupied habitats is not possible, translocation of individuals from areas of direct effects or compensatory mitigation of direct effects on occupied habitats may be used to reduce impacts. A comprehensive mitigation strategy for special status species that uses one or more of these options to offset the impacts of projects shall be developed in coordination with the appropriate federal and state agencies.

- Avoidance or minimization of disturbance to wetland and riparian habitats within the SEZ shall be employed to reduce impacts on halfmoon milkvetch (*Astragalus allochrous* var. *playanus)*, least moonwort (*Botrychium simplex*), Rocky Mountain blazing-star (*Liatris ligulistylis*), Rio Grande chub (*Gila pandora*), Rio Grande sucker (*Catostomus plebius*), milk snake (*Lampropeltis triangulum*), bald eagle (*Haliaeetus leucocephalus*), Barrow's goldeneye (*Bucephala islandica*), ferruginous hawk (*Buteo regalis*), and southwestern willow flycatcher (*Empidonax traillii extimus*).

- Avoiding or limiting groundwater withdrawals for solar energy development on the SEZ shall be employed to reduce impacts on groundwater-dependent special status species, including those species that may occur in riparian or aquatic habitats supported by groundwater. These species include the southwestern willow flycatcher and the western yellow-billed cuckoo.

- Consultations with the USFWS and CDOW shall be conducted to address the potential for impacts on the Mexican spotted owl and southwestern willow flycatcher, which are species listed under the ESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.

- Coordination with the USFWS and CDOW should be conducted to address the potential for impacts on the Gunnison's prairie dog (*Cynomys gunnisoni*)

and northern leopard frog (*Rana pipiens*)—species that are either candidates or under review for listing under the ESA. Coordination would identify an appropriate survey protocol, avoidance measures, and, potentially, translocation or compensatory mitigation.

If the programmatic design features are implemented, it is anticipated that the majority of impacts on the special status species from habitat disturbance and groundwater use would be reduced.

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

10.4.13 Air Quality and Climate

10.4.13.1 Affected Environment

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

10.4.13.1.1 Existing Air Emissions

The Draft Solar PEIS presented Conejos County emissions data for 2002. More recent data for 2008 (CDPHE 2011) were reviewed. The two emissions inventories are from different sources and assumptions. All emissions in the 2008 data were lower than those in the 2002 data; all criteria air pollutants were much lower, but VOCs were about half of those in the 2002 data. These changes would not affect modeled air quality impacts presented in this update.

10.4.13.1.2 Air Quality

The calendar quarterly average NAAQS of 1.5 $\mu g/m^3$ for lead (Pb) presented in Table 10.4.13.1-2 of the Draft Solar PEIS has been replaced by the rolling 3-month standard (0.15 $\mu g/m^3$). The federal 24-hour and annual SO_2, 1-hour O_3, and annual PM_{10} standards have been revoked as well (EPA 2011). All Colorado SAAQS, except the 3-hour SO_2 standard of 700 $\mu g/m^3$, have been revoked since the Draft Solar PEIS. These changes will not affect the modeled air quality impacts presented in this update.

The size of the proposed Los Mogotes East SEZ was reduced by about 55%, from 5,918 acres (23.9 km^2) to 2,650 acres (10.7 km^2) by removing the western half of the originally proposed SEZ. Based on this reduction, the distances from the proposed SEZ to the Great Sand

Dunes WA and Wheeler Peak WA in New Mexico did not change, and the distances to Weminuche WA and La Garita WA increased by about 1 mi (1.6 km).

10.4.13.2 Impacts

10.4.13.2.1 Construction

Methods and Assumptions

Except for the area disturbed at any one time during construction, the methods and modeling assumptions have not changed from those presented in the Draft Solar PEIS. Based on the reduction in the area of the proposed Los Mogotes East SEZ, air quality for this Final Solar PEIS was remodeled by assuming that 2,120 acres (8.6 km^2), 80% of the updated developable area, would be disturbed at any one time. The Draft Solar PEIS assumed disturbance of an area of 3,000 acres (12.1 km^2).

Results

Since the annual PM_{10} standard has been rescinded, the discussion of annual PM_{10} impacts in the Draft Solar PEIS is no longer applicable, and Table 10.4.13.2-1 has been updated for this Final Solar PEIS. The concentration values in the table are based on updated air quality modeling reflecting the updated boundaries of the proposed SEZ.

With the reduced area of the proposed SEZ, the concentrations predicted for this Final Solar PEIS are less than those predicted in the Draft Solar PEIS, but the conclusions presented in the Draft Solar PEIS remain valid.[1] Predicted 24-hour PM_{10} and 24-hour $PM_{2.5}$ concentration levels could exceed NAAQS levels used for comparison at the SEZ boundaries and in the immediately surrounding area during the construction phase of a solar development. These high particulate levels would be limited to the immediate area surrounding the SEZ boundaries and would decrease quickly with distance. Predicted total concentrations for annual $PM_{2.5}$ would be below the standard level used for comparison.

The updated analysis conducted for this Final Solar PEIS predicted lower concentrations at all modeled locations than those in the Draft Solar PEIS. For 24-hr PM_{10}, the concentration at

[1] At this programmatic level, detailed information on construction activities, such as facility size, type of solar technology, heavy equipment fleet, activity level, work schedule, and so on, is not known; thus air quality modeling cannot be conducted. It has been assumed that 80% of the developable area of 2,650 acres (10.7 km^2) would be disturbed continuously; thus the modeling results and discussion here should be interpreted in that context. During the site-specific project phase, more detailed information would be available and more realistic air quality modeling analysis could be conducted. It is likely that impacts on ambient air quality predicted for specific projects would be much lower than those in this Final Solar PEIS.

TABLE 10.4.13.2-1 Maximum Air Quality Impacts from Emissions Associated with Construction Activities for the Proposed Los Mogotes East SEZ as Revised

Pollutant[a]	Averaging Time	Rank[b]	Concentration (μg/m^3)				Percentage of NAAQS	
			Maximum Increment[b]	Background	Total	NAAQS	Increment	Total
PM_{10}	24 hours	H6H	374	27	401	150	249	267
$PM_{2.5}$	24 hours	H8H	26.0	16	42.0	35	74	120
	Annual	–[c]	6.3	4	10.3	15	42	68

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

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

[c] A dash indicates not applicable.

Source: Chick (2009) for background concentration data.

the nearest residence about 0.4 mi (0.6 km) east of the SEZ changed from above to below the standard level used for comparison. The updated concentration at the second nearest residence about 0.6 mi (1.0 km) north of the SEZ was above the standard level used for comparison. However, construction activities are not subject to the PSD program; the comparison is made as an indicator of possible dust levels at the residence during the limited construction period and as a screen to gage the size of the potential impact. Therefore, it is anticipated that the potential impacts of construction activities on ambient air quality would be moderate and temporary.

Other locations modeled include the communities of Antonito, Conejos, Romeo, La Jara, Manassa, Estrella, Sanford, and San Antonio. At these communities, the conclusions of the Draft Solar PEIS that total predicted concentrations would be below the standard level used for comparison remain valid.

With the reduced area of the proposed SEZ, updated 24-hour and annual PM_{10} concentration increments the nearest Class I area, Great Sand Dunes WA, would be lower than those in the Draft Solar PEIS, about 6.9 and 0.14 μg/m^3, or 87% and 4%, respectively, of the allowable PSD increment levels for Class I areas. The conclusion in the Draft Solar PEIS that 24-hr PM_{10} PSD Class I increments could be exceeded in the Great Sand Dunes WA is updated for this Final Solar PEIS to conclude that all Class I PSD increments for PM_{10} would be met at the nearest Class I area. The conclusion of the Draft Solar PEIS that concentration increments at the other three Class I areas (La Garita WA and Weminuche WA in Colorado, and Wheeler Peak

WA in New Mexico) would be much lower than those at the Great Sand Dunes WA and thus would not be exceeded remains valid.

With the reduced size of the Los Mogotes East SEZ, emissions from construction equipment and vehicles would be less than those discussed in the Draft Solar PEIS. Any potential impacts on AQRVs at nearby federal Class I areas would be less. The conclusions in the Draft Solar PEIS remain valid. Emissions from construction-related equipment and vehicles are temporary in nature and could cause some unavoidable but short-term impacts.

10.4.13.2.2 Operations

The reduction in the size of the proposed Los Mogotes East SEZ by about 55% from 5,918 acres (23.9 km^2) to 2,650 acres (10.7 km^2) reduces the generating capacity and annual power generation and thus reduces the potentially avoided emissions presented in the Draft Solar PEIS. Total revised power generation capacity ranging from 236 to 424 MW is estimated for the Los Mogotes East SEZ for various solar technologies. As explained in the Draft Solar PEIS, the estimated amount of emissions avoided for the solar technologies evaluated depends only on the megawatts of conventional fossil fuel–generated power avoided. Updated estimates for emissions potentially avoided by a solar facility can be obtained from the table in the Draft Solar PEIS by reducing the tabulated estimates by about 55%, as shown in the revised Table 10.4.13.2-2. For example, for the technologies estimated to require 9 acres/MW (power tower, dish engine, and PV), up to 629 tons per year (= 44.78% × [the low-end value of 1,405 tons per year tabulated in the Draft Solar PEIS]) of NO_X could be avoided by full solar development of the proposed Los Mogotes East SEZ as revised for this Final Solar PEIS. Although the total emissions avoided by full solar development of the proposed SEZ are considerably reduced from those presented in the Draft Solar PEIS, the conclusions of the Draft remain valid. Solar facilities built in the Los Mogotes East SEZ could avoid relatively more fossil fuel emissions than those built in other states that rely less on fossil fuel–generated power.

10.4.13.2.3 Decommissioning and Reclamation

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

10.4.13.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

TABLE 10.4.13.2-2 Annual Emissions from Combustion-Related Power Generation Avoided by Full Solar Development of the Proposed Los Mogotes East SEZ as Revised

Area Size (acres)[a]	Capacity (MW)[b]	Power Generation (GWh/yr)[c]	Emissions Avoided (tons/yr; 10^3 tons/yr for CO_2)[d]			
			SO_2	NO_x	Hg	CO_2
2,650	236–424	413–743	546–982	629–1,133	0.004–0.006	408–734
Percentage of total emissions from electric power systems in the state of Colorado[e]			0.87–1.6%	0.87–1.6%	0.87–1.6%	0.87–1.6%
Percentage of total emissions from all source categories in the state of Colorado[f]			0.46–0.83%	0.15–0.28%	–[g]	0.39–0.71%
Percentage of total emissions from electric power systems in the six-state study area[e]			0.22–0.39%	0.17–0.31%	0.12–0.22%	0.16–0.28%
Percentage of total emissions from all source categories in the six-state study area[f]			0.12–0.21%	0.02–0.04%	–	0.05–0.09%

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

[b] It is assumed that the SEZ would eventually have development on 80% of the lands and that a range of 5 acres (0.020 km^2) per MW (for parabolic trough technology) to 9 acres (0.036 km^2) per MW (power tower, dish engine, and photovoltaic technologies) would be required.

[c] Assumed a capacity factor of 20%.

[d] Composite combustion-related emission factors for SO_2, NO_X, Hg, and CO_2 of 2.64, 3.05,1.71×10^{-5}, and 1,976 lb/MWh, respectively, were used for the state of Colorado.

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

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

[g] A dash indicates not estimated.

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

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

10.4.14 Visual Resources

10.4.14.1 Affected Environment

The proposed Los Mogotes East SEZ, as revised, extends approximately 5.0 mi (8.0 km) north to south and 1.0 mi (1.6 km) east to west. The SEZ has been revised to eliminate 3,268 acres (13.2 km^2), primarily within the western half of the SEZ. The proposed Los Mogotes East SEZ now occupies an area of 2,650 acres (10.7 km^2). Because of the reduction in the size of the SEZ, the total acreage of the lands visible within the 25-mi (40-km) viewshed of the SEZ has decreased.

An updated visual resources inventory (VRI) map for the SEZ and surrounding lands is shown in Figure 10.4.14.1-1; it provides information from the BLM's September 2010 VRI, which was finalized in October 2011 (BLM 2011a). As shown, the VRI value for the SEZ still is VRI Class III, indicating moderate relative visual values.

Lands in the La Jara Field Office within the 25-mi (40-km), 650-ft (198-m) viewshed of the revised SEZ include 42,978 acres (173.9 km^2) of VRI Class II areas; 50,825 acres (205.7 km^2) of VRI Class III areas; and 23,210 acres (93.9 km^2) of VRI Class IV areas.

