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)

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

The U.S. Department of the Interior Bureau of Land Management (BLM) has carried 17 solar energy zones (SEZs) forward for analysis in this Final Solar Programmatic Environmental Impact Statement (PEIS). These SEZs total approximately 285,000 acres (1,153 km^2) of land potentially available for development. This chapter includes analyses of potential environmental impacts for the proposed SEZs in Arizona, Brenda and Gillespie, as well as a summary of the Bullard Wash SEZ and why it was eliminated from further consideration. The SEZ-specific analyses provide documentation from which the BLM will tier future project authorizations, thereby limiting the required scope and effort of project-specific National Environmental Policy Act of 1969 (NEPA) analyses.

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

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

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

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

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

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

8.3 GILLESPIE

8.3.1 Background and Summary of Impacts

8.3.1.1 General Information

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

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

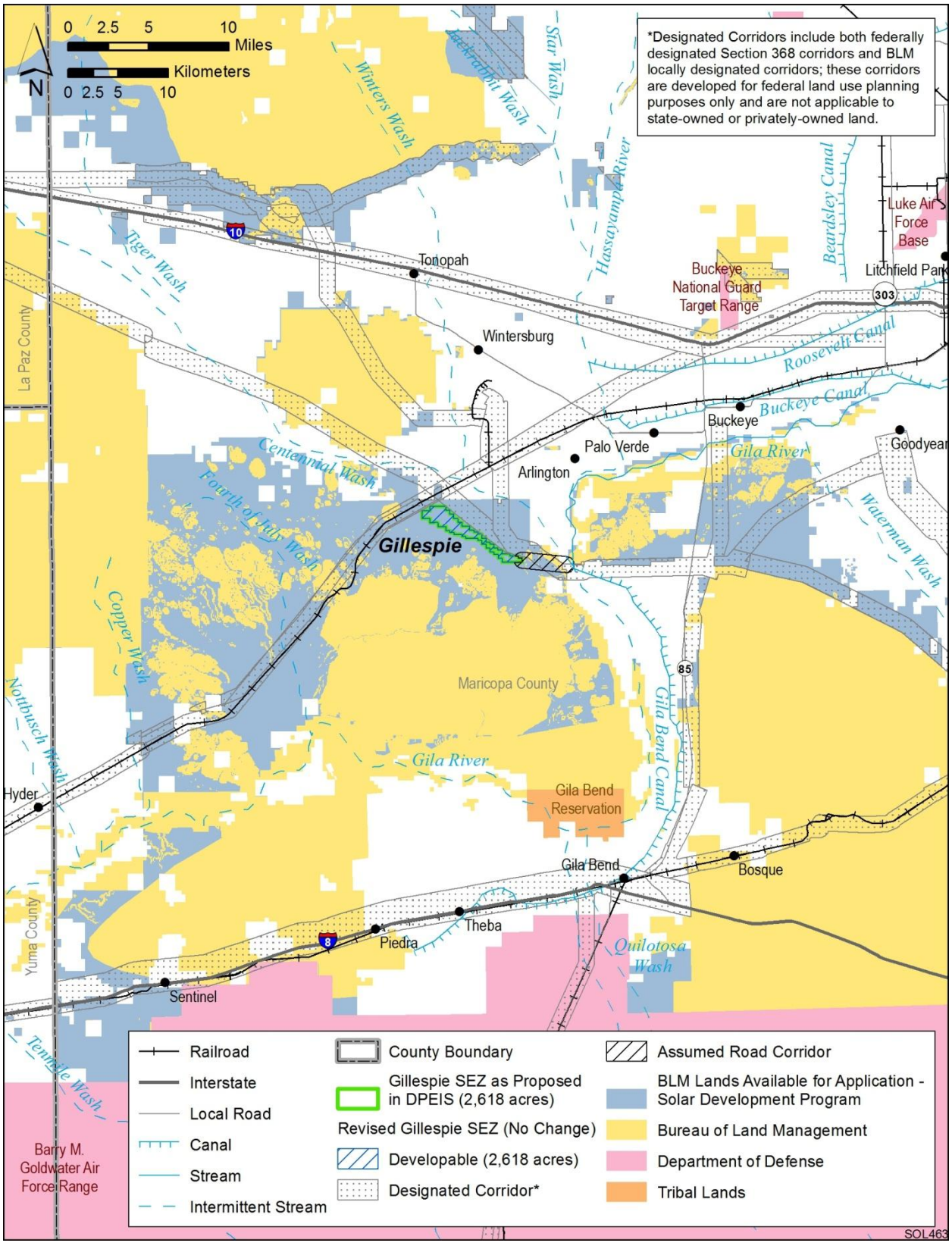
As published in the Draft Solar PEIS (BLM and DOE 2010), the proposed Gillespie SEZ had a total area of 2,618 acres (11 km^2) (see Figure 8.3.1.1-1). In the Supplement to the Draft Solar PEIS (BLM and DOE 2011), no boundary revisions or non-developable areas for the proposed Gillespie SEZ were identified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

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

8.3.1.2 Development Assumptions for the Impact Analysis

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

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



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

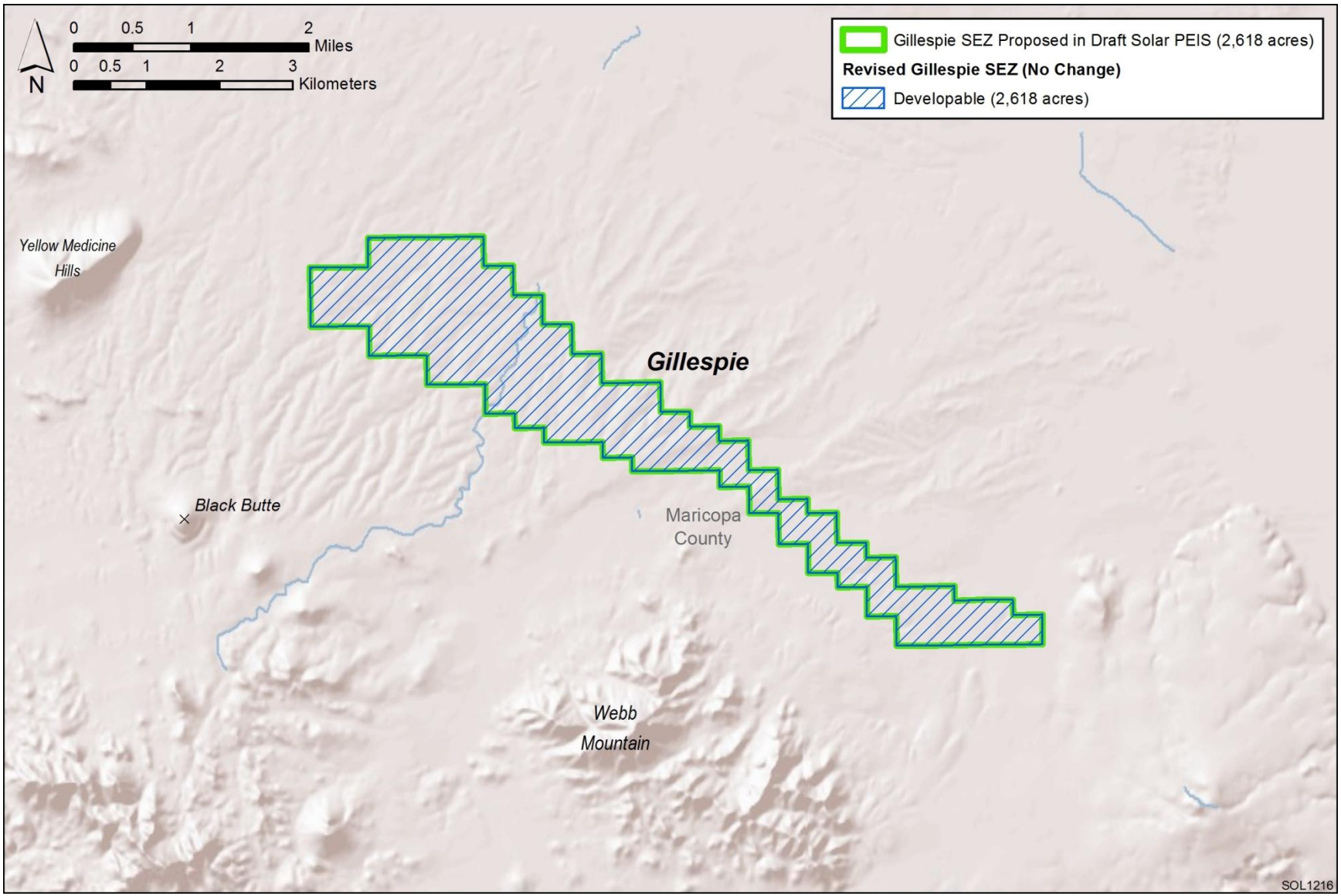

FIGURE 8.3.1.1-2 Developable Areas for the Proposed Gillespie SEZ

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

Total Developable Acreage and Assumed Developed Acreage (80% of Total)	Assumed Maximum SEZ Output for Various Solar Technologies	Distance to Nearest State, U.S. or Interstate Highway	Distance and Capacity of Nearest Existing Transmission Line	Assumed Area of Road ROW	Distance to Nearest Designated Corridor[e]
2,618 acres[a] and 2,094 acres	233 MW[b] 419 MW[c]	Old U.S. 80 3 mi[d]	<1 mi and 500 kV	22 acres	Adjacent

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

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

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

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

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

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

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

8.3.1.3 Programmatic and SEZ-Specific Design Features

The proposed programmatic design features for each resource area to be required under the BLM Solar Energy Program are presented in Section A.2.2 of Appendix A of this Final Solar PEIS. These programmatic design features are intended to avoid, reduce, and/or mitigate adverse

impacts from solar energy development and will be required for development on all BLM-administered lands, including SEZ and non-SEZ lands.

