9.4 RIVERSIDE EAST

9.4.1 Background and Summary of Impacts

9.4.1.1 General Information

The proposed Riverside East SEZ is the largest of the proposed SEZs in the six-state study area**,** with a total area of 202,896 acres (821 km^2). The SEZ spans a distance of about 45 mi (72 km) between the points farthest west and east, but it has an irregular shape with a large excluded central area (see Figure 9.4.1.1-1). The eastern boundary of the site is about 6 mi (10 km) west of the Arizona border. The western boundary abuts and surrounds a portion of Joshua Tree National Park. The nearest towns with populations greater than 10,000 are Blythe, located about 6 mi (10 km) southeast of the SEZ with a 2008 population of 21,727; and Indio, located about 45 mi (72 km) west of the SEZ on I-10, with a 2008 population of 84,443. The small town of Desert Center (2000 population of 150) is located at the far southwestern edge of the SEZ, along I-10.

The SEZ is located in Riverside County in southeastern California. In 2008, the county population was 84,443. The closest large cities are Moreno Valley, San Bernardino, and Riverside (all located slightly more than 100 mi [161 km] west of the SEZ on I-10. The Interstate runs east–west along the southern boundary of the SEZ. Other paved roads that cross parts of the Riverside East SEZ include State Route 177, which runs north–south through the western section of the SEZ, and Midland Road, which crosses the northeastern portion of the SEZ. U.S. 95 runs north–south about 3 mi (5 km) from the eastern boundary of the SEZ and through the town of Blythe.

The nearest operating railroad is the Arizona and California (ARZC) Railroad, which passes through Rice, about 18 mi (29 km) north of the large eastern section of the proposed Riverside East SEZ. The ARZC is a regional short line; the rail stop at Vidal is about a 41 mi (66 km) drive from the SEZ via U.S. 95. Eight small airports open to the public are within a driving distance of approximately 72 mi (116 km) of the SEZ.

An existing 500-kV transmission line runs east–west along I-10 and parallel to the southern SEZ boundary. It is assumed that the existing 500-kV transmission line could potentially provide access from the SEZ to the transmission grid (see Section 9.4.1.2). In addition, a 230-kV line passes through the far western section of the SEZ, and a 69-kV line passes through the eastern portion of the SEZ, along with other transmission lines (see Section 9.4.2).

As of February 2010, a total of 15 solar project applications were pending in the SEZ. The combined areas of these applications cover about 132,000 acres (534 km^2), about 65% of the SEZ area (see Figure 9.4.1.1-1). Of these active pending applications within the SEZ, three are fast-track applications for parabolic trough facilities and one is a fast-track application for a PV facility. The combined capacity for these four facilities, when built, would be about 2,300 MW.