10.4.14.2 Impacts

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

The reduction in size of the SEZ eliminated approximately 55% of the original SEZ. The resulting visual contrast reduction for any given point within view of the SEZ would vary greatly depending on the viewpoint's distance and direction from the SEZ. Contrast reduction generally would be greatest for viewpoints closest to the portions of the SEZ that were eliminated, especially for those that had wide-angle views of these areas. In general, contrast reductions also would be larger for elevated viewpoints relative to non-elevated viewpoints, because the reduction in area of the solar facilities would be more apparent when looking down at the SEZ than when looking across it.

10.4.14.2.1 Impacts on the Proposed Los Mogotes East SEZ

Although the reduction in the size of the SEZ would reduce visual contrasts associated with solar development, solar development within the SEZ still would involve major modification of the existing character of the landscape and would likely dominate the views from most locations within the SEZ. Additional impacts would occur as a result of the construction, operation, and decommissioning of related facilities, such as access roads and electric

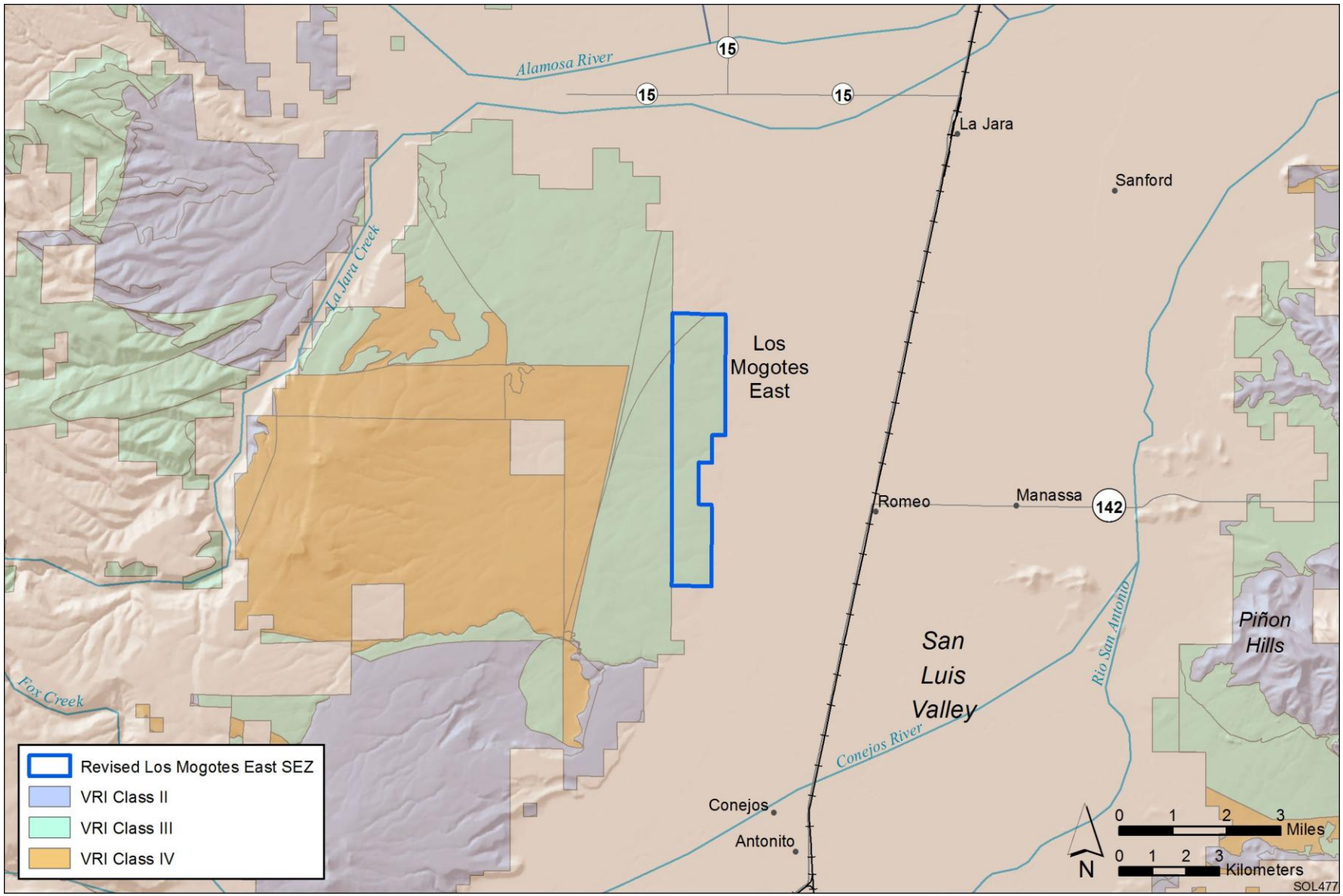

FIGURE 10.4.14.1-1 Visual Resource Inventory Values for the Proposed Los Mogotes East SEZ as Revised

transmission lines. In general, strong visual contrasts from solar development still would be expected to be observed from viewing locations within the SEZ.

10.4.14.2.2 Impacts on Lands Surrounding the Proposed Los Mogotes East SEZ

For the Draft Solar PEIS, preliminary viewshed analyses were conducted to identify which lands surrounding the proposed SEZ could have views of solar facilities in at least some portion of the SEZ (see Appendixes M and N of the Draft Solar PEIS for important information on assumptions and limitations of the methods used). Four viewshed analyses were conducted, assuming four different heights representative of project elements associated with potential solar energy technologies: PV and parabolic trough arrays, 24.6 ft (7.5 m); solar dishes and power blocks for CSP technologies, 38 ft (11.6 m); transmission towers and short solar power towers, 150 ft (45.7 m); and tall solar power towers, 650 ft (198.1 m).

These same viewsheds were recalculated in order to account for the boundary changes described in the Supplement to the Draft Solar PEIS. Figure 10.4.14.2-1 shows the combined results of the viewshed analyses for all four solar technologies. The colored portions indicate areas with clear lines of sight to one or more areas within the SEZ and from which solar facilities within these areas of the SEZ would be expected to be visible, assuming the absence of screening vegetation or structures and adequate lighting and other atmospheric conditions. The light brown areas are locations from which PV and parabolic trough arrays located in the SEZ could be visible. Solar dishes and power blocks for CSP technologies would be visible from the areas shaded light brown and the additional areas shaded light purple. Transmission towers and short solar power towers would be visible from the areas shaded light brown, light purple, and the additional areas shaded dark purple. Power tower facilities located in the SEZ could be visible from areas shaded light brown, light purple, dark purple, and at least the upper portions of power tower receivers could be visible from the additional areas shaded medium brown.

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

Figure 10.4.14.2-2 shows the results of a GIS analysis that overlays selected federal-, state-, and BLM-designated sensitive visual resource areas onto the combined tall solar power tower (650 ft [198.1 m]) and PV and parabolic trough array (24.6 ft [7.5 m]) viewsheds, in order to illustrate which of these sensitive visual resource areas could have views of solar facilities within the SEZ and therefore potentially would be subject to visual impacts from those facilities. Distance zones that correspond with BLM's VRM system-specified foreground-middleground distance (5 mi [8 km]), background distance (15 mi [24 km]), and a 25-mi (40-km) distance zone are shown as well, in order to indicate the effect of distance from the SEZ on impact levels, which are highly dependent on distance. A similar analysis was conducted for the Draft Solar PEIS.

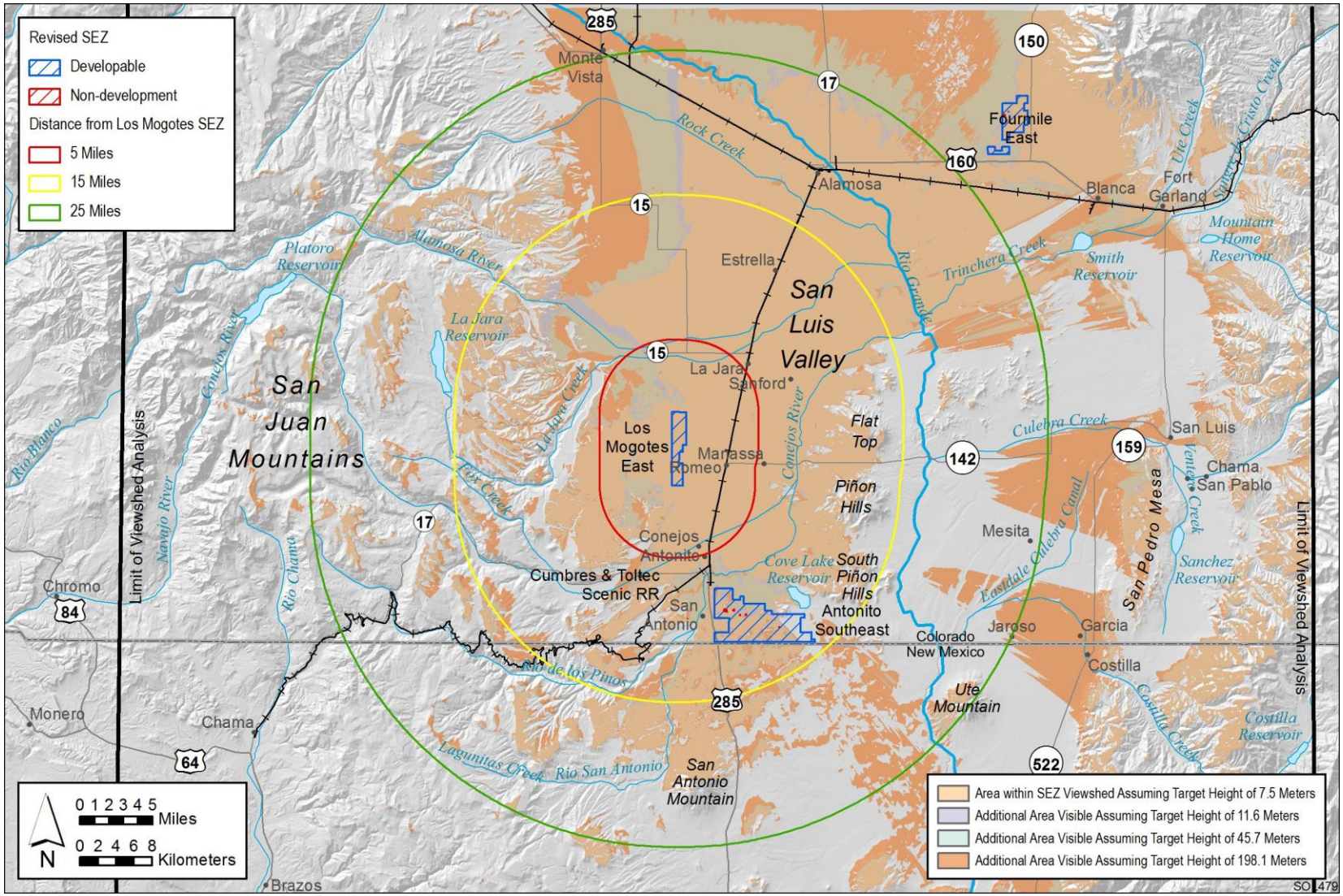

FIGURE 10.4.14.2-1 Viewshed Analyses for the Proposed Los Mogotes East SEZ as Revised and Surrounding Lands, Assuming Viewshed Heights of 24.6 ft (7.5 m), 38 ft (11.6 m), 150 ft (45.7 m), and 650 ft (198.1 m) (shaded areas indicate lands from which solar development and/or associated structures within the SEZ could be visible)