The discussions below addressing potential impacts of solar energy development on specific resource areas (Sections 8.3.2 through 8.3.22) also provide an assessment of the effectiveness of the programmatic design features in mitigating adverse impacts from solar development within the SEZ. SEZ-specific design features to address impacts specific to the proposed Gillespie SEZ may be required in addition to the programmatic design features. The proposed SEZ-specific design features for the Gillespie SEZ have been updated on the basis of revisions to the SEZ since the Draft Solar PEIS (such as boundary changes and the identification of non-development areas), and on the basis of comments received on the Draft and Supplement to the Draft Solar PEIS. All applicable SEZ-specific design features identified to date (including those from the Draft Solar PEIS that are still applicable) are presented in Sections 8.3.2 through 8.3.22.

8.3.2 Lands and Realty

8.3.2.1 Affected Environment

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

8.3.2.2 Impacts

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

8.3.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

within an otherwise rural area, and induced land use changes, if any, on nearby or adjacent state and private lands may not be fully mitigated.

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

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

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

8.3.3 Specially Designated Areas and Lands with Wilderness Characteristics

8.3.3.1 Affected Environment

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

8.3.3.2 Impacts

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

8.3.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.4 Rangeland Resources

8.3.4.1 Livestock Grazing

8.3.4.1.1 Affected Environment

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

8.3.4.1.2 Impacts

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

8.3.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on livestock grazing are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some mitigation for the identified impacts.

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

8.3.4.2 Wild Horses and Burros

8.3.4.2.1 Affected Environment

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

8.3.4.2.2 Impacts

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

8.3.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

8.3.5 Recreation

8.3.5.1 Affected Environment

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

8.3.5.2 Impacts

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

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

8.3.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on recreation are described in Section A.2.2 of Appendix A of this Final Solar PEIS. Implementing the programmatic design features will provide some mitigation for the identified impacts.

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

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

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

8.3.6 Military and Civilian Aviation

8.3.6.1 Affected Environment

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

8.3.6.2 Impacts

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

8.3.6.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.7 Geologic Setting and Soil Resources

8.3.7.1 Affected Environment

8.3.7.1.1 Geologic Setting

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

8.3.7.1.2 Soil Resources

Data provided in the Draft Solar PEIS remain valid.

8.3.7.2 Impacts

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

8.3.7.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.8 Minerals (Fluids, Solids, and Geothermal Resources)

A mineral potential assessment for the proposed Gillespie SEZ has been prepared and reviewed by BLM mineral specialists knowledgeable about the region where the SEZ is located (BLM 2012a). The BLM is proposing to withdraw the SEZ from settlement, sale, location, or entry under the general land laws, including the mining laws, for a period of 20 years (see Section 2.2.2.2.4 of the Final Solar PEIS). The potential impacts of this withdrawal are discussed in Section 8.3.24.

8.3.8.1 Affected Environment

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

8.3.8.2 Impacts

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

8.3.8.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.9 Water Resources

8.3.9.1 Affected Environment

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

The proposed Gillespie SEZ is within the Lower Gila River subregion of the Lower Colorado Hydrologic Region. This SEZ is located in a valley northeast of the Gila Bend Mountains, with the Palo Verde Hills and other small mountain ranges to the north. Precipitation in the valley is estimated to be less than 8 in./yr (20 cm/yr), and pan evaporation rates are estimated to be on the order of 105 in./yr (267 cm/yr). No perennial surface water features or wetlands have been identified within the SEZ, but several intermittent/ephemeral wash tributaries to Centennial Wash (a tributary to the Gila River) flow in a northeasterly direction through the SEZ. Flood hazards are estimated to be between the 100-year and 500-year floodplains in the vicinity of the SEZ. The Gillespie SEZ is located in the Lower Hassayampa groundwater basin, where the primary aquifer is composed of basin-fill alluvium deposits of

varying particle sizes and a thickness of up to 1,000 ft (300 m). Pre-disturbance groundwater underflow from neighboring basins was estimated to be 32,000 ac-ft/yr (39 million m^3/yr) in the Lower Hassayampa Basin. Between the 1950s and 1980, water levels declined by up to 90 ft (27 m) as a result of groundwater pumping. In addition, land subsidence was measured at a rate of approximately 0.8 in./yr (2 cm/yr) between 2006 and 2008. Levels of TDS in the basin are considered high and exceed the secondary MCL. In addition, concentrations of fluoride, arsenic, nitrate, and volatile or semivolatile organic compounds have all been recorded above the drinking water standard.

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

In addition to the water resources information provided in the Draft Solar PEIS, this section provides a planning-level inventory of available climate, surface water, and groundwater monitoring stations within the immediate vicinity of the Gillespie SEZ and surrounding basin. Additional data regarding climate, surface water, and groundwater conditions are presented in Tables 8.3.9.1-1 through 8.3.9.1-7 and in Figures 8.3.9.1-1 and 8.3.9.1-2. Fieldwork and hydrologic analyses needed to determine jurisdictional water bodies would need to be

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

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

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

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

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

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

Climate Station (COOP ID[a])	Elevation[b] (ft)[c]	Distance to SEZ (mi)[d]	Period of Record	Mean Annual Precipitation (in.)[e]	Mean Annual Snowfall (in.)
Buckeye, Arizona (021026)	870	19	1893–2003	7.59	0.00
Gila Bend, Arizona (023393)	735	24	1892–2011	6.04	0.00
Painted Rock Dam, Arizona (026194)	550	15	1960–2011	5.39	0.00
Tonopah, Arizona (028641)	1,110	15	1951–2010	7.63	0.00

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

[b] Surface elevations for the proposed Gillespie SEZ range from 880 to 1,040 ft.

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

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

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

Source: NOAA (2012).

TABLE 8.3.9.1-3 Total Lengths of Selected Streams at the Subregion, Cataloging Unit, and SEZ Scale Relevant to the Proposed Gillespie SEZ

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

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

Source: USGS (2012a).

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

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

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

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

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

Source: USGS (2012b).

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

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

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

Source: USGS (2012b).

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

8.3.9.2 Impacts

8.3.9.2.1 Land Disturbance Impacts on Water Resources

The discussion of land disturbance effects on water resources in the Draft Solar PEIS remains valid. As stated in the Draft Solar PEIS, land disturbance impacts in the vicinity of the proposed Gillespie SEZ could potentially affect drainage patterns, along with groundwater

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

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

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

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

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

Source: USGS (2012b).

recharge and discharge properties. The alteration of natural drainage pathways during construction can lead to impacts related to flooding, loss of water delivery to downstream regions, and alterations to riparian vegetation and habitats. At the Gillespie SEZ, these impacts are mostly relevant to the several intermittent/ephemeral tributaries of Centennial Wash.

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

The study region considered for the intermittent/ephemeral stream evaluation relevant to the Gillespie SEZ is a subset of the Centennial Wash and Lower Gila-Painted Rock Reservoir

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

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

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

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

Source: USGS (2012b).