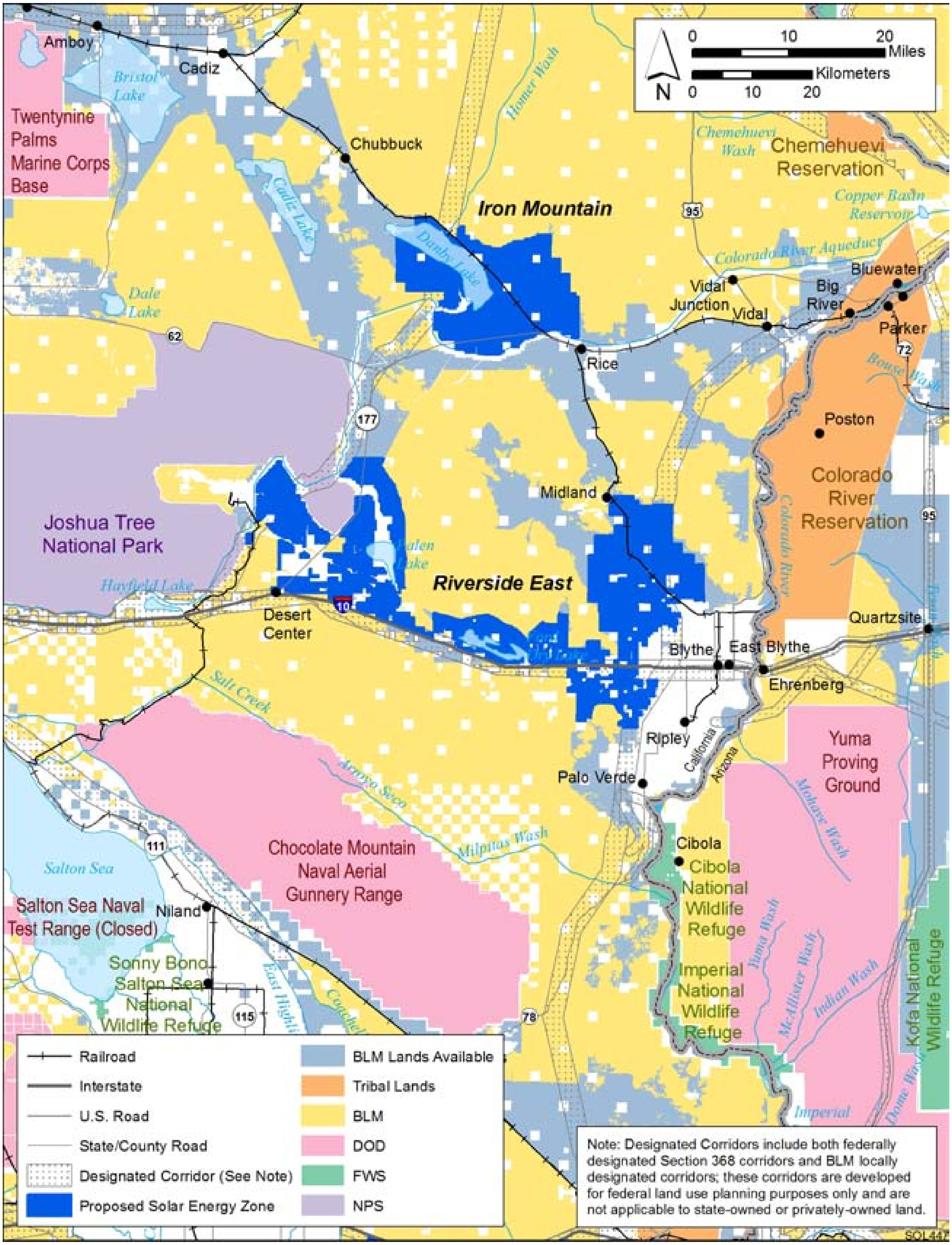

FIGURE 9.4.1.1-1 Proposed Riverside East SEZ

The proposed Riverside East SEZ and other relevant information are shown in Figure 9.4.1.1-1. The criteria used to identify the SEZ as an appropriate location for solar development included proximity to existing transmission lines or designated corridors, proximity to existing roads, a slope of generally less than 2%, and an area of more than 2,500 acres (10 km^2). In addition, the area was identified as being free of other types of conflicts, such as USFWS-designated critical habitat for threatened and endangered species, ACECs, SRMAs, and NLCS lands (see Section 2.2.2.2 for the complete list of exclusions). Although these classes of restricted lands were excluded from the proposed Riverside East SEZ, other restrictions might be appropriate. The analyses in the following sections address the affected environment and potential impacts associated with utility-scale solar energy development in the proposed SEZ for important environmental, cultural, and socioeconomic resources.

As initially announced in the *Federal Register* on June 30, 2009, the proposed Riverside East SEZ encompassed 202,295 acres (819 km^2). Subsequent to the study area scoping period, the Riverside East boundaries were altered somewhat to facilitate the BLM's administration of the SEZ area. Borders with irregularly shaped boundaries were adjusted to match the section boundaries of the PLSS (BLM and USFS 2010). Some small higher slope areas at the borders of the site were also added to the SEZ, but these higher slope areas would not likely be utilized for solar facilities. The revised SEZ is approximately 600 acres (2.4 km^2) larger than the original SEZ as published in June 2009.

9.4.1.2 Development Assumptions for the Impact Analysis

Maximum development of the proposed Riverside East SEZ was assumed to be 80% of the total SEZ area over a period of 20 years, a maximum of 162,317 acres (657 km^2). These values are shown in Table 9.4.1.2-1, along with other development assumptions. Full development of the Riverside East SEZ would allow development of facilities with an estimated total of 18,035 MW of electrical power capacity if power tower, dish engine, or PV technologies were used, assuming 9 acres/MW (0.04 km^2/MW) of land required, and an estimated 32,463 MW of power if solar trough technologies were used, assuming 5 acres/MW (0.02 km^2/MW) of land required.