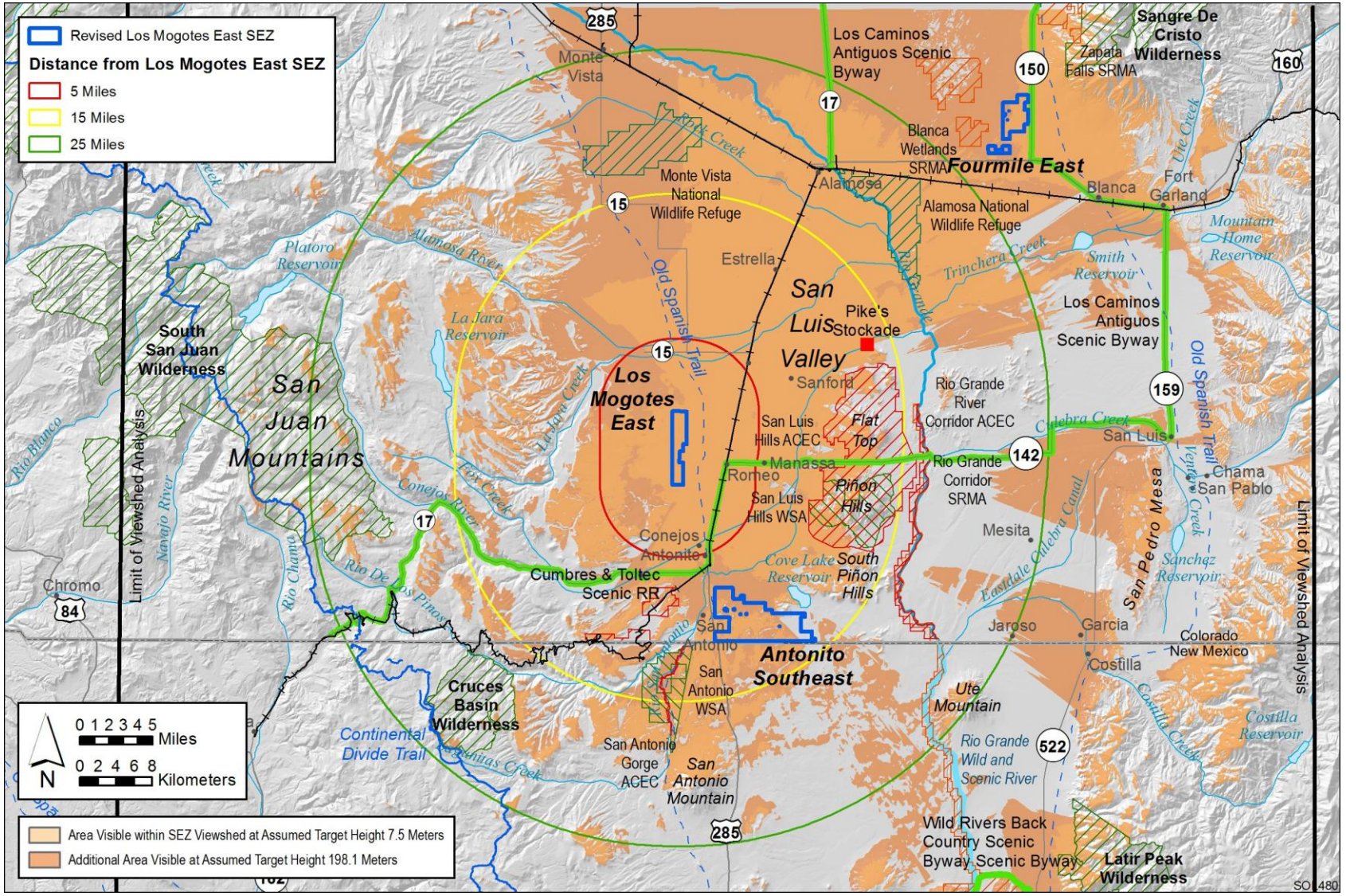

FIGURE 10.4.14.2-2 Overlay of Selected Sensitive Visual Resource Areas onto Combined 650-ft (198.1-m) and 24.6-ft (7.5-m) Viewsheds for the Proposed Los Mogotes East SEZ as Revised

The scenic resources included in the viewshed analyses were as follows:

- National Parks, National Monuments, National Recreation Areas, National Preserves, National Wildlife Refuges, National Reserves, National Conservation Areas, National Historic Sites;
- Congressionally authorized Wilderness Areas;
- Wilderness Study Areas;
- National Wild and Scenic Rivers;
- Congressionally authorized Wild and Scenic Study Rivers;
- National Scenic Trails and National Historic Trails;
- National Historic Landmarks and National Natural Landmarks;
- All-American Roads, National Scenic Byways, State Scenic Highways, and BLM- and USFS-designated scenic highways/byways;
- BLM-designated Special Recreation Management Areas; and
- ACECs designated because of outstanding scenic qualities.

The results of the GIS analyses are summarized in Table 10.4.14.2-1. The change in size of the SEZ alters the viewshed, such that the visibility of the SEZ and solar facilities within the SEZ from the surrounding lands would be reduced. With the reduction in size of the SEZ, solar energy development within the SEZ would be expected to create minimal or weak visual contrasts for viewers within most of the surrounding scenic resource areas and other resources listed in Table 10.4.14.2-1. Exceptions include the San Luis Hills WSA and ACEC and the Los Antiguos Caminos Scenic Byway. In these three areas, moderate or strong visual contrasts still could occur.

In addition to these areas, impacts on other lands and resource areas also were evaluated. These areas include the surrounding communities of Antonito, Conejos, La Jara, Manassa, Romeo, and Sanford; the CTSR; and the West Fork of the North Branch of the Old Spanish Trail.

10.4.14.2.4 Summary of Visual Resource Impacts for the Proposed Los Mogotes East SEZ

The visual contrast analysis in the Draft Solar PEIS determined that because there could be multiple solar facilities within the Los Mogotes East SEZ, a variety of technologies employed, and a range of supporting facilities required, solar development within the SEZ would make it

TABLE 10.4.14.2-1 Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Proposed Los Mogotes East SEZ as Revised, Assuming a Target Height of 650 ft (198.1 m)

Feature Type	Feature Name (Total Acreage/ Linear Distance)[a,b]	Feature Area or Linear Distance[c]		
			Visible Between	
		Visible within 5 mi	0 and 15 mi	0 and 25 mi
WAs	Cruces Basin (18,876 acres)	0 acres	0 acres	1,052 acres (6%)
	South San Juan (160,832 acres)	0 acres	0 acres	2,997 acres (2%)
WSAs	San Antonio (7,321 acres)	0 acres	3,890 acres (53%)	2,158 acres (29%)
	San Luis Hills (10,896 acres)	0 acres	3,245 acres (30%)	0 acres
National Scenic Trail	Continental Divide (591 mi)[d]	0 mi	0 mi	5.9 mi (1%)
National Historic Landmark	Pike's Stockade (4 acres)	0 acres	4 acres (100%)	0 acres
NWRs	Alamosa (12,098 acres)	0 acres	0 acres	12,062 acres (100%)
	Monte Vista (14,761 acres)	0 acres	0 acres	14,713 acres (100%)
ACECs designated for outstanding scenic values	San Luis Hills (39,421 acres)	0 acres	15,475 acres (39%)	0 acres (0%)
	CTSR Corridor (3,868 acres)	0 acres	1,577 acres (41%)	0 acres
	San Antonio Gorge (377 acres)	0 acres	131 acres (35%)	30 acres (8%)
Scenic Highway/ Byway	Los Caminos Antiguos (129 mi)[e]	8.3 mi (6%)	15.0 mi (11%)	8.2 mi (6%)

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

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

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

[d] Mileage of Colorado portion of the Trail built as of 2009. Source: Continental Divide Trail Association (2012).

[e] Source: America's Byways (2011).

essentially industrial in appearance and would contrast strongly with the surrounding mostly natural-appearing landscape.

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

- Within the Los Mogotes East SEZ: Contrasts experienced by viewers within the western portion of the SEZ would be reduced because of the elimination of more than half the total area of the SEZ, as it was originally proposed in the Draft Solar PEIS. However, strong contrasts still could be observed in the remaining developable area.

- Cruces Basin WA: A slight reduction in contrasts would be anticipated because of the elimination of acreage in the western half of the SEZ; solar development within the SEZ still would cause minimal to weak contrasts.

- South San Juan WA: A slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal to weak contrasts.

- San Antonio WSA: A slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal to weak contrasts, depending on viewer location in the WSA.

- San Luis Hills WSA: A reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak to moderate contrasts, depending on viewer location in the WSA.

- Continental Divide National Scenic Trail: A slight reduction in contrasts would be anticipated due to the elimination of acreage in the western half of the SEZ; solar development within the SEZ still would cause minimal to weak contrasts, depending on viewer location on the trail.

- Pike's Stockade National Historic Landmark: A slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal to weak contrasts.

- Alamosa NWR: A very slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal contrasts.

- Monte Vista NWR: A very slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause minimal contrasts.

- San Luis Hills ACEC: A reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak to moderate contrasts.

- CTSR Corridor ACEC: A reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak contrasts.

- San Antonio Gorge ACEC: No impacts are anticipated since the creek and ACEC are within a canyon.

- Los Caminos Antiguos Scenic Byway: A very slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause weak to strong contrasts, depending on viewer location on the byway.

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

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

- La Jara: A slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause moderate contrasts.

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

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

- Sanford: A slight reduction in contrasts would be anticipated; solar development within the SEZ still would cause moderate to strong contrasts.

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

- West Fork of the North Branch of the Old Spanish Trail: A reduction in contrasts would be anticipated because of the elimination of acreage in the western half of the SEZ; however, solar development within the SEZ still would cause minimal to strong contrasts depending on observer location on the Trail.

In addition, the proposed Antonito Southeast SEZ is relatively close to the proposed Los Mogotes East SEZ (approximately 7 mi [11.3 km]). A majority of the Antonito Southeast SEZ is located within the 25-mi (40-km) viewshed of the Los Mogotes East SEZ, and some of the sensitive visual resource areas discussed above may be subject to impacts associated with both SEZs.

10.4.14.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on visual resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. While application of the programmatic design features would reduce potential visual impacts somewhat, the degree of effectiveness of these design features could be assessed only at the site- and project-specific level. With 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. Utility-scale solar energy development using any of the solar technologies analyzed in the PEIS and at the scale analyzed would be expected to result in large adverse visual impacts that could not be mitigated.

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 proposed SEZ-specific design feature for the SEZ has been identified:

- The development of power tower facilities should be prohibited within the SEZ. The San Luis Valley is a regionally important tourist destination and is an area with many small communities and numerous important historic, cultural, and recreational resources. The valley contains numerous historic sites, two scenic railways, two scenic highways, several wildlife refuges, Great Sand Dunes NP and Preserve, the Rio Grande WSR, congressionally designated WAs, the Sangre de Cristo NHA, and various other attractions that draw tourists to the region. A number of these areas overlook the San Luis Valley from the surrounding mountains and include elevated viewpoints that would have clear views of power tower facilities in the Valley. The height of solar power tower receiver structures, combined with the intense light generated by the receivers atop the towers, would be expected to create strong visual contrasts that could not be effectively screened from view for most areas surrounding the SEZ. The effective area of impact from power tower structures is much larger than that for comparably rated lower height facilities, which makes it more likely that they would conflict with the growing tourism focus of the Valley. In addition, for power towers exceeding 200 ft (61 m) in height, hazard navigation lighting that could be visible for very long distances would likely be required. Prohibiting the development of power tower facilities would remove this source of impacts, thus substantially reducing potential visual impacts on the West Fork of the North Branch of the Old Spanish Trail; the Los Caminos Antiguos Scenic Byway; the other sensitive visual resource areas identified above; and the communities of Antonito, Conejos, La Jara, Manassa, Romeo, and Sanford.

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.

10.4.15 Acoustic Environment

10.4.15.1 Affected Environment

The size of the proposed Los Mogotes East SEZ was reduced by about 55%, from 5,918 acres (23.9 km^2) to 2,650 acres (10.7 km^2) by removing the western half of the originally proposed SEZ. Distances to the nearest residences and towns, which are all located north, east, or south of the SEZ, remain the same as in the Draft Solar PEIS. The updated distance to the Los Mogotes ACEC, located to the west, is about 2 mi (3.2 km), greater than the distance of about 1 mi (1.6 km) in the Draft Solar PEIS.

10.4.15.2 Impacts

Based on the boundary changes and reduced size of the proposed Los Mogotes East SEZ, noise impacts from construction and operations were remodeled for this Final Solar PEIS. Distances from the SEZ to the nearest residences and towns have not changed, and except as noted below for impacts on specially designated areas and impacts from operating dish engine facilities, the conclusions of the Draft Solar PEIS remain valid.

10.4.15.2.1 Construction

Except as noted below for impacts in specially designated areas, the conclusions in the Draft Solar PEIS remain valid.

On the basis of comments received and recent references as applicable, this Final Solar PEIS used an updated approximate significance threshold of 55 dBA corresponding to the onset of adverse physiological impacts (Barber et al. 2010) to update the analysis of potential noise impacts on terrestrial wildlife in areas of special concern. As a result of this updated analysis, the conclusion in the Draft Solar PEIS that wildlife would not be adversely affected has been updated for this Final Solar PEIS as follows. With construction activities occurring near the southwestern SEZ boundary, the estimated noise level at the boundary of the Los Mogotes ACEC (about 2 mi [3 km] to the west) is about 34 dBA. This estimated level is below the updated significance threshold, and thus noise from construction in the proposed Los Mogotes East SEZ is not anticipated to adversely affect wildlife in the nearby specially designated areas. However, as discussed in Section 5.10.2 of this Final Solar PEIS, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). With these impacts and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. However, even considering potential impacts at these lower noise levels, construction noise at the SEZ would not be anticipated to affect wildlife there.