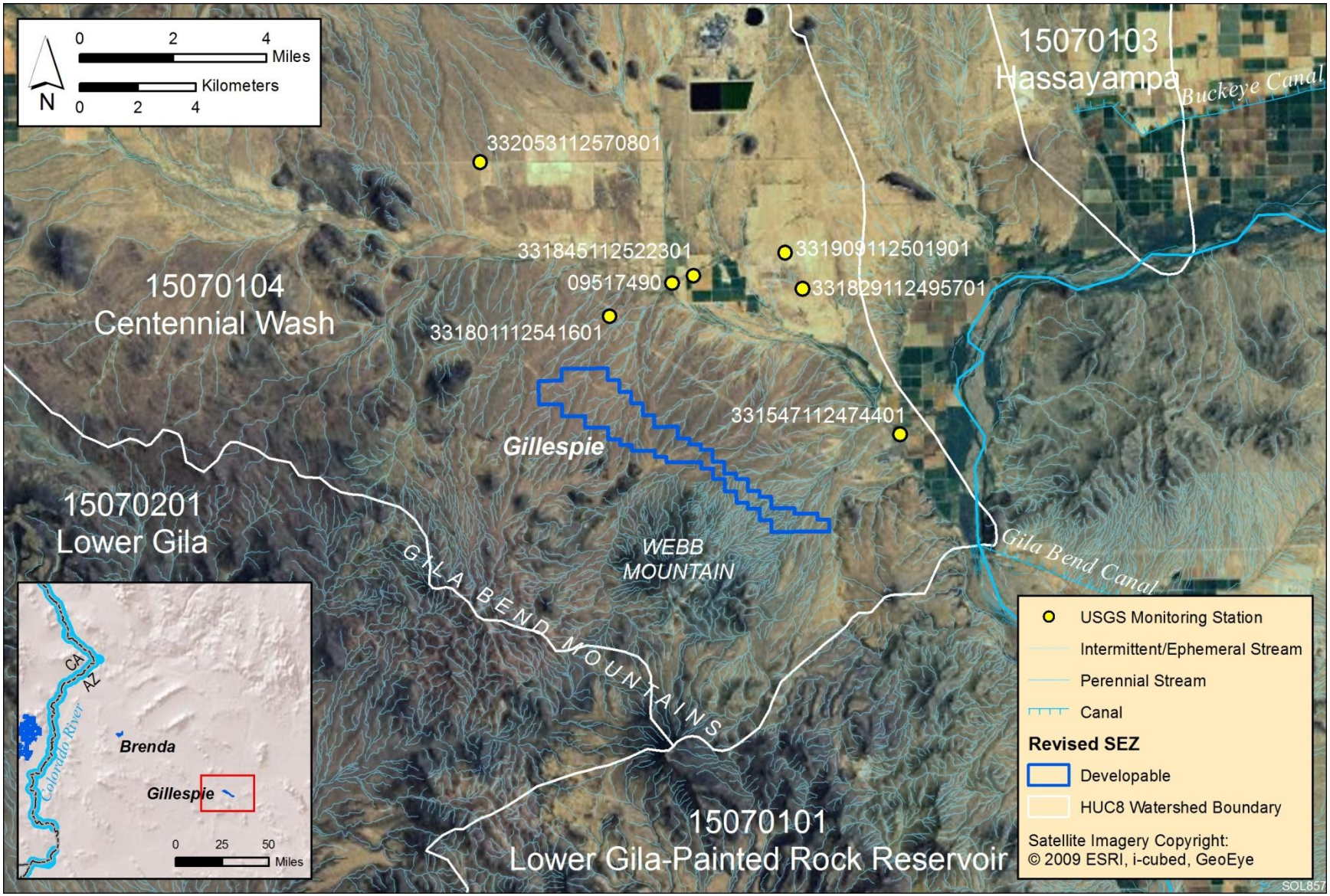

FIGURE 8.3.9.1-1 Water Features near the Proposed Gillespie SEZ

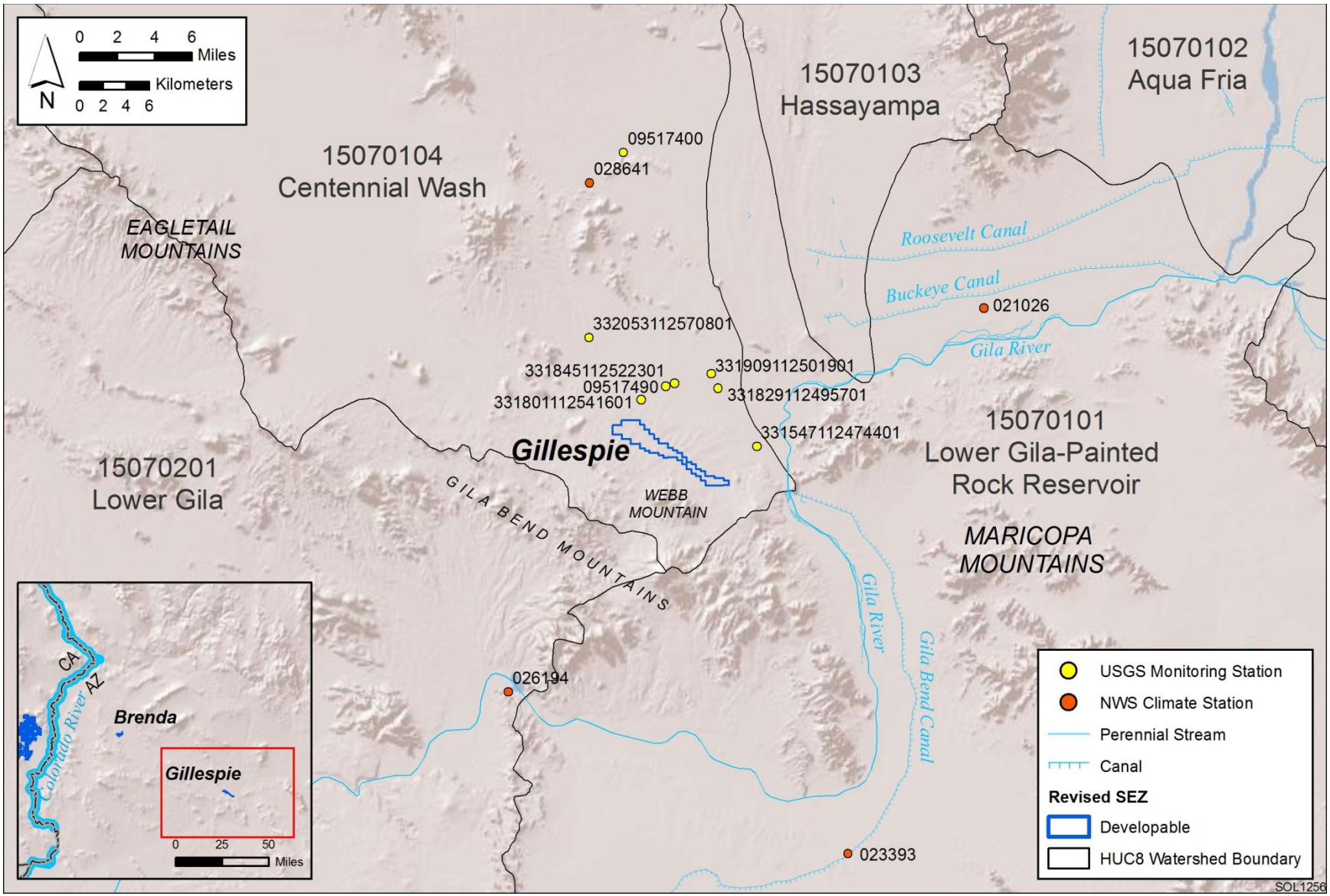

FIGURE 8.3.9.1-2 Water Features within the Centennial Wash and Lower Gila Watersheds, Which Include the Proposed Gillespie SEZ

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

8.3.9.2.2 Water Use Requirements for Solar Energy Technologies

This section presents additional analyses of groundwater, including a basin-scale groundwater budget and a simplified, one-dimensional groundwater model of potential groundwater drawdown in the vicinity of the SEZ. Only a summary of the results from these groundwater analyses is presented in this section; more information on methods and results is presented in Appendix O.

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

The estimated total water use requirements during the peak construction year are as high as 1,287 ac-ft (1.6 million m^3), which is a minor portion of the average annual recharge to the basin and a very small portion of current groundwater withdrawals and estimated groundwater storage in the Phoenix AMA basin. Given the short duration of construction activities, the water use estimate for construction is not a primary concern to water resources in the basin. The long duration of groundwater pumping during operations (20 years) poses a greater threat to groundwater resources. This analysis considered low, medium, and high groundwater pumping scenarios that represent full build-out of the SEZ assuming PV, dry-cooled parabolic trough, and wet-cooled parabolic trough, respectively (a 30% operational time was considered for all solar facility types on the basis of operations estimates for proposed utility-scale solar energy facilities).