For construction activities occurring near the eastern SEZ boundary, the estimated noise level at the West Fork of the North Branch of the Old Spanish Trail (about 1.0 mi [1.6 km] to the east) would be about 42 dBA, which is just above the typical daytime mean rural background level of 40 dBA but less than a just noticeable difference of 3 dBA. The conclusion in the Draft Solar PEIS that construction occurring near the eastern SEZ boundary would result in minor noise impacts on the West Fork of the North Branch of the Old Spanish Trail is updated for this Final Solar PEIS to conclude that the noise impacts would be negligible and temporary.

Overall, construction would cause some unavoidable but localized short-term impacts on neighboring communities, particularly for activities occurring near the eastern proposed SEZ boundary, close to the nearby residences. No adverse vibration impacts are anticipated from construction activities, including pile driving for dish engines.

10.4.15.2.2 Operations

The conclusions presented in the Draft Solar PEIS remain valid, except as noted below for impacts from TES and dish engine facilities near residences or in specially designated areas.

Parabolic Trough and Power Tower

If TES were not used for parabolic trough and power tower technologies (12 hours of daytime operations only), estimated noise levels at the nearest residence about 0.4 mi (0.6 km) from the SEZ boundary would be about 45 dBA, which exceeds the typical daytime mean rural background of 40 dBA. The day-night average noise level of 44 dBA L_{dn} would be well below the EPA guideline of 55 dBA L_{dn} for residential areas. If TES were used, the estimated nighttime noise level at the nearest residence would be about 55 dBA, which is significantly higher than the typical nighttime mean rural background level of 30 dBA. The day-night average noise level is estimated to be about 57 dBA L_{dn}, which is a little higher than the EPA guideline of 55 dBA L_{dn} for residential areas. The assumptions are conservative in terms of operating hours, and no credit was given to other attenuation mechanisms. Thus, it is likely that noise levels would be lower than 53 dBA L_{dn} at the nearest residence, even if TES were used at a solar facility. Nonetheless, operating parabolic trough or power tower facilities with TES located near the southeastern SEZ boundary could result in noise impacts on the nearest residence, depending on background noise levels and meteorological conditions.

As stated above under construction impacts, for this Final Solar PEIS an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. With TES operating near the western SEZ boundary, estimated daytime and nighttime noise levels at the boundary of the Los Mogotes ACEC (about 2 mi [3 km] to the west) would be about 36 and 46 dBA, respectively. These estimated levels are below the significance threshold; thus, noise from operations in the proposed Los Mogotes East SEZ is not anticipated to adversely affect wildlife in the nearby specially designated area. However, as discussed in Section 5.10.2, there is the potential for other effects (e.g., startle) to occur at lower noise levels (Barber et al. 2011). With these impacts and the

potential for impacts at lower noise levels, noise 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.

Associated with operation of a parabolic trough or power tower facility equipped with TES occurring at the eastern boundary of the SEZ, the estimated daytime and nighttime noise levels at the West Fork of the North Branch of the Old Spanish Trail (about 1.0 mi [1.6 km] to the east) would be about 41 and 51 dBA, respectively, which are comparable to and far above the typical daytime and nighttime mean rural background levels of 40 and 30 dBA. Accordingly, operation of a solar facility with TES located near the eastern SEZ boundary could result in noise impacts on the West Fork of the North Branch of the Old Spanish Trail during nighttime hours.

Dish Engines

The reduced size of the proposed Los Mogotes East SEZ would reduce the maximum potential number of 25-kW dish engines to 9,420 covering 2,120 acres (8.6 km^2); the Draft Solar PEIS modeled 21,040 dish engines covering 4,734 acres (19.2 km^2). The estimated noise level at the nearest residence about 0.4 mi (0.6 km) from the SEZ boundary would be about 47 dBA, which is higher than the typical daytime mean rural background level of 40 dBA. The estimated day-night average noise level of 46 dBA L_{dn} at these residences is below the EPA guideline of 55 dBA L_{dn} for residential areas. The conclusion of the Draft Solar PEIS that noise from dish engines could cause adverse impacts on the nearest residence, depending on background noise levels and meteorological conditions, remains valid.

As stated above under construction impacts, for this Final Solar PEIS an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. The estimated noise level from operation of a dish engine solar facility at the boundary of the Los Mogotes ACEC (about 2 mi [3 km] to the west) is about 41 dBA. This estimated level is below the significance threshold; thus, noise from operations in the proposed Los Mogotes East SEZ is not anticipated to adversely affect wildlife in the nearby specially designated area. However, as discussed in Section 5.10.2, there is the potential for other effects to occur at lower noise levels (Barber et al. 2011). With these impacts and the potential for impacts at lower noise levels, noise impacts on terrestrial wildlife from a dish engine facility would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern.

Assuming full build-out of the SEZ with dish engine facilities, the estimated noise level at the West Fork of the North Branch of the Old Spanish Trail (about 1.0 mi [1.6 km] to the east of the SEZ) would be about 46 dBA, which is above the typical daytime mean rural background level of 40 dBA. Dish engine noise from the SEZ could result in minor noise impacts on the West Fork of the North Branch of the Old Spanish Trail.

Changes in the proposed Los Mogotes East SEZ boundaries would not alter the discussions of vibration, transformer and switchyard noise, and transmission line corona

discharge presented in the Draft Solar PEIS. Noise impacts from vibration and transformer and switchyard noise would be minimal. Noise impacts from transmission line corona discharge would be negligible.

10.4.15.2.3 Decommissioning and Reclamation

The conclusions on decommissioning and reclamation in the proposed Los Mogotes East SEZ as presented in the Draft Solar PEIS remain valid. Decommissioning and reclamation activities would be of short duration, and their potential noise impacts would be minor and temporary. Potential noise and vibration impacts on surrounding communities would be minimal.

10.4.15.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

10.4.16 Paleontological Resources

10.4.16.1 Affected Environment

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

- The ratio of the PFYC in the SEZ has changed with the new footprint; the Class 1 areas of low potential have been reduced from 88% to 73% of the SEZ, and the Class 4/5 areas of higher paleontological potential have been increased from 12% to 27% of the SEZ. In the Class 4/5 areas, the depth of the Alamosa Formation would need to be determined.

- The BLM Regional Paleontologist may have additional information regarding the paleontological potential of the SEZ and be able to verify the PFYCs of the SEZ as Class 1 and Class 4/5 as used in the Draft Solar PEIS.

10.4.16.2 Impacts

The assessment provided in the Draft Solar PEIS remains valid. Impacts on significant paleontological resources in the PFYC Class 1 areas are unlikely. In the PFYC Class 4/5 areas, impacts on significant paleontological resources have a greater potential to occur. However, a more detailed look at the geological deposits is needed to determine whether a paleontological survey is warranted.

10.4.16.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

- Avoidance of PFYC Class 4/5 areas is recommended for development within the proposed Los Mogotes East SEZ and for access road placement. Where avoidance of Class 4/5 deposits is not possible, a paleontological survey would be required.

Additional SEZ-specific design features would depend on the results of future paleontological investigations. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

As additional information on paleontological resources (e.g., from regional paleontologists or from new surveys) becomes available, the BLM will post the data to a public Web site for use by applicants, the BLM, and other stakeholders.

10.4.17 Cultural Resources

10.4.17.1 Affected Environment

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

- The new footprint of the SEZ does not include the areas that had been previously surveyed for cultural resources, bringing the percentage of area surveyed down from 0.02% to 0.0%.

- Additional information may be available to characterize the SEZ and its surrounding area in the future (after this Final Solar PEIS is completed), as follows:
  - Results of an ethnographic study currently being conducted by TRC Solutions, which focuses on Native American use of lands being analyzed for solar development within the San Luis Valley. The study will discuss sensitive and traditional use areas. Interviews with tribal members and field visits will facilitate the identification of resources and sites of traditional and religious importance to tribes.
  - Results of a Class II sample survey of the SEZ designed to obtain a statistically valid sample of archeological properties and their distribution within the SEZ. Results from the ethnographic study and the sample inventory can be combined to project cultural sensitivity zones as an aid in planning future solar developments.
  - Identification of the integrity and historical significance of the portion of the West Fork of the North Branch of the Old Spanish National Historic Trail in the vicinity of the SEZ and viewshed analyses from key observation points along the Trail. If this portion of the Trail is determined significant, a mitigation strategy would need to be developed to address unavoidable impacts on the Trail.
  - Continuation of government-to-government consultation, as described in Section 2.4.3 of the Supplement to the Draft Solar PEIS and IM 2012-032 (BLM 2011b), including follow-up to recent ethnographic studies covering some SEZs in Nevada and Utah with tribes not included in the original studies to determine whether those tribes have similar concerns.

10.4.17.2 Impacts

The assessment provided in the Draft Solar PEIS remains valid. Impacts on significant cultural resources are possible in the proposed Los Mogotes East SEZ. While no sites have been identified in the SEZ, many significant archaeological sites have been located in close proximity to the SEZ. A survey of the West Fork of the North Branch of the Old Spanish Trail is needed to determine its location, integrity, and the significance of portions of the Trail from which future potential development in the SEZ could be viewed. The assessment provided in the Draft Solar PEIS remains valid with the following update:

- Impacts on significant cultural resources and cultural landscapes associated with American Latino heritage are possible throughout the San Luis Valley.

10.4.17.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on cultural resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Programmatic design features will be applied to address SEZ-specific resources and conditions, for example:

- For projects in the Los Mogotes SEZ that are located within the viewshed of the West Fork of the North Branch of the Old Spanish Trail, a National Trail inventory will be required to determine the area of possible adverse impact on resources, qualities, values, and associated settings of the Trail; to prevent substantial interference; and to determine any areas unsuitable for development. Residual impacts will be avoided, minimized, and/or mitigated to the extent practicable according to program policy standards. Programmatic design features have been included in BLM's Solar Energy Program to address impacts on National Historic Trails (see Section A.2.2.23 of Appendix A).

Programmatic design features also assume that the necessary surveys, evaluations, and consultations will occur. Ongoing consultation with the Colorado SHPO and the appropriate Native American governments would be conducted during the development of the proposed Los Mogotes East SEZ. It is likely that adverse effects on significant resources in the valley could be mitigated to some degree through such efforts, although mitigation will not eliminate the adverse effects unless significant resources are avoided entirely.

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 have been identified:

- Development of an MOA may be needed among the BLM, Colorado SHPO, and other parties, such as the ACHP, to address the adverse effects of solar energy development on historic properties. The agreement may specify avoidance, minimization, or mitigation measures. Should an MOA be developed to resolve adverse effects on the West Fork of the North Branch of the Old Spanish Trail, the Trail Administration for the Old Spanish Trail (BLM-NMSO and National Park Service [NPS] Intermountain Trails Office, Santa Fe) should be included in the development of that MOA.

- Additional coordination with the CTSR Commission is recommended to address possible mitigation measures for reducing visual impacts on the CTSR.

The need for and nature of additional SEZ-specific design features will depend on the results of future investigations. Some additional SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

10.4.18 Native American Concerns

10.4.18.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid but will be supplemented in the future by the results of the ethnographic study being completed in the San Luis Valley (see Section 10.1.17.1).

10.4.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. No direct impacts from solar energy development are likely to occur to culturally significant areas (i.e., San Luis Lakes, the Great Sand Dunes, and Blanca Peak); however, indirect visual and auditory impacts are possible. It is likely that traditional plant resources and animal habitats would be directly affected with solar energy development in the proposed Los Mogotes East SEZ.

10.4.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on Native American concerns are described in Section A.2.2 of Appendix A of this Final Solar PEIS. For example, impacts would be minimized through the implementation of required programmatic design features such as avoidance of sacred sites, water sources, and tribally important plant and animal species. Programmatic design features assume that the necessary surveys, evaluations, and consultations will occur. The tribes would be notified regarding the results of archaeological surveys, and they would be contacted immediately upon any discovery of Native American human remains and associated cultural items.

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features to address Native American concerns have been identified. The need for and nature of SEZ-specific design features would be determined during government-to-government consultation with affected tribes as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis. Potentially significant sites and landscapes the SEZ associated with Blanca Peak, Great Sand Dunes, and San Luis Lakes, as well as trail systems, mountain springs, mineral resources, burial sites, ceremonial areas, water resources, and plant and animal resources, should be considered and discussed during consultation.

10.4.19 Socioeconomics

10.4.19.1 Affected Environment

Although the boundaries of the Los Mogotes East SEZ have been reduced compared to the boundaries given in the Draft Solar PEIS, the socioeconomic ROI, the area in which site employees would live and spend their wages and salaries, and into which any in-migration would occur, includes the same counties and communities as described in the Draft Solar PEIS, meaning that no updates to the affected environment information given in the Draft Solar PEIS are required.

10.4.19.2 Impacts

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

10.4.19.2.1 Solar Trough

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) in 2021 from the use of solar trough technologies would be 2,039 jobs (Table 10.4.19.2-1). Construction activities would constitute 3.1% of total ROI employment. A solar development would also produce $108.6 million in income. Direct sales taxes would be $0.1 million; direct income taxes, $4.2 million.

With the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 1,291 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with up to 446 rental units expected to be occupied in the ROI. This occupancy rate would represent 13.8% of the vacant rental units expected to be available in the ROI.

TABLE 10.4.19.2-1 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Los Mogotes East SEZ as Revised with Trough Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	1,160	92
Total	2,039	145
Income[c]		
Total	108.6	4.6
Direct state taxes[c]		
Sales	0.1	0.1
Income	4.2	0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	2.8
In-migrants (no.)	1,291	59
Vacant housing[f] (no.)	446	37
Local community service employment		
Teachers (no.)	15	1
Physicians (no.)	2	0
Public safety (no.)	1	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 424 MW (corresponding to 2,120 acres [9 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 424 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

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

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

In addition to the potential impact on housing markets, in-migration would affect community service (education, health, and public safety) employment. An increase in such employment would be required to meet existing levels of service in the ROI. Accordingly, up to 15 new teachers, 2 physicians, and 1 public safety employee (career firefighters and uniformed police officers) would be required in the ROI. These increases would represent 1.4% of total ROI employment expected in these occupations.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using solar trough technologies would be 145 jobs (Table 10.4.19.2-1). Such a solar development would also produce $4.6 million in income. Direct sales taxes would be $0.1 million; direct income taxes, $0.1 million. Based on fees established by the BLM (BLM 2010), acreage rental payments would be $0.2 million, and solar generating capacity payments at least $2.8 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 59 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with up to 37 owner-occupied units expected to be occupied in the ROI.

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

10.4.19.2.2 Power Tower

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) in 2021 from the use of power tower technologies would be 812 jobs (Table 10.4.19.2-2). Construction activities would constitute 1.2% of total ROI employment. Such a solar development would also produce $43.3 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, $1.7 million.

With the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families

TABLE 10.4.19.2-2 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Los Mogotes East SEZ as Revised with Power Tower Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	462	48
Total	812	67
Income[c]		
Total	43.3	2.1
Direct state taxes[c]		
Sales	<0.1	<0.1
Income	1.7	0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	1.5
In-migrants (no.)	514	30
Vacant housing[f] (no.)	178	19
Local community service employment		
Teachers (no.)	6	0
Physicians (no.)	1	0
Public safety (no.)	1	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 236 MW (corresponding to 2,120 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 236 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

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

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

from outside the ROI would be required, with up to 514 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with up to 178 rental units expected to be occupied in the ROI. This occupancy rate would represent 5.5% of the vacant rental units expected to be available in the ROI.

In addition to the potential impact on housing markets, in-migration would affect community service (education, health, and public safety) employment. An increase in such employment would be required to meet existing levels of service in the ROI. Accordingly, up to six new teachers, one physician, and one public safety employee (career firefighters and uniformed police officers) would be required in the ROI. These increases would represent 0.5% of total ROI employment expected in these occupations.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using power tower technologies would be 67 jobs (Table 10.4.19.2-2). Such a solar development would also produce $2.1 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, $0.1 million. Based on fees established by the BLM (BLM 2010), acreage rental payments would be $0.2 million, and solar generating capacity payments, at least $1.5 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 30 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with up to 19 owner-occupied units expected to be required in the ROI.

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

10.4.19.2.3 Dish Engine

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) in 2021 using dish engine technologies would be 330 jobs (Table 10.4.19.2-3). Construction activities would constitute 0.5% of total ROI employment. Such a solar development would also

TABLE 10.4.19.2-3 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Los Mogotes East SEZ as Revised with Dish Engine Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operations Impacts[b]
Employment (no.)		
Direct	188	46
Total	330	66
Income[c]		
Total	17.6	2.0
Direct state taxes[c]		
Sales	<0.1	<0.1
Income	0.7	0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	1.5
In-migrants (no.)	209	30
Vacant housing[f] (no.)	72	18
Local community service employment		
Teachers (no.)	2	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 236 MW (corresponding to 2,120 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 236 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

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

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

produce $17.6 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, $0.7 million.

With the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 209 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with up to 72 rental units expected to be occupied in the ROI. This occupancy rate would represent 2.2% of the vacant rental units expected to be available in the ROI.

In addition to the potential impact on housing markets, in-migration would also affect community service (education, health, and public safety) employment. An increase in such employment would be required to meet existing levels of service in the ROI. Accordingly, up to two new teachers would be required in the ROI. These increases would represent 0.2% of total ROI employment expected in these occupations.

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out of the SEZ using dish engine technologies would be 66 jobs (Table 10.4.19.2-3). Such a solar development would also produce $2.0 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, $0.1 million. Based on fees established by the BLM (BLM 2010), acreage rental payments would be $0.2 million, and solar generating capacity payments, at least $1.5 million.

As for the construction workforce, operation of a solar facility likely would require some in-migration of workers and their families from outside the ROI, with up to 30 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with up to 18 owner-occupied units expected to be required in the ROI.

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

10.4.19.2.4 Photovoltaic

Construction

Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of PV technologies would be 154 jobs (Table 10.4.19.2-4). Construction activities would constitute 0.2% of total ROI employment. Such a solar development would also produce $8.2 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, $0.3 million.

With the scale of construction activities and the low likelihood that the entire construction workforce in the required occupational categories would be available in the ROI, construction of a solar facility would mean that some in-migration of workers and their families from outside the ROI would be required, with up to 98 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with up to 34 rental units expected to be occupied in the ROI. This occupancy rate would represent 1.0% of the vacant rental units expected to be available in the ROI.

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

Operations

Total operations employment impacts in the ROI (including direct and indirect impacts) of a full build-out on the SEZ using PV technologies would be seven jobs (Table 10.4.19.2-4). Such a solar development would also produce $0.2 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes, less than $0.1 million. Based on fees established by the BLM (BLM 2010), acreage rental payments would be $0.2 million, and solar generating capacity payments at least $1.2 million.

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

TABLE 10.4.19.2-4 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Los Mogotes East SEZ as Revised with PV Facilities

Parameter	Maximum Annual Construction Impacts[a]	Annual Operation Impacts[b]
Employment (no.)		
Direct	88	5
Total	154	7
Income[c]		
Total	8.2	0.2
Direct state taxes[c]		
Sales	<0.1	<0.1
Income	0.3	<0.1
BLM payments[c]		
Rental	NA[d]	0.2
Capacity[e]	NA	1.2
In-migrants (no.)	98	3
Vacant housing[f] (no.)	34	2
Local community service employment		
Teachers (no.)	1	0
Physicians (no.)	0	0
Public safety (no.)	0	0

[a] Construction impacts were based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 236 MW (corresponding to 2,120 acres [12 km^2] of land disturbance) could be built.

[b] Operations impacts were based on full build-out of the site, producing a total output of 236 MW.

[c] Values are reported in $ million 2008.

[d] NA = not applicable.

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

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

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

10.4.19.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

10.4.20 Environmental Justice

10.4.20.1 Affected Environment

The data presented in the Draft Solar PEIS have changed due to the change in boundaries of the proposed Los Mogotes East SEZ.

The data in Table 10.4.20.1-1 show the minority and low-income composition of the total population located within a 50-mi (80-km) radius of the proposed SEZ based on 2000 Census data and CEQ guidelines (CEQ 1997). Individuals identifying themselves as Hispanic or Latino are included in the table as a separate entry. However, because Hispanics can be of any race, this number also includes individuals also identifying themselves as being part of one or more of the population groups listed in the table.

A large number of minority and low-income individuals are located in the 50-mi (80-km) area around the boundary of the SEZ. Within the 50-mi (80-km) radius in Colorado, 47.3% of the population is classified as minority, while 19.5% is classified as low-income. Although the number of minority individuals does not exceed 50% of the total population in the area, the number of minority individuals exceeds the state average by 20 percentage points or more; that is, there is a minority population in the Colorado portion of the 50-mi (80-km) area based on 2000 Census data and CEQ guidelines. The number of low-income individuals does not exceed the state average by 20 percentage points or more and does not exceed 50% of the total population in the area; that is, there are no low-income populations in the Colorado portion of the SEZ.

Within the 50-mi (80-km) radius in New Mexico, 58.0% of the population is classified as minority, while 18.4% is classified as low-income. Although the number of minority individuals does not exceed the state average by 20 percentage points or more, the minority population

TABLE 10.4.20.1-1 Minority and Low-Income Populations within the 50-mi (80-km) Radius Surrounding the Proposed Los Mogotes East SEZ as Revised

Parameter	Colorado	New Mexico
Total population	50,396	20,278
White, non-Hispanic	26,572	8,513
Hispanic or Latino	22,256	10,971
Non-Hispanic or Latino minorities	1,568	794
One race	977	489
Black or African American	163	44
American Indian or Alaskan Native	497	328
Asian	219	69
Native Hawaiian or other Pacific Islander	18	5
Some other race	80	43
Two or more races	591	305
Total minority	23,824	11,765
Low-income	9,574	3,712
Percentage minority	47.3	58.0
State percent minority	25.5	55.3
Percentage low-income	19.5	18.4
State percent low-income	9.3	18.4

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

exceeds 50% of the total population in the area, meaning that there are minority populations in the New Mexico portion of the 50-mi (80-km) area based on 2000 Census data and CEQ guidelines. The number of low-income individuals does not exceed the state average by 20 percentage points or more and does not exceed 50% of the total population in the area, meaning that there are no low-income populations in the New Mexico portion of the 50-mi (80-km) area.

In the Colorado portion of the 50-mi (80-km) radius around the SEZ, more than 50% of the population in all but one of the block groups in Conejos County is made up of minority population groups, together with all the block groups in the adjacent Costilla County. Block groups in the cities of Alamosa (Alamosa County), Monte Vista and Del Norte (both in Rio Grande County), and Center (Saguache County) are also more than 50% minority. In the New Mexico portion of the area, Rio Arriba County has three block groups in which the minority population is more than 20 percentage points higher than the state average and one block group that is more than 50% minority, while Taos County has three block groups with more than 50%

minority, and one block group where the minority population is 20 percentage points higher than the state average.

Low-income populations in the 50-mi (80-km) radius are limited to five block groups in the Colorado portion, in the cities of San Luis (Costilla County), Center (Saguache County) and Alamosa, all of which have low-income population shares that are more than 20 percentage points higher than the state average.

Figures 10.4.20.1-1 and 10.4.20.1-2 show the locations of minority and low-income population groups in the 50-mi (80-km) radius around the boundary of the SEZ.

10.4.20.2 Impacts

Environmental justice concerns common to all utility-scale solar energy projects are described in detail in Section 5.18. These impacts will be minimized through the implementation of programmatic design features described in Section A.2.2 of Appendix A, which address the underlying environmental impacts contributing to the concerns. The potentially relevant environmental impacts associated with solar development within the proposed SEZ include noise and dust during the construction of solar facilities; noise and EMF effects associated with solar project operations; the visual impacts of solar generation and auxiliary facilities, including transmission lines; access to land used for economic, cultural, or religious purposes; and effects on property values as areas of concern that might potentially affect minority and low-income populations.

Potential impacts on low-income and minority populations could be incurred as a result of the construction and operation of solar facilities involving each of the four technologies. Although impacts are likely to be small, there are minority populations defined by CEQ guidelines (see Section 10.4.20.1) within both the Colorado and New Mexico portions of the 50-mi (80-km) radius around the boundary of the SEZ; thus, any adverse impacts of solar projects would disproportionately affect minority populations. Further analysis of these impacts would be included in subsequent NEPA reviews of individual solar projects. Because there are no low-income populations within the 50-mi (80-km) radius, according to CEQ guidelines, there would not be any impacts on low-income populations.