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

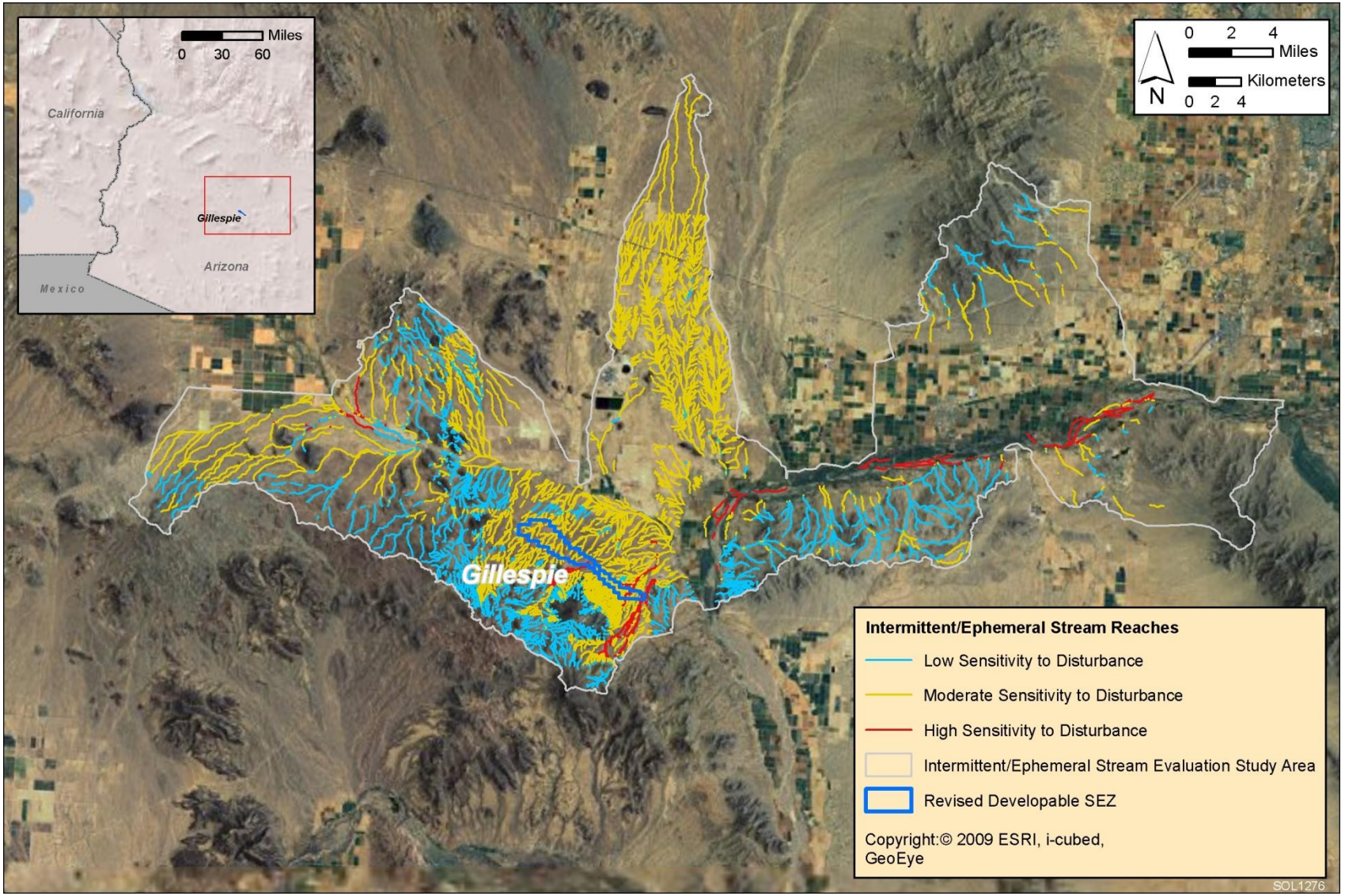

FIGURE 8.3.9.2-1 Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Proposed Gillespie SEZ

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

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

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

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

[c] Values reported for the year 2005.

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

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

Source: Tillman et al. (2011).

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

Groundwater budgeting allows for quantification of complex groundwater processes at the basin scale, but it ignores the temporal and spatial components of how groundwater withdrawals affect groundwater surface elevations, groundwater flow rates, and connectivity to surface water features such as streams, wetlands, playas, and riparian vegetation. A one-dimensional groundwater modeling analysis was performed to present a simplified depiction of the spatial and temporal effects of groundwater withdrawals by examining groundwater drawdown in a radial direction around the center of the SEZ for the low, medium, and high pumping scenarios. A detailed discussion of the groundwater modeling analysis is presented in Appendix O. It should be noted, however, that the aquifer parameters used for the one-dimensional groundwater model (Table 8.3.9.2-3) represent available literature data, and that the model aggregates these value ranges into a simplistic representation of the aquifer.

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

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

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

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

[c] Source: ADWR (1999).

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

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

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

8.3.9.2.3 Off-Site Impacts: Roads and Transmission Lines

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

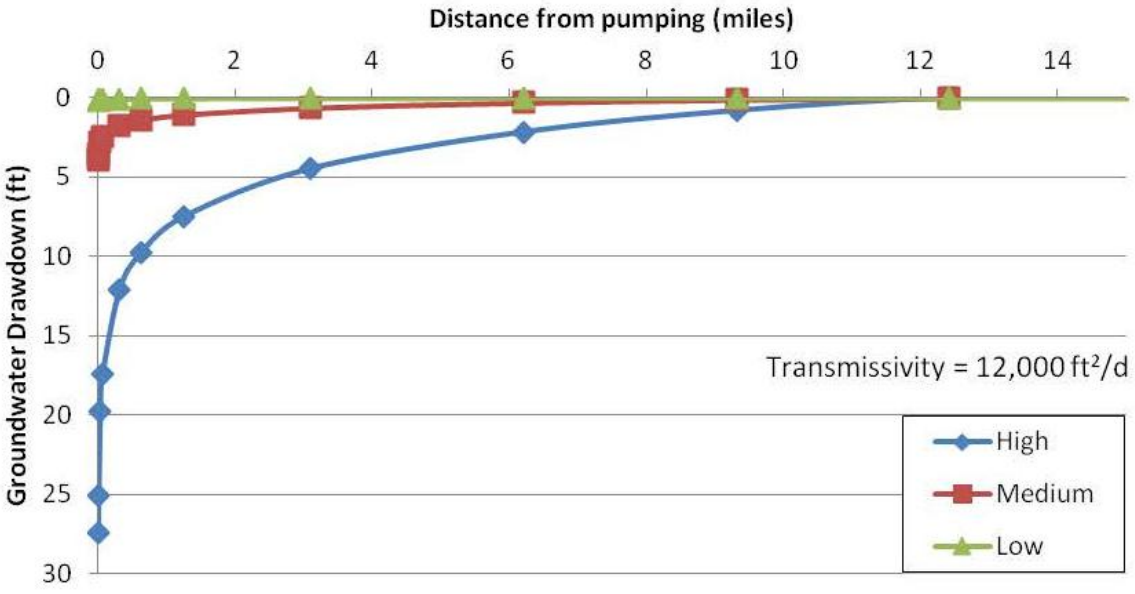

FIGURE 8.3.9.2-2 Estimated One-Dimensional Groundwater Drawdown Resulting from High, Medium, and Low Groundwater Pumping Scenarios over the 20-Year Operational Period at the Proposed Gillespie SEZ

8.3.9.2.4 Summary of Impacts on Water Resources

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

Disturbance to intermittent/ephemeral stream channels within the Gillespie SEZ may affect the critical functions of groundwater recharge, sediment transport, flood conveyance, and ecological habitat given the density of intermittent/ephemeral streams within the Gillespie SEZ. The intermittent/ephemeral stream evaluation suggests that three intermittent/ephemeral channels within the SEZ have high sensitivity to disturbance and several have moderate sensitivity to disturbance. Surface disturbances within the Gillespie SEZ could also lead to impacts within upstream and downstream reaches of unnamed intermittent/ephemeral streams that flow through

the SEZ. Several of the programmatic design features described in Section A.2.2 of Appendix A of this Final Solar PEIS specify measures to reduce impacts regarding intermittent/ephemeral water features.

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

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

8.3.9.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

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

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

8.3.10 Vegetation

8.3.10.1 Affected Environment

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

8.3.10.2 Impacts

As presented in the Draft Solar PEIS, the construction of solar energy facilities within the proposed Gillespie SEZ would result in direct impacts on plant communities because of the removal of vegetation within the facility footprint during land-clearing and land-grading operations. Approximately 80% of the SEZ would be expected to be cleared with full development of the SEZ; approximately 2,094 acres (8.5 km^2) would be cleared.

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

8.3.10.2.1 Impacts on Native Species

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

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

8.3.10.2.2 Impacts from Noxious Weeds and Invasive Plant Species

As presented in the Draft Solar PEIS, land disturbance from project activities and indirect effects of construction and operation within the Gillespie SEZ could potentially result in the establishment or expansion of noxious weeds and invasive species populations, potentially including those species listed in Section 8.3.10.1 of the Draft Solar PEIS. Impacts, such as reduced restoration success and possible widespread habitat degradation, could still occur.

8.3.10.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

- Appropriate engineering controls shall be used to minimize impacts on wetland, dry wash, dry wash woodland, mesquite bosque, and riparian habitats, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls will be determined through agency consultation.

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

It is anticipated that implementation of these programmatic design features will reduce a high potential for impacts from invasive species and impacts on wetland, dry wash, dry wash woodland, riparian, mesquite bosque, and saguaro cactus communities to a minimal potential for impact. Residual impacts on groundwater-dependent habitats could result from limited groundwater withdrawal, and so forth; however, it is anticipated that these impacts would be avoided in the majority of instances.