10.4.20.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

On the basis of impact analyses conducted for the Draft Solar PEIS, updates to those analyses due to changes to the SEZ boundaries, and consideration of comments received as applicable, no SEZ-specific design features for environmental justice have been identified. Some

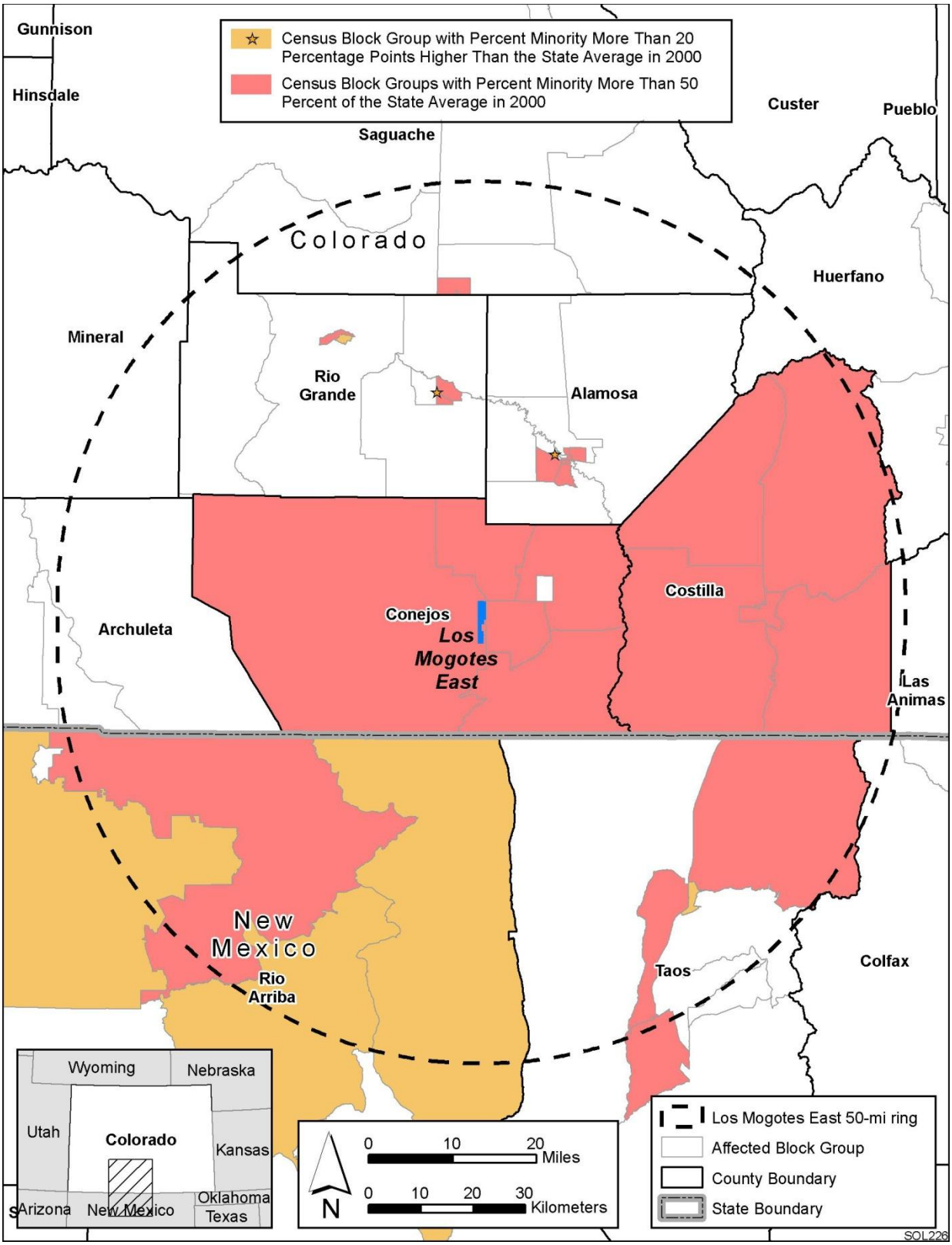

FIGURE 10.4.20.1-1 Minority Population Groups within the 50-mi (80-km) Radius Surrounding the Proposed Los Mogotes East SEZ as Revised

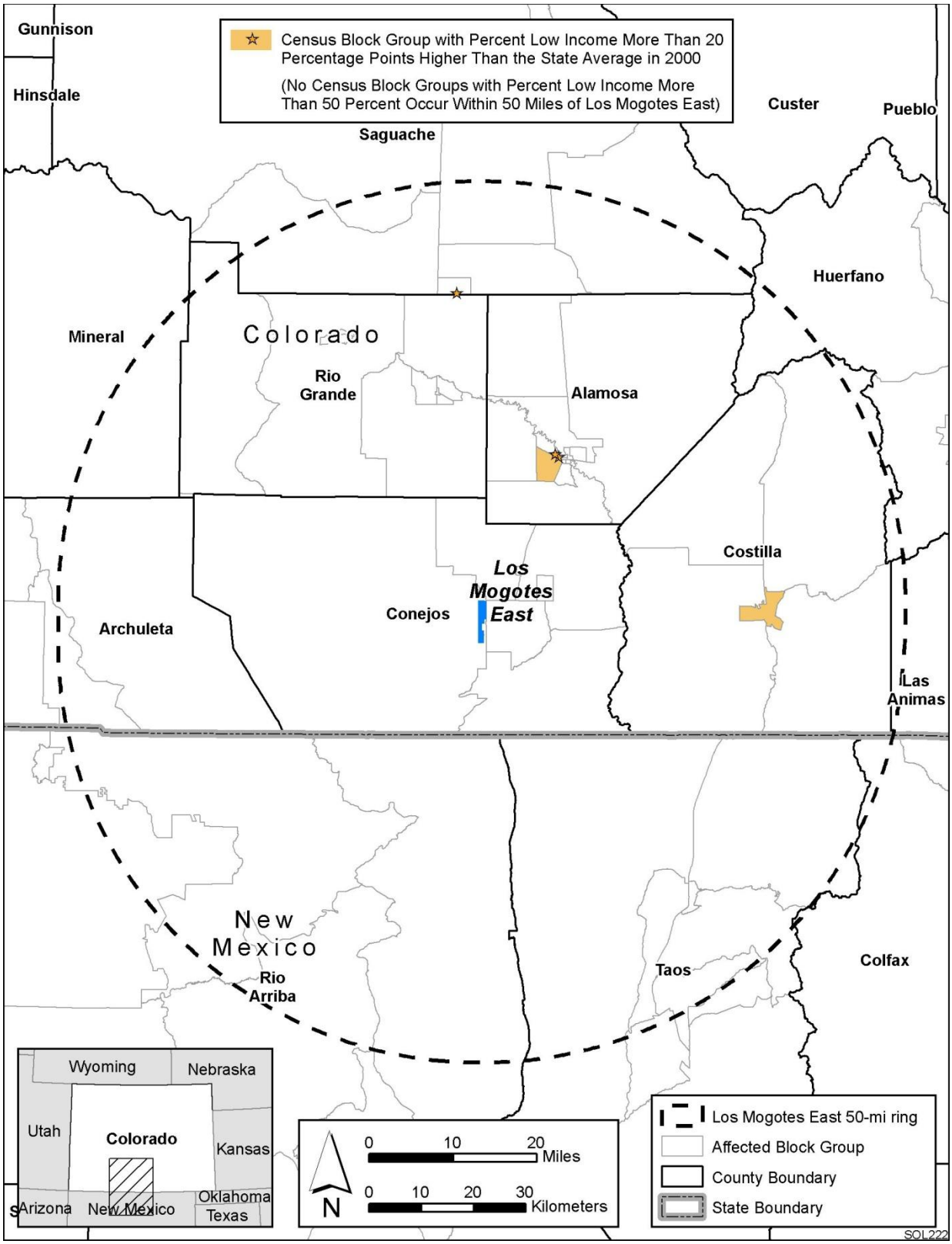

FIGURE 10.4.20.1-2 Low-Income Population Groups within the 50-mi (80-km) Radius Surrounding the Proposed Los Mogotes East SEZ as Revised

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

10.4.21 Transportation

10.4.21.1 Affected Environment

The reduction in size of the SEZ does not change the information on affected environment for transportation presented in the Draft Solar PEIS.

10.4.21.2 Impacts

As stated in the Draft Solar PEIS, the primary transportation impacts are anticipated to be from commuting worker traffic. U.S. 285 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), an increase that is about half of the current daily traffic levels for U.S. 285. In addition, local road improvements might be necessary on the county roads between U.S. 285 and the SEZ. Improvements would be necessary in any portion of the SEZ 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 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.

10.4.21.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce transportation impacts are described in Appendix A of this Final Solar PEIS. The programmatic design features, including local road improvements, multiple site access locations, staggered work schedules, and ride-sharing, will all provide some relief to traffic congestion on local roads leading to the SEZ. Depending on the location of solar facilities within the SEZ, more specific access locations and local road improvements could be implemented.

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

10.4.22 Cumulative Impacts

The analysis of potential impacts in the vicinity of the proposed Los Mogotes East SEZ presented in the Draft Solar PEIS is still generally applicable for this Final Solar PEIS, although the impacts would be decreased because the size of the proposed SEZ has been reduced to 2,650 acres (10.7 km^2). The following sections include an update to the information presented in the Draft Solar PEIS regarding cumulative effects for the proposed Los Mogotes East SEZ.

10.4.22.1 Geographic Extent of the Cumulative Impact Analysis

The geographic extent of the cumulative impact analysis has not changed. The extent varies on the basis of the nature of the resource being evaluated and the distance at which an impact may occur (thus, e.g., air quality impacts may have a greater regional extent than cultural resources impacts). Lands around the SEZ are privately owned or administered by the USFS, NPS, or BLM. The BLM administers approximately 11% of the lands within a 50-mi (80-km) radius of the Los Mogotes East SEZ.

10.4.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The proposed Los Mogotes East SEZ decreased from 5,918 acres (24.0 km^2) to 2,650 acres (10.7 km^2). The Draft Solar PEIS included three other proposed SEZs in Colorado: Antonito Southwest, De Tilla Gulch, and Fourmile East. All these proposed SEZs are being carried forward to the Final Solar PEIS; the areas of the De Tilla Gulch and Fourmile East SEZs have been reduced.

The ongoing and reasonably foreseeable future actions described below are grouped into two categories: (1) actions that relate to energy production and distribution, including potential solar energy projects under the proposed action (Section 10.4.22.2.1); and (2) other ongoing and reasonably foreseeable actions, including those related to electric power generation and distribution, wildlife management, and military facility improvement (Section 10.4.22.2.2). Together, these actions and trends have the potential to affect human and environmental receptors within the geographic range of potential impacts over the next 20 years.

10.4.22.2.1 Energy Production and Distribution

The list of reasonably foreseeable future actions near the proposed Los Mogotes East SEZ has been updated and is presented in Table 10.4.22.2-1. Projects listed in the table are shown in Figure 10.4.22.2-1.

Xcel Energy (Public Service Company of Colorado) has submitted a transmission planning report to the Colorado Public Utility Commission stating that it intends to end its involvement in the proposed San Luis Valley–Calumet-Comanche Transmission project (Heide 2011). The project itself has not been cancelled.

TABLE 10.4.22.2-1 Ongoing and Reasonably Foreseeable Future Actions Related to Energy Development and Distribution near the Proposed Los Mogotes East SEZ as Revised and in the San Luis Valley[a]

Description	Status	Resources Affected	Primary Impact Location
Renewable Energy Development			
San Luis Valley Generation Development Area (GDA) (Solar) Designation	Ongoing	Land use	San Luis Valley
Xcel Energy/SunEdison Project, 8.2-MW PV	**Operating**	Land use, ecological resources, visual	San Luis Valley GDA
San Luis Valley Solar Ranch (formerly Alamosa Solar Generating Project), 30-MW PV	**Operating[b]**	Land use, ecological resources, visual	San Luis Valley GDA
Greater Sandhill Solar Project, 19-MW PV	**Operating[b]**	Land use, ecological resources, visual	San Luis Valley GDA
San Luis Valley Solar Project; Tessera Solar, 200 MW, dish engine, **changed to 145 MW, 1,500 acres[c]**	**New proposal[d]**	Land use, ecological resources, visual, cultural	San Luis Valley GDA
Solar Reserve; 200-MW solar tower	**Application submitted for land-use permit[e]**	Land use, ecological resources, visual	San Luis Valley GDA (Saguache)
Alamosa Solar Generating Project (formerly Cogentrix Solar Services), 30-MW high-concentration PV	**Under construction[b]**	Land use, ecological resources, visual	San Luis Valley GDA
Lincoln Renewables, 37-MW PV	County Permit approved	Land use, ecological resources, visual	San Luis Valley GDA
NextEra, 30-MW PV	County Permit approved	Land use, ecological resources, visual	San Luis Valley GDA
Transmission and Distribution Systems			
San Luis Valley–Calumet-Comanche Transmission Project	**Proposed[f]**	Land use, ecological resources, visual, cultural	San Luis Valley (select counties)

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

[b] See SEIA (2012) for details.

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

[d] See Solar Feeds (2012) for details.

[e] See Tetra Tech EC, Inc. (2011) for details.

[f] See Heide (2011) for details.

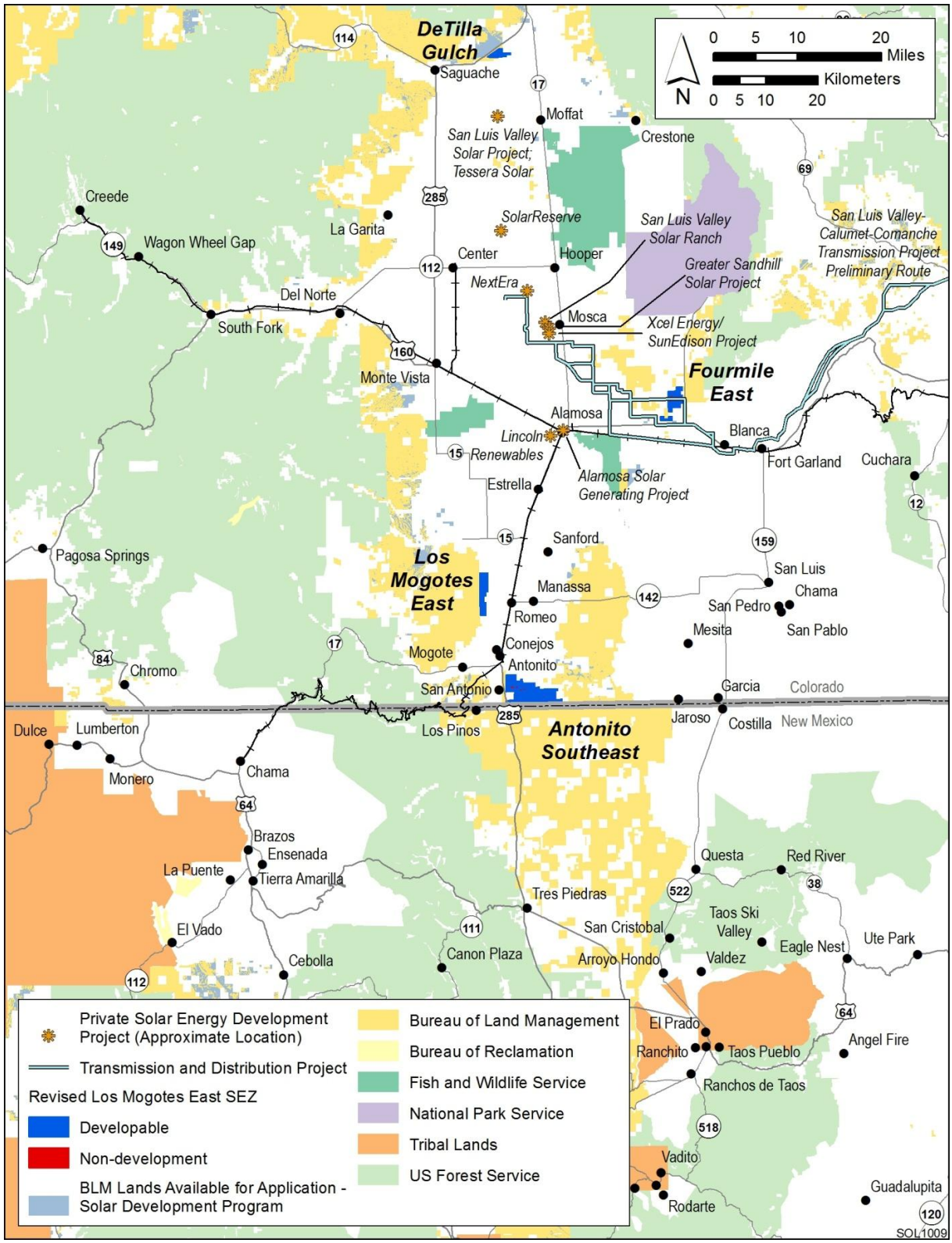

FIGURE 10.4.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Los Mogotes East SEZ as Revised

10.4.22.2.2 Other Actions

None of the major ongoing and foreseeable actions within 50 mi (80 km) of the proposed Los Mogotes East SEZ that were listed in Table 10.4.22.2-3 of the Draft Solar PEIS have had a change in their status.

10.4.22.3 General Trends

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

10.4.22.4 Cumulative Impacts on Resources

Total disturbance in the proposed Los Mogotes East SEZ over 20 years is assumed to be about 2,120 acres (8.6 km^2) (80% of the entire proposed SEZ). This development would contribute incrementally to the impacts from other past, present, and reasonably foreseeable future actions in the region as described in the Draft Solar PEIS. Primary impacts from development in the Los Mogotes 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.

No additional major actions have been identified within 50 mi (80 km) of the SEZ. As a result of the reduction in the developable area of the SEZ as well as that of the nearby Fourmile East SEZ, the incremental cumulative impacts associated with development in the proposed Los Mogotes East SEZ during construction, operation, and decommissioning are expected to be the same or less than those discussed in the Draft Solar PEIS.

On the basis of comments received on the Draft Solar PEIS, cumulative impacts on recreation in the San Luis Valley have been reconsidered. While it is unlikely that the proposed Los Mogotes East SEZ would have a large impact on recreational use or tourism throughout the valley, cumulative impacts could occur because it is one of four proposed SEZs totaling about 16,300 acres (66 km^2) on public lands, and there are additional solar energy developments on private lands. Because most of the land on the valley floor of the San Luis Valley is private and is heavily developed for agricultural use, undeveloped public lands around the valley provide accessible areas for public recreation. Although it is believed the recreational use of the proposed SEZ is low, the loss of public access to such areas cumulatively leads to an overall reduction in the availability of recreation that can become significant.

10.4.23 Transmission Analysis

The methodology for this transmission analysis is described in Appendix G of this Final Solar PEIS. This section presents the results of the transmission analysis for the Los Mogotes East SEZ, including the identification of potential load areas to be served by power generated at the SEZ and the results of the DLT analysis. Unlike Sections 10.4.2 through 10.4.22, this section

is not an update of previous analysis for the Los Mogotes 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 Los Mogotes East SEZ is estimated to have the potential to generate 424 MW of marketable solar power at full build-out.

10.4.23.1 Identification and Characterization of Load Areas

The primary candidates for Los Mogotes East SEZ load areas are the major surrounding cities. Figure 10.4.23.1-1 shows the possible load areas for the Los Mogotes East SEZ and the estimated portion of their market that could be served by solar generation. Possible load areas for the Los Mogotes East SEZ include Pueblo, Colorado Springs, and Denver, Colorado; Farmington, Albuquerque, and Santa Fe, New Mexico; Salt Lake City, Utah; Phoenix, Arizona; and Las Vegas, Nevada.

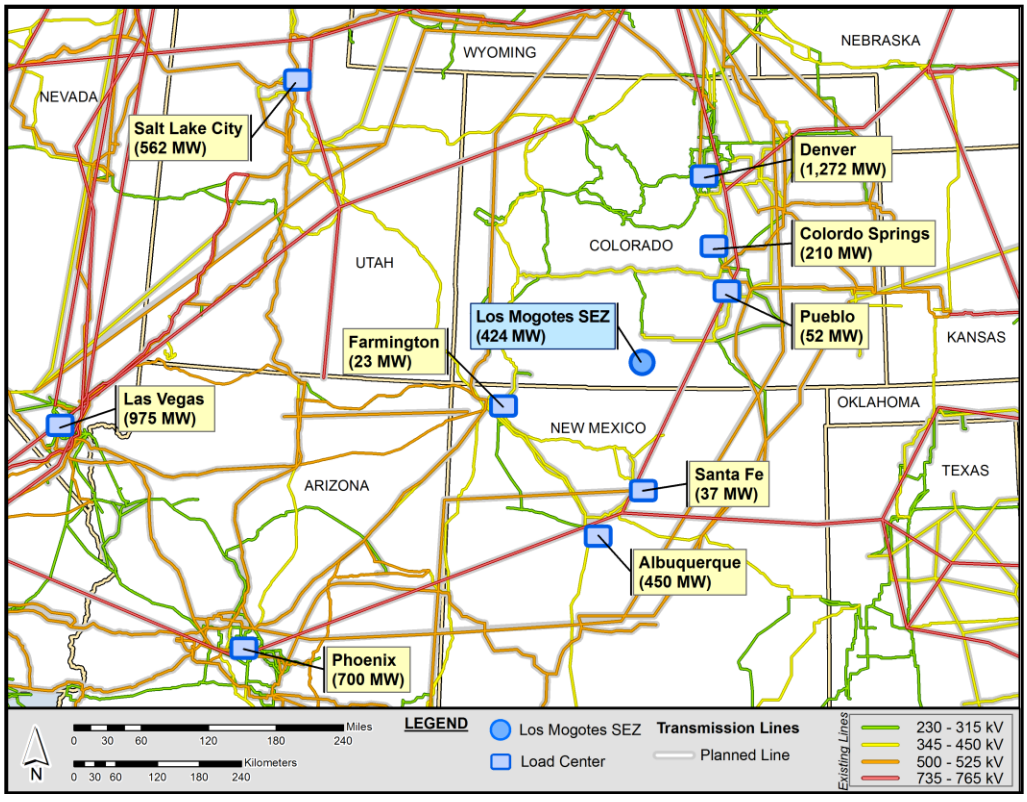

FIGURE 10.4.23.1-1 Locations of the Proposed Los Mogotes East SEZ and Possible Load Areas (Source for background map: Platts 2011)

The two load area groups examined for the Los Mogotes East SEZ are as follows:

1. Pueblo, Colorado Springs, and Denver, Colorado, and

2. Farmington and Albuquerque, New Mexico.

Figure 10.4.23.1-2 shows the most economically viable transmission scheme for the Los Mogotes East SEZ (transmission scheme 1), and Figure 10.4.23.1-3 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 424 MW could be fully allocated.

Table 10.4.23.1-1 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.

10.4.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the proposed Los Mogotes East SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The

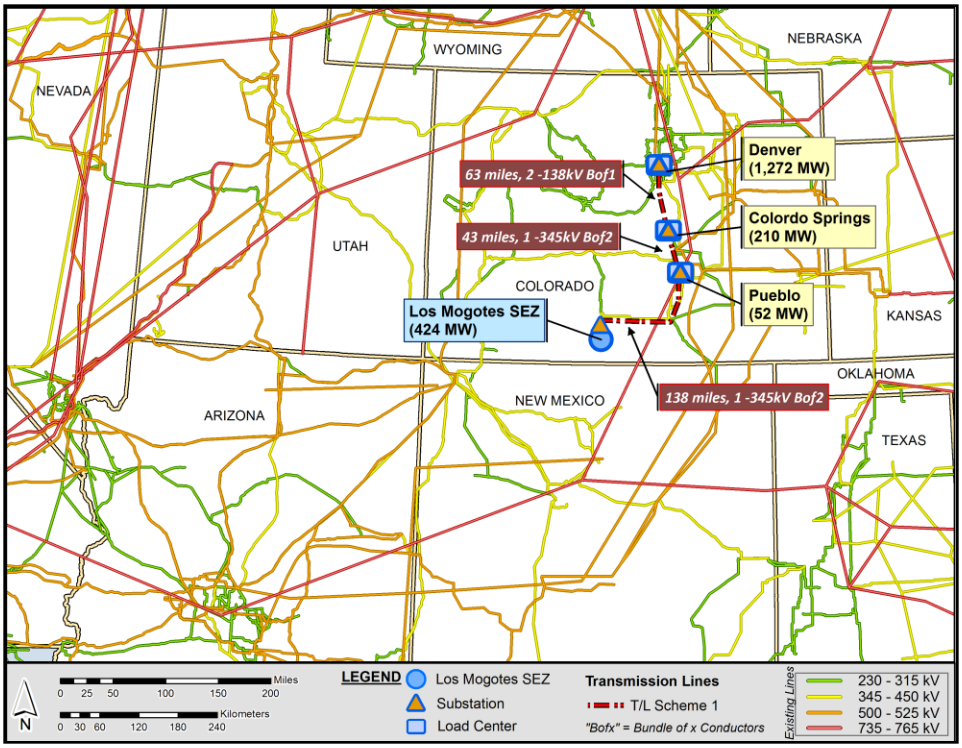

FIGURE 10.4.23.1-2 Transmission Scheme 1 for the Proposed Los Mogotes East SEZ (Source for background map: Platts 2011)