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

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

8.3.11 Wildlife and Aquatic Biota

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

8.3.11.1 Amphibians and Reptiles

8.3.11.1.1 Affected Environment

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

8.3.11.1.2 Impacts

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

8.3.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

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

8.3.11.2 Birds

8.3.11.2.1 Affected Environment

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

8.3.11.2.2 Impacts

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

8.3.11.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.11.3 Mammals

8.3.11.3.1 Affected Environment

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

8.3.11.3.2 Impacts

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

8.3.11.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

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

If SEZ-specific design features are implemented in addition to required programmatic design features, impacts on mammal species would be small. The need for additional SEZ-specific design features will be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.11.4 Aquatic Biota

8.3.11.4.1 Affected Environment

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

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

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

8.3.11.4.2 Impacts

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

8.3.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

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

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

8.3.12 Special Status Species

8.3.12.1 Affected Environment

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

8.3.12.2 Impacts

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

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

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

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

8.3.12.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

- Pre-disturbance surveys shall be conducted within the area of direct effects to determine the presence and abundance of special status species, including those identified in Table 8.3.12.1-1 of the Draft Solar PEIS. Disturbance to occupied habitats for these species shall be avoided or minimized to the extent practicable. If avoiding or minimizing impacts on occupied habitats is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation of direct effects on occupied habitats may be used to reduce impacts. A comprehensive mitigation strategy for special status species that uses one or more of these options to offset the impacts of development shall be prepared in coordination with the appropriate federal and state agencies.

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

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

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

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

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

8.3.13 Air Quality and Climate

8.3.13.1 Affected Environment

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

8.3.13.1.1 Existing Air Emissions

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

8.3.13.1.2 Air Quality

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

8.3.13.2 Impacts

8.3.13.2.1 Construction

Methods and Assumptions

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

Results

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

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

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

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

[1] At this programmatic level, detailed information on construction activities, such as facility size, type of solar technology, heavy equipment fleet, activity level, work schedule, and so on, is not known; thus air quality modeling cannot be conducted. Therefore, it has been assumed that an area of 2,094 acres (8.5 km^2) would be disturbed continuously; thus the modeling results and discussion here should be interpreted in that context. During the site-specific project phase, more detailed information would be available and more realistic air quality modeling analysis could be conducted. It is likely that impacts on ambient air quality predicted for specific projects would be lower than those in this Final Solar PEIS.

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

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

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

8.3.13.2.2 Operations

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

8.3.13.2.3 Decommissioning and Reclamation

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

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

8.3.13.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.14 Visual Resources

8.3.14.1 Affected Environment

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

8.3.14.2 Impacts

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

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

8.3.14.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce impacts on visual resources are described in Section A.2.2 of Appendix A of this Final Solar PEIS. While application of the programmatic design features would reduce potential visual impacts somewhat, the degree of effectiveness of these design features could be assessed only at the site- and project-specific level. Given the large-scale, reflective surfaces, and strong regular geometry of utility-scale solar energy facilities and the lack of screening vegetation and landforms within the SEZ viewshed, siting the facilities away from sensitive visual resource areas and other sensitive viewing areas would be the primary means of mitigating visual impacts. The effectiveness of other visual impact mitigation measures generally would be limited.

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

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

Application of this SEZ-specific design feature prohibiting the development of power tower facilities would substantially reduce potential visual impacts on the Woolsey Peak WA, the Sonoran Desert National Monument, the North Maricopa Mountains WA, the Saddle Mountain SRMA, and the Agua Caliente Scenic Drive. The need for additional SEZ-specific design features will be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.15 Acoustic Environment

8.3.15.1 Affected Environment

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

8.3.15.2 Impacts

8.3.15.2.1 Construction

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

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

On the basis of comments received and recent references, as applicable, this Final Solar PEIS used an updated approximate significance threshold of 55 dBA, corresponding to the onset of adverse physiological impacts (Barber et al. 2010), to update the analysis of potential noise impacts on terrestrial wildlife in areas of special concern. As a result of this updated significance threshold, the assessment of impacts has been updated as follows. Noise levels associated with construction activities in the SEZ at the boundaries of the Woolsey Peak WA, Signal Mountain WA, and Saddle Mountain SRMA are estimated to be about 34, 28, and 26 dBA, respectively. These estimated levels are below the significance threshold; thus, as concluded in the Draft Solar PEIS, noise from construction in the proposed Gillespie SEZ is not anticipated to adversely affect wildlife in the nearby specially designated areas. However, as discussed in Section 5.10.2 of this Final Solar PEIS, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). On the basis of the approximate significance threshold of 55 dBA and the potential for impacts at lower noise levels, impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. Nonetheless, even considering potential impacts at lower noise levels, construction noise from the SEZ is not anticipated to affect wildlife in the nearby specially designated areas.

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

8.3.15.2.2 Operations

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

Parabolic Trough and Power Tower

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

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

Dish Engine

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

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

As stated above under construction impacts, for this Final Solar PEIS, an updated approximate significance threshold of 55 dBA was used to evaluate potential noise impacts on terrestrial wildlife in areas of special concern. Associated with operations of a dish engine facility at the SEZ, estimated noise levels at the boundaries of the Woolsey Peak WA, Signal Mountain WA, and Saddle Mountain SRMA are about 39, 38, and 34 dBA, respectively. These estimated levels are below the updated approximate significance threshold; thus, noise from operations in the proposed Gillespie SEZ is not anticipated to considerably affect wildlife in the nearby specially designated areas. However, as discussed in Section 5.10.2, there is the potential for other effects (e.g., startle or masking) to occur at lower noise levels (Barber et al. 2011). Considering the approximate significance threshold and the potential for impacts at lower noise levels, noise impacts on terrestrial wildlife from an operating dish engine facility would have to be considered on a project-specific basis, including site-specific background levels and hearing sensitivity for site-specific terrestrial wildlife of concern. Nonetheless, even considering potential impacts at lower noise levels, noise from operation of TES at the SEZ is not anticipated to affect wildlife in the nearby specially designated areas.

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

8.3.15.2.3 Decommissioning and Reclamation

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

8.3.15.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.16 Paleontological Resources

8.3.16.1 Affected Environment

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

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

8.3.16.2 Impacts

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

8.3.16.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features for paleontological resources have been identified. Because the PFYC of the proposed Gillespie SEZ is Class 3b (unknown potential), paleontological surveys would be needed to identify those areas that may have significant paleontological resources; therefore, the need for and nature of any SEZ-specific design features will depend on the findings of future paleontological investigations. Mitigation is not likely needed in the PFYC Class 1 volcanic areas located within a portion of the assumed access road corridor. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

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

8.3.17 Cultural Resources

8.3.17.1 Affected Environment

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

- Additional information may be available to characterize the area surrounding the proposed SEZ in the future (after the Final Solar PEIS is completed), as follows:
  - Results of a Class I literature file search to better understand (1) the site distribution pattern in the vicinity of the SEZ, (2) potential trail networks through existing ethnographic reports, and (3) overall cultural sensitivity of the landscape.
  - Results of a Class II reconnaissance-level stratified random sample survey of 131 acres (0.53 km^2) or roughly 5% of the SEZ. The Class II survey is being conducted by the BLM to meet its ongoing Section 110 responsibilities under the NHPA. The objectives of the Class II surveys currently under contract are to reliably predict the density, diversity, and distribution of archaeological sites within each SEZ in Arizona, California, and Nevada and create sensitivity zones based on projected site density, complexity, likely presence of human burials, and/or other tribal concerns. BLM will continue to request funding to support additional Class II sample inventories in the SEZ areas. Areas of specific local interest, as determined through a Class I review, and, if appropriate, some subsurface testing of dune and/or colluvium areas should be considered in the sampling strategies of future surveys.
  - Continuation of government-to-government consultation as described in Section 2.4.3 of the Supplement to the Draft Solar PEIS and IM 2012-032 (BLM 2011a), including follow-up to recent ethnographic studies covering some SEZs in Nevada and Utah with tribes not included in the original studies to determine whether those tribes have similar concerns.

8.3.17.2 Impacts

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

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

enough to the SEZ for solar development to be visible and for which significance is based on visual integrity.

8.3.17.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

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

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

8.3.18 Native American Concerns

8.3.18.1 Affected Environment

Data provided in the Draft Solar PEIS remain valid.

8.3.18.2 Impacts

The description of potential concerns provided in the Draft Solar PEIS remains valid. The impacts expected on resources important to Native Americans from solar energy development within the Gillespie SEZ fall into two major categories: impacts on the landscape and impacts on discrete localized resources. As consultation with the tribes continues and project-specific analyses are undertaken, it is possible that Native Americans will express concerns over potential visual and other effects of solar energy development within the SEZ on a culturally important landscape, including features such as the Painted Rock and Gila Bend Mountains. Regarding localized effects, since solar energy facilities cover large tracts of ground, even taking into account the implementation of design features, it is unlikely that avoidance of all resources

would be possible. However, as discussed in Sections 8.3.10 and 8.3.11 of this Final Solar PEIS, impacts on plant and animal resources are expected to be small since there is an abundance of similar plant and animal habitat in the area. As discussed in Section 8.3.17.2, potential impacts are possible on cultural resources if those present (or identified in the future) are determined eligible for listing in the NRHP.

8.3.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

On the basis of impact analyses conducted for the Draft Solar PEIS and consideration of comments received as applicable, no SEZ-specific design features to address Native American concerns have been identified. The need for and nature of SEZ-specific design features would be determined during government-to-government consultations with affected tribes as part of the process of preparing parcels for competitive offer and subsequent project-specific analysis. Culturally significant sites and landscapes in the vicinity of the SEZ associated with the Gila River corridor, rock art, burials, and sacred mountains in the area, as well as traditional plant and animal resources, should be considered during consultation.

8.3.19 Socioeconomics

8.3.19.1 Affected Environment

The boundaries and developable area of the Gillespie SEZ have not changed. The socioeconomic ROI, the area in which site employees would live and spend their wages and salaries and into which any in-migration would occur, includes the same counties and communities as described in the Draft Solar PEIS; that is, no updates to the affected environment information given in the Draft Solar PEIS are required.

8.3.19.2 Impacts

Socioeconomic resources in the ROI around the SEZ could be affected by solar energy development through the creation of direct and indirect employment and income, the generation of direct sales and income taxes, SEZ acreage rental and capacity payments to the BLM, the in-migration of solar facility workers and their families, and impacts on local housing markets and on local community service employment. Since the boundaries of the proposed Gillespie

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

8.3.19.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

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

8.3.20 Environmental Justice

8.3.20.1 Affected Environment

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

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

8.3.20.2 Impacts

Potential impacts (e.g., from noise and dust during construction and operations, visual impacts, cultural impacts, and effects on property values) on low-income and minority populations could be incurred as a result of the construction and operation of solar facilities

involving each of the four technologies. Impacts are likely to be small to moderate, and within the 50-mi (80-km) radius as a whole there are minority populations, but no low-income populations defined by CEQ guidance (CEQ 1997) (see Section 8.3.20.1 of the Draft Solar PEIS). This means that any adverse impacts of solar projects could disproportionately affect minority populations.

8.3.20.3 SEZ-Specific Design Features and Design Feature Effectiveness

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

On the basis of impact analyses conducted for the Draft Solar PEIS and considering comments received as applicable, no SEZ-specific design features for environmental justice impacts in the Gillespie SEZ have been identified. Some SEZ-specific design features may be identified through the process of preparing parcels for competitive offer and subsequent project-specific analysis.

8.3.21 Transportation

8.3.21.1 Affected Environment

The data in the Draft Solar PEIS remain valid.

8.3.21.2 Impacts

As stated in the Draft Solar PEIS, the primary transportation impacts are anticipated to be from commuting worker traffic. Single projects could involve up to 1,000 workers each day, with an additional 2,000 vehicle trips per day (maximum). For a single project, this volume of traffic on Old U.S. 80 would represent an increase in traffic of about 200% in the area of the Gillespie SEZ. If all project traffic were to be routed through State Route 85, such traffic levels would represent about a 20% increase in the traffic levels experienced on State Route 85 near the SEZ. Because higher traffic volumes would be experienced during shift changes, traffic on Old U.S. 80 could experience moderate slowdowns during these time periods in the area of any junctions with SEZ site access roads. Local road improvements, in addition to turn lanes, might be necessary on any portion of Old U.S. 80 near any site access point(s).

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

Appendix A) that requires consideration of replacement of lost OHV route acreage and of access across and to public lands.

8.3.21.3 SEZ-Specific Design Features and Design Feature Effectiveness

Required programmatic design features that would reduce transportation impacts are described in Section A.2.2 of Appendix A of this Final Solar PEIS. The programmatic design features, including local road improvements, multiple site access locations, staggered work schedules, and ride-sharing, would all provide some relief to traffic congestion on local roads leading to the SEZ. Depending on the location of solar facilities within the SEZ, more specific access locations and local road improvements could be implemented.

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

8.3.22 Cumulative Impacts

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

8.3.22.1 Geographic Extent of the Cumulative Impacts Analysis

The geographic extent of the cumulative impact analysis has not changed. The extent varies on the basis of the nature of the resource being evaluated and the distance at which the impact may occur (e.g., air quality impacts may have a greater geographic extent than visual resources impacts). The BLM, DoD, and USFS administer most of the land around the SEZ; there are also several Tribal lands east, southeast, and south of the SEZ. The BLM administers approximately 43% of the lands within a 50-mi (80-km) radius of the SEZ.

8.3.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

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

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

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

8.3.22.2.1 Energy Production and Distribution

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

Sonoran Solar Energy Project

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

Solana Solar Generating Station

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

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

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

TABLE 8.3.22.2-1 (Cont.)

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

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

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

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

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

[e] See Sempra (2011) for details.

[f] See AVSE (2009) for details.

[g] NA = not applicable.

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

Cotton Center Solar Plant

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

Paloma Solar Plant

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

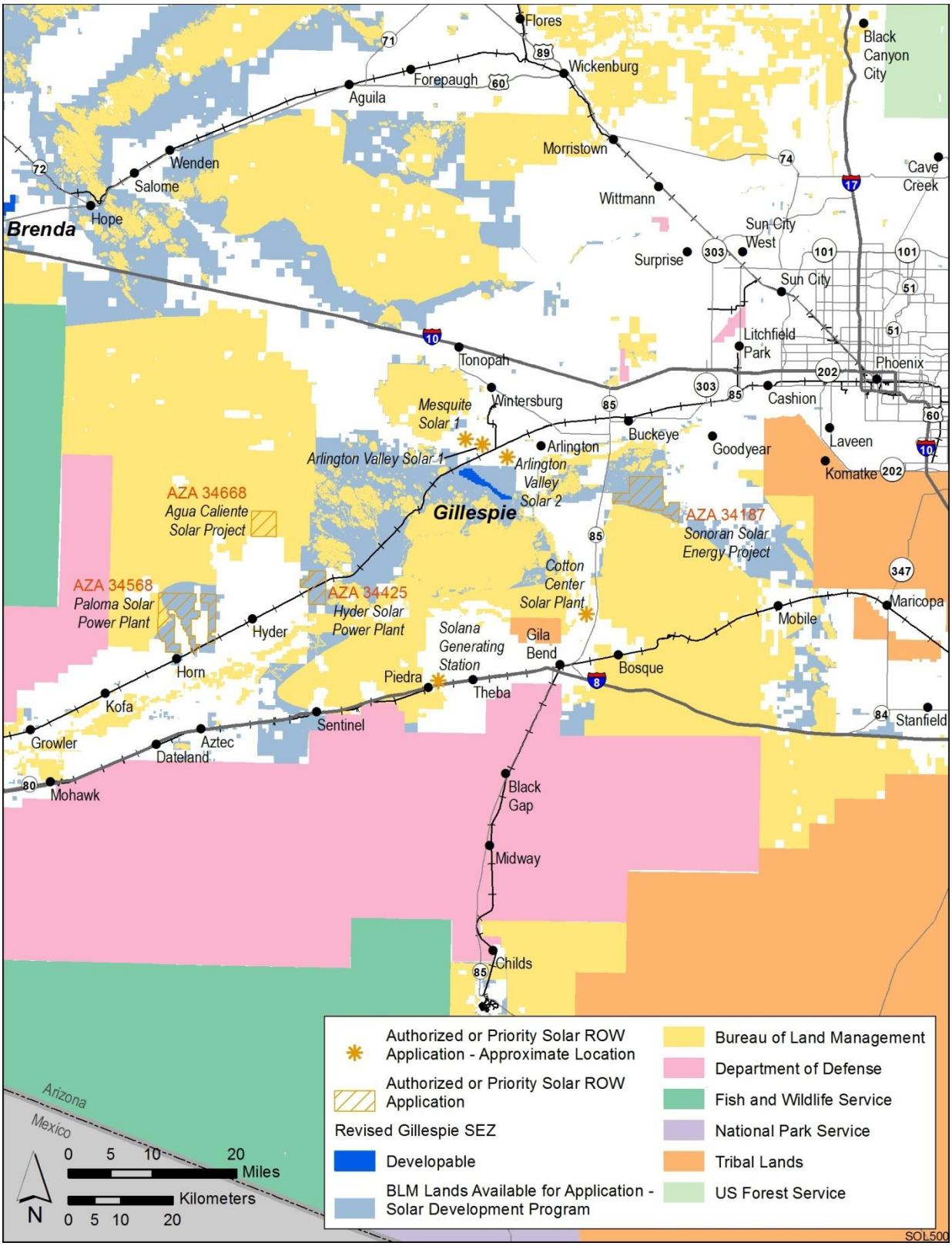

FIGURE 8.3.22.2-1 Locations of Existing and Reasonably Foreseeable Renewable Energy Projects on Public Land within a 50-mi (80-km) Radius of the Proposed Gillespie SEZ

Hyder Solar Plant

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

Agua Caliente Solar Project

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

8.3.22.2.2 Other Actions

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

8.3.22.3 General Trends

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

8.3.22.4 Cumulative Impacts on Resources

Total disturbance in the proposed Gillespie SEZ over 20 years is assumed to be up to about 2,094 acres (8.47 km^2) (80% of the developable area of the proposed SEZ). This development would contribute incrementally to the impacts from other past, present, and reasonably foreseeable future actions in the region as described in the Draft Solar PEIS. Primary impacts from development in the Gillespie SEZ may include impacts on water quantity and quality, air quality, ecological resources such as habitat and species, cultural and visual resources, and specially designated lands.