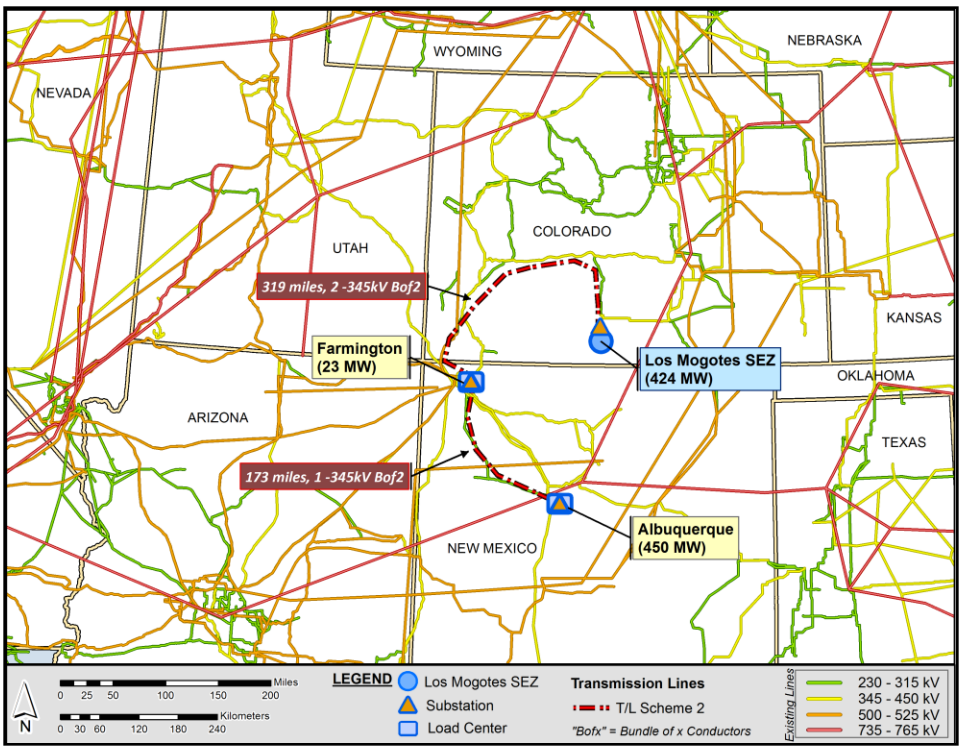

FIGURE 10.4.23.1-3 Transmission Scheme 2 for the Proposed Los Mogotes East SEZ (Source for background map: Platts 2011)

new transmission lines(s) would directly convey the 424-MW output of the Los Mogotes East SEZ to the prospective load areas for each possible transmission scheme. The approach also assumes that all existing transmission lines in the WECC region are saturated and have little or no available capacity to accommodate the SEZ's output throughout the entire 10-year study horizon.

Figures 10.4.23.1-2 and 10.4.23.1-3 display the pathways that new dedicated lines might follow to distribute solar power generated at the Los Mogotes East SEZ via the two identified transmission schemes described in Table 10.4.23.1-1. These pathways parallel existing 500-, 345-, 230-kV, and lower voltage lines. The intent of following existing lines is to avoid pathways that may be infeasible due to topographical limitations or other concerns.

For transmission scheme 1, serving load centers to the north, a new line would be constructed to connect with Pueblo (52 MW), Colorado Springs (210 MW), and Denver (1,272 MW), so that the 424-MW output of the Los Mogotes East SEZ could be fully utilized (Figure 10.4.23.1-2). This particular scheme has three segments. The first segment extends northeast from the SEZ to Pueblo over a distance of about 138 mi (222 km). On the basis of engineering and operational considerations, this segment would require a single-circuit 345-kV bundle of two conductors (Bof2) transmission design. The second leg goes north about 43 mi (69 km) from Pueblo to Colorado Springs. The third and final leg extends 63 mi (101 km) farther north to Denver. The transmission configuration options were determined by using the line "loadability" curve in American Electric Power's *Transmission Facts* (AEP 2010). Appendix G

TABLE 10.4.23.1-1 Candidate Load Area Characteristics for the Proposed Los Mogotes East SEZ

Transmission Scheme	City/Load Area Name	Position Relative to SEZ	2010 Population[c]	Estimated Total Peak Load (MW)	Estimated Peak Solar Market (MW)
1	Pueblo, Colorado[a]	North	104,877	262	52
	Colorado Springs, Colorado[a]	North	419,848	1,050	210
	Denver, Colorado[b]	North	2,543,000	6,358	1,272
2	Farmington, New Mexico[a]	Southwest	46,000	115	23
	Albuquerque, New Mexico[b]	South	907,775	2,269	450

[a] The load area represents the city named.

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

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

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 southwest, Figure 10.4.23.1-3 shows that new lines would be constructed to connect with Farmington (23 MW) and Albuquerque (450 MW), so that the 424-MW output of the Los Mogotes East SEZ could be fully utilized. This scheme has two segments. The first segment, from the SEZ to Farmington, is 319 mi (513 km) long, and the second segment, from Farmington to Albuquerque, is about 173 mi (278 km) long. Again, the transmission configuration for each leg or segment varies and was determined by using the line "loadability" curve in American Electric Power's *Transmission Facts* (AEP 2010), with the constraint that the full output of the SEZ (424 MW) would be completely marketed.

Table 10.4.23.2-1 summarizes the distances to the various load areas over which new transmission lines would need to be constructed, as well as the assumed number of substations that would be required. One substation is assumed to be installed at each load area and an additional one at the SEZ. Thus, in general, the total number of substations per scheme is simply equal to the number of load areas associated with the scheme plus one. Substations at the load areas would consist of one or more step-down transformers, while the originating substation at the SEZ would consist of several step-up transformers. The originating substation would have a rating of at least 424 MW (to match the plant's output), while the combined load substations would have a similar total rating of 424 MW. For schemes that require the branching of the lines, a switching substation is assumed to be constructed at the appropriate junction. In general, switching stations carry no local load but are assumed to be equipped with switching gears

TABLE 10.4.23.2-1 Potential Transmission Schemes, Estimated Solar Markets, and Distances to Load Areas for the Proposed Los Mogotes SEZ

Transmission Scheme	City/Load Area Name	Estimated Peak Solar Market (MW)[c]	Total Solar Market (MW)	Sequential Distance (mi)[d]	Total Distance (mi)[d]	Line Voltage (kV)	No. of Substations
1	Pueblo, Colorado[a]	52	1,534	138	244	345,	4
	Colorado Springs, Colorado[a]	210		43		138	
	Denver, Colorado[b]	1,272		63			
2	Farmington, New Mexico[a]	23	473	331	492	345	3
	Albuquerque, New Mexico[b]	450		173			

[a] The load area represents the city named.

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

[c] From Table 10.4.23.1-1.

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

(e.g., circuit breakers and connecting switches) to reroute power as well as, in some cases, with additional equipment to regulate voltage.

Table 10.4.23.2-2 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 the cities of Pueblo, Colorado Springs, and Denver and for which the construction of new transmission lines and substations is estimated to disturb about 4,460 acres (18 km^2) of land. The less favorable transmission scheme with respect to minimizing costs and the area disturbed would be scheme 2 (serving Farmington and Albuquerque). For this scheme, the construction of new transmission lines and substations is estimated to disturb a land area on the order of 10,447 acres (42.3 km^2).

Table 10.4.23.2-3 shows the estimated NPV of both transmission schemes and takes into account the cost of constructing the lines and the substations and the projected revenue stream over the 10-year horizon. A positive NPV indicates that revenues more than offset investments. This calculation does not include the cost of producing electricity.

The most economically attractive configuration (transmission scheme 1) has the highest positive NPV and serves the Colorado cities of Pueblo, Colorado Springs, and Denver. The secondary case (transmission scheme 2), which excludes one or more of the primary pathways used in scheme 1, is less economically attractive and focuses on delivering power to Farmington and Albuquerque. For the assumed utilization factor of 20%, scheme 2 exhibits a negative NPV, implying that this option may not be economically viable under the current assumptions.

TABLE 10.4.23.2-2 Comparison of the Various Transmission Line Configurations with Respect to Land Use Requirements for the Proposed Los Mogotes East SEZ

Transmission Scheme	City/Load Area Name	Total Distance (mi)[c]	No. of Substations	Land Use (acres)[d]		
				Transmission Line	Substation	Total
1	Pueblo, Colorado[a] Colorado Springs, Colorado[a] Denver, Colorado[b]	244	4	4,450.3	10.2	4,460.5
2	Farmington, New Mexico[a] Albuquerque, New Mexico[b]	492	3	10,436.4	10.2	10,446.6

[a] The load area represents the city named.

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

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

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

TABLE 10.4.23.2-3 Comparison of Potential Transmission Lines with Respect to NPV (Base Case) for the Proposed Los Mogotes 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	Pueblo, Colorado[a] Colorado Springs, Colorado[a] Denver, Colorado[b]	446.3	28.0	74.3	573.6	99.3
2	Farmington, New Mexico[a] Albuquerque, New Mexico[b]	1,178.1	28.0	74.3	573.8	−632.5

[a] The load area represents the city named.

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

Table 10.4.23.2-4 shows the effect of varying the value of the utilization factor on the NPV of the transmission schemes. The table shows that at about 50% utilization, NPVs for both schemes are positive. It also shows that as the utilization factor is increased, the economic viability of the lines also increases. Utilization factors can be raised by allowing the new dedicated lines to market other power generation outputs in the region in addition to that of its associated SEZ.

TABLE 10.4.23.2-4 Effect of Varying the Utilization Factor on the NPV of the Transmission Schemes for the Proposed Los Mogotes East SEZ

Transmission Scheme	City/Load Area Name	NPV ($ million) at Different Utilization Factors					
		20%	30%	40%	50%	60%	70%
1	Pueblo, Colorado[a] Colorado Springs, Colorado[a] Denver, Colorado[b]	99.3	386.1	672.9	959.7	1,246.5	1,533.3
2	Farmington, New Mexico[a] Albuquerque, New Mexico[b]	−632.5	−345.7	−58.9	227.9	514.7	802.5

[a] The load area represents the city named.

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

The findings of the DLT analysis for the proposed Los Mogotes East SEZ are as follows:

- Transmission scheme 1, which identifies the cities of Pueblo, Colorado Springs, and Denver (in that specific sequence) as the primary markets, represents the most favorable option based on NPV and land use requirements. This scheme would result in new land disturbance of about 4,460 acres (18 km^2).

- Transmission scheme 2, which represents an alternative configuration, serves Farmington and Albuquerque. In terms of defining potential upper-bound impacts of new transmission infrastructure development, this configuration would result in new land disturbance of about 10,447 acres (42.3 km^2). In terms of NPV, however, this scheme may not be economically viable under the current assumptions.

- 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 Los Mogotes 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.

- The analysis of transmission requirements for the proposed Los Mogotes East SEZ would be expected to show lower costs and less land disturbance if solar-eligible load assumptions were increased, although the magnitude of those changes would vary due to a number of factors. In general, for cases such as the Los Mogotes 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.

10.4.24 Impacts of the Withdrawal

The BLM proposes to withdraw 16,797 acres (67 km^2) of public land comprising the proposed Los Mogotes 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 Los Mogotes 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 LR2000 (accessed in January 2012), there are no recorded mining claims within the land withdrawal area.

Although the mineral potential of the lands within the Los Mogotes 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).

10.4.25 References

Note to Reader: This list of references identifies Web pages and associated URLs where reference data were obtained for the analyses presented in this Final Solar 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 the 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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10.4.26 Errata for the Proposed Los Mogotes 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 10.4.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

TABLE 10.4.26-1 Errata for the Proposed Los Mogotes East SEZ (Section 10.1.4 of the Draft Solar PEIS and Section C.3.4 of the Supplement to the Draft Solar PEIS)

Section No.	Page No.	Line No.	Figure No.	Table No.	Correction
10.4.1.2	10.4-3	24–25			"The nearest existing transmission line is a 69-kV line adjacent to the SEZ," should read, "The nearest existing transmission line is a 69-kV line located about 3 mi (5 km) to the east of the SEZ."
10.4.5.1	10.4-31	10			The text indicates that quail are hunted in the area. The Colorado Division of Wildlife has commented that quail are not found in this area.
10.4.11.2					All uses of the term "neotropical migrants" in the text and tables of this section should be replaced with the term "passerines."
10.4.14.2	10.4-225	28–29	10.4.14.2-9		The text reads "The West Fork is visible as a blue dashed line near the eastern boundary of the SEZ on Figure 10.4.14.2-9." This line did not appear in the figure. This information is shown correctly in Figure 10.4.14.2-2 of this Final Solar PEIS.