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

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

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

TABLE 8.3.22.2-2 (Cont.)

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

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

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

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

[d] See DoD (2012) for details.

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

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

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

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

8.3.23 Transmission Analysis

The methodology for this transmission analysis is described in Appendix G of this Final Solar PEIS. This section presents the results of the transmission analysis for the Gillespie SEZ, including the identification of potential load areas to be served by power generated at the SEZ and the results of the DLT analysis. Unlike Sections 8.3.2 through 8.3.22, this section is not an update of previous analysis for the Gillespie SEZ; this analysis was not presented in the Draft

Solar PEIS. However, the methodology and a test case analysis were presented in the Supplement to the Draft Solar PEIS. Comments received on the material presented in the Supplement were used to improve the methodology for the assessment presented in this Final Solar PEIS.

On the basis of its size, the assumption of a minimum of 5 acres (0.02 km^2) of land required per MW, and the assumption of a maximum of 80% of the land area developed, the Gillespie SEZ is estimated to have the potential to generate 419 MW of marketable solar power at full build-out.

8.3.23.1 Identification and Characterization of Load Areas

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

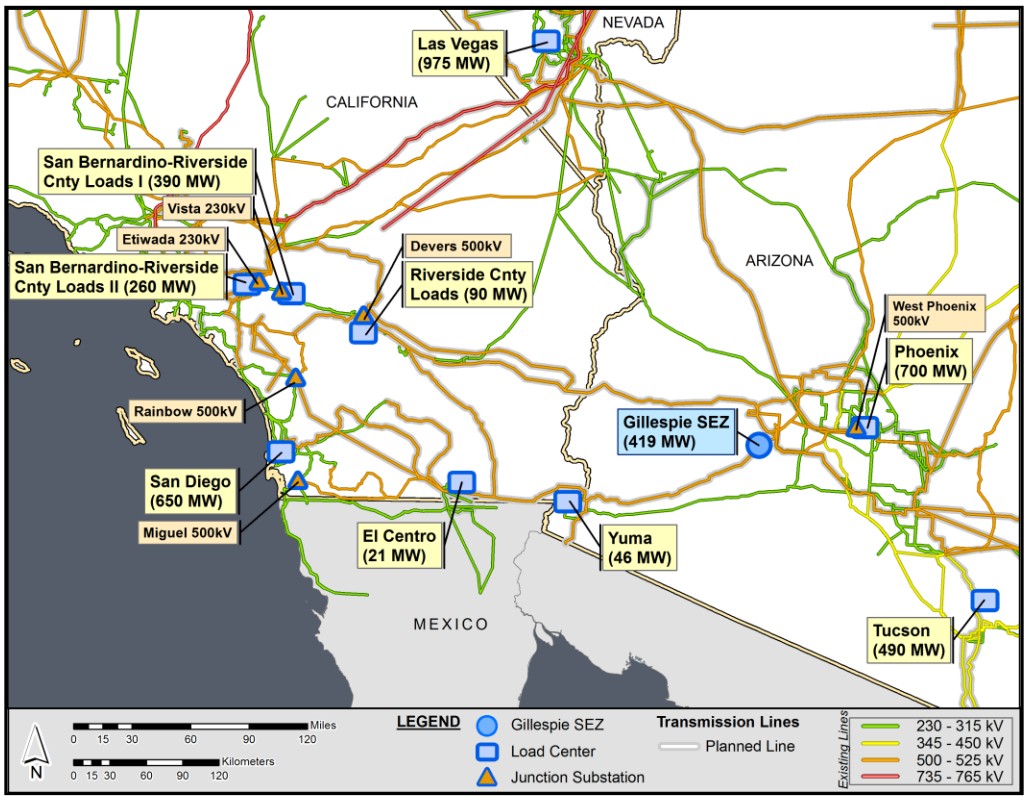

FIGURE 8.3.23.1-1 Location of the Proposed Gillespie SEZ and Possible Load Areas (Source for background map: Platts 2011)

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

1. Phoenix, Arizona, and

2. Tucson, Arizona.

Figures 8.3.23.1-2 shows the most economically viable transmission scheme for the Gillespie SEZ (transmission scheme 1), and Figure 8.3.23.1-3 shows an alternative transmission scheme (transmission scheme 2) that represents a logical choice should transmission scheme 1 be infeasible. As described in Appendix G, the alternative shown in transmission scheme 2 represents the optimum choice if one or more of the primary linkages in transmission scheme 1 are excluded from consideration. The groups provide for linking loads along alternative routes so that the SEZ's output of 419 MW could be fully allocated.

Table 8.3.23.1-1 summarizes and groups the load areas according to their associated transmission scheme and provides details on how the megawatt load for each area was estimated.

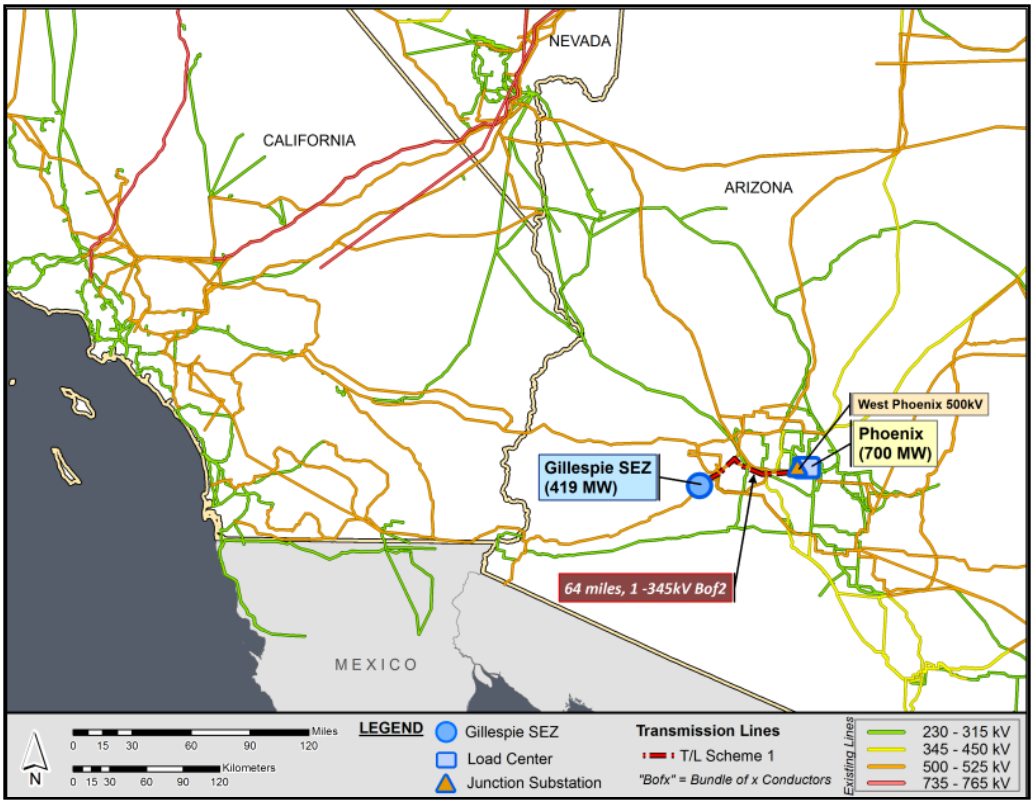

FIGURE 8.3.23.1-2 Transmission Scheme 1 for the Proposed Gillespie SEZ (Source for background map: Platts 2011)

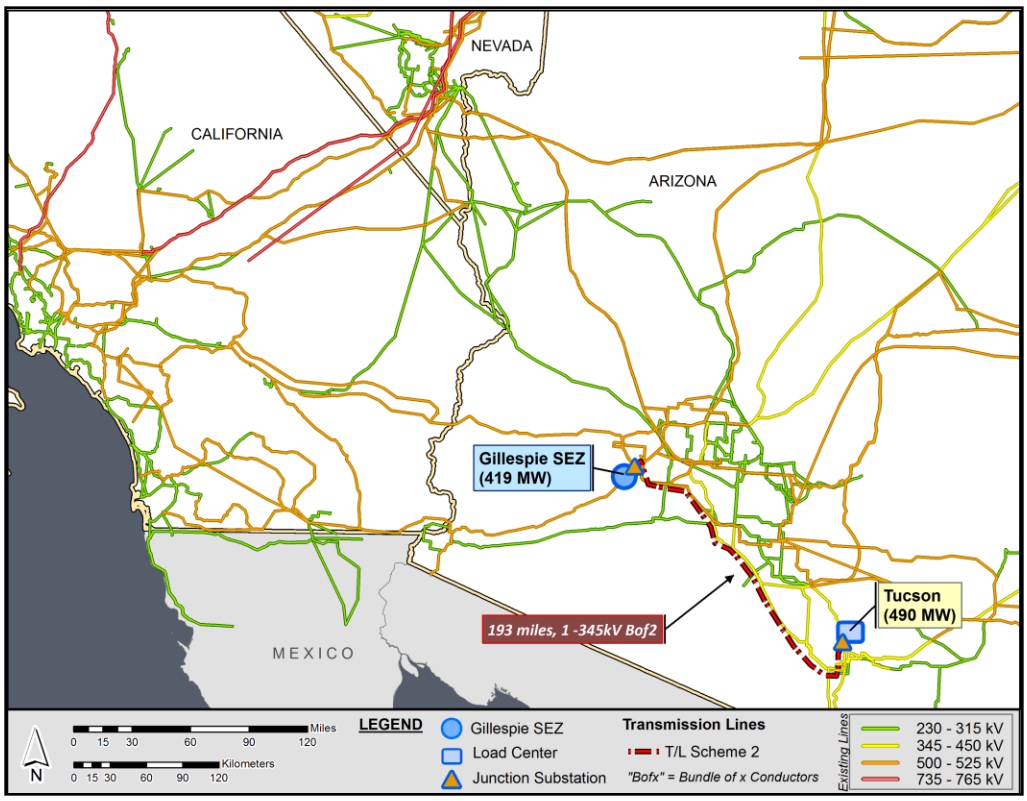

FIGURE 8.3.23.1-3 Transmission Scheme 2 for the Proposed Gillespie SEZ (Source for background map: Platts 2011)

TABLE 8.3.23.1-1 Candidate Load Area Characteristics for the Proposed Gillespie SEZ

Transmission Scheme	City/Load Area Name	Position Relative to SEZ	2010 Population[c]	Estimated Total Peak Load (MW)	Estimated Peak Solar Market (MW)
1	Phoenix, Arizona[a]	East	1,400,000	3,614	700
2	Tucson, Arizona[b]	East	980,000	2,450	490

[a] The load area represents the city named.

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

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

8.3.23.2 Findings for the DLT Analysis

The DLT analysis approach assumes that the Gillespie SEZ will require all new construction for transmission lines (i.e., dedicated lines) and substations. The new transmission lines(s) would directly convey the 419-MW output of the Gillespie SEZ to the prospective load areas for each possible transmission scheme. The approach also assumes that all existing transmission lines in the WECC region are saturated and have little or no available capacity to accommodate the SEZ's output throughout the entire 10-year study horizon.

Figures 8.3.23.1-2 and 8.3.23.1-3 display the pathways that new dedicated lines might follow to distribute solar power generated at the Gillespie SEZ via the two identified transmission schemes described in Table 8.3.23.1-1. These pathways parallel existing 500-, 345, 230-kV, and/or lower voltage lines. The intent of following existing lines is to avoid pathways that may be infeasible due to topographical limitations or other concerns.

For transmission scheme 1, a new line would be constructed to connect with Phoenix (700 MW) so that the 419-MW output of the Gillespie SEZ could be fully utilized. This particular scheme has one 64-mi (103-km) segment. The configuration of this segment would be a single-circuit 345-kV (1-345 kV) line employing conductors in a bundle of two (Bof2). The transmission configuration options were determined by using the line "loadability" curve in American Electric Power's *Transmission Facts* (AEP 2010). Appendix G documents the line options used for this analysis and describes how the load area groupings were determined.

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

Table 8.3.23.2-1 summarizes the distances to the various load areas over which new transmission lines would need to be constructed, as well as the assumed number of substations that would be required. One substation is assumed to be installed at each load area and an additional one at the SEZ. In general, the total number of substations per scheme is simply equal to the number of load areas associated with the scheme plus one. Substations at the load areas would consist of one or more step-down transformers, while the originating substation at the SEZ would consist of several step-up transformers. For schemes that require the branching of the lines, a switching substation is assumed to be constructed at the appropriate junction. In general, switching stations carry no local load but are assumed to be equipped with switching gears (e.g., circuit breakers and connecting switches) to reroute power as well as, in some cases, with additional equipment to regulate voltage. The originating substation would have a combined substation rating of at least 419 MW (to match the plant's output), while the combined load substations would have a similar total rating of 419 MW.

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

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

[a] The load area represents the city named.

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

[c] From Table 8.3.23.1-1.

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

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

Table 8.3.23.2-3 shows the estimated NPV of both transmission schemes and takes into account the cost of constructing the lines, the substations, and the projected revenue stream over the 10-year horizon. A positive NPV indicates that revenues more than offset investments. This calculation does not include the cost of producing electricity.

The most economically attractive configuration (transmission scheme 1) has the highest positive NPV and serves Phoenix. The secondary case (transmission scheme 2), which excludes one or more of the primary pathways used in scheme 1, is less economically attractive and focuses on delivering power to Tucson.

Table 8.3.23.2-4 shows the effect of varying the value of the utilization factor on the NPV of the transmission schemes. The table shows that at about 20% utilization, the NPVs for both schemes are positive. It also shows that as the utilization factor is increased, the economic viability of the lines also increases. Utilization factors can be raised by allowing the new dedicated lines to market other power generation outputs in the region in addition to that of its associated SEZ.

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

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

[a] The load area represents the city named.

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

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

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

TABLE 8.3.23.2-3 Comparison of Potential Transmission Lines with Respect to NPV (Base Case) for the Proposed Gillespie SEZ

Transmission Scheme	City/Load Area Name	Present Value Transmission Line Cost ($ million)	Present Value Substation Cost ($ million)	Annual Sales Revenue ($ million)	Present Worth of Revenue Stream ($ million)	NPV ($ million)
1	Phoenix, Arizona[a]	140.8	27.7	73.4	566.8	398.4
2	Tucson, Arizona[b]	424.6	27.7	73.4	566.8	114.6

[a] The load area represents the city named.

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

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

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

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

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

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

[a] The load area represents the city named.

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

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

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

8.3.24 Impacts of the Withdrawal

The BLM is proposing to withdraw 2,618 acres (11 km^2) of public land comprising the proposed Gillespie SEZ from settlement, sale, location, or entry under the general land laws, including the mining laws, for a period of 20 years (see Section 2.2.2.2.4 of the Final Solar PEIS). The public lands would be withdrawn, subject to valid existing rights, from settlement, sale, location, or entry under the general land laws, including the mining laws. This means that the lands could not be appropriated, sold, or exchanged during the term of the withdrawal, and new mining claims could not be filed on the withdrawn lands. Mining claims filed prior to the segregation or withdrawal of the identified lands would take precedence over future solar energy development. The withdrawn lands would remain open to the mineral leasing, geothermal leasing, and mineral material laws, and the BLM could elect to lease the oil, gas, coal, or geothermal steam resources, or to sell common-variety mineral materials, such as sand and

gravel, contained in the withdrawn lands. In addition, the BLM would retain the discretion to authorize linear and renewable energy ROWs on the withdrawn lands.

The purpose of the proposed land withdrawal is to minimize the potential for conflicts between mineral development and solar energy development for the proposed 20-year withdrawal period. Under the land withdrawal, only mining claims recorded before the current segregation could be developed, if valid. Because the Gillespie SEZ has an active claim, it is possible that some mining-related surface development could occur at the site during the withdrawal period and preclude use of at least a portion of the SEZ for solar energy development. Mining-related surface development includes activities such as the establishment of open pit mining, construction of roads for hauling materials, extraction of ores from tunnels or adits, or construction of facilities to process the material mined.

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

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

8.3.25 References

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

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8.3.26 Errata for the Proposed Gillespie SEZ

This section presents corrections to material presented in the Draft Solar PEIS and the Supplement to the Draft. The need for these corrections was identified in several ways: through comments received on the Draft Solar PEIS and the Supplement to the Draft (and verified by the authors), through new information obtained by the authors subsequent to publication of the Draft Solar PEIS and the Supplement to the Draft, or through additional review of the original material by the authors. Table 8.3.26-1 provides corrections to information presented in the Draft Solar PEIS and the Supplement to the Draft.

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

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

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