Availability of transmission from SEZs to load centers will be an important consideration for future development in SEZs. The nearest existing transmission line is a 500-kV line that runs through the SEZ. It is possible that this existing line could be used to provide access from the SEZ to the transmission grid, but the 500-kV capacity of that line would be inadequate for 18,035 to 32,463 MW of new capacity (note that a 500-kV line can accommodate approximately the load of one 700 MW facility). At full build-out capacity, it is clear that substantial new transmission and/or upgrades of existing transmission lines would be required to bring electricity from the proposed Riverside East SEZ to load centers; however, at this time the location and size of such new transmission facilities are unknown. Generic impacts of transmission and associated infrastructure construction and of line upgrades for various resources are discussed in Chapter 5. Project-specific analyses would need to identify the specific impacts of new transmission construction and line upgrades for any projects proposed within the SEZ.

TABLE 9.4.1.2-1 Proposed Riverside East Development Acreages, Maximum Solar Megawatt Output, Access Roads, and Transmission Line ROWs

Total 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 Transmission Line ROW and Road ROW	Distance to Nearest Designated Transmission Corridor[d]
202,896 acres and 162,317 acres[a]	18,035 MW[b] 32,463 MW[c]	Adjacent (I-10)	Adjacent to SEZ, and 500 kV	0 acres and 0 acres	Adjacent to SEZ[e]

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

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

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

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

[e] A Section 368 federally designated 2-mi (3-km) wide energy corridor runs adjacent to the south boundary of the SEZ.

For the purposes of analysis in this PEIS, it was assumed that the existing 500-kV transmission line that runs east–west along I-10 and parallel to the southern SEZ boundary could provide access to the transmission grid, and thus no additional acreage disturbance for transmission line access was assessed. In addition, a 230-kV line passes through the far western section of the SEZ, and a 69-kV line passes through the eastern portion of the SEZ. Access to the existing transmission lines was assumed, without additional information on whether these lines would be available for connection of future solar facilities. If a connecting transmission line were constructed in the future to a different off-site grid location from the one assumed here, site developers would need to determine the impacts from construction and operation of that line. Additionally, developers would need to determine the impacts of line upgrades if they are needed.

Existing road access to the proposed Riverside East SEZ should be adequate to support construction and operation of solar facilities, because I-10 passes along the southern edge of the SEZ and there are several exits from I-10 as it passes by and through the SEZ. Because of the site access provided by I-10, no additional road construction outside of the SEZ is assumed to be required to support solar development of the SEZ.

9.4.1.3 Summary of Major Impacts and SEZ-Specific Design Features

In this section, the impacts and SEZ-specific design features assessed in Sections 9.4.2 through 9.4.21 for the proposed Riverside East SEZ are summarized in tabular form. Table 9.4.1.3-1 is comprehensive list of the impacts identified in these sections; the reader may reference the applicable sections for detailed support of the impact assessment. Section 9.4.22 discusses potential cumulative impacts from solar energy development in the proposed SEZ.

Only those design features specific to the proposed Riverside East SEZ are included in Sections 9.4.2 through 9.4.21 and in the summary table. The detailed programmatic design features for each resource area to be required under BLM's proposed Solar Energy Program are presented in Appendix A, Section A.2.2. These programmatic design features would also be required for development in this and the other SEZs.

TABLE 9.4.1.3-1 Summary of Impacts of Solar Energy Development within the Proposed Riverside East SEZ and SEZ-Specific Design Features[a]

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Lands and Realty	Full development of the SEZ for utility-scale solar energy production (80% of the total area) could disturb up to 162,317 acres (657 km^2) and would establish a very large and continuous industrial area along the 45-mi (72-km) stretch of I-10 that would exclude many existing and potential uses of the land, perhaps in perpetuity. Since much of the SEZ is undeveloped and rural, utility-scale solar energy development would introduce a new and discordant land use to the area.	None.
	Solar development along the I-10 corridor, State Route 177, and Midland Road would be highly visible to the public traveling these routes. In addition, solar development in the western portion of the SEZ along State Route 177 and County Road 2 would likely create conflict with existing residential use near Desert Center, Lake Tamarisk Resort, and scattered private residences, including those associated with agricultural development.	None.
	It is possible that the 11,640 acres (47 km^2) of private and state lands located within the external boundary of the SEZ eventually would be developed in the same or a complementary manner as the public lands.	None.
	15,683 acres (63 km^2) of the Section 368 energy corridor overlaps with the proposed SEZ. Two other BLM corridors oriented principally north and south designated in the CDCA Plan also overlap the SEZ. Because of technical constraints, solar development could not occur within a transmission ROW. Thus it appears that either the transmission corridors would have to be modified/reduced or solar development would have to be precluded within the transmission corridor.	None.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Specially Designated Areas and Lands with Wilderness Characteristics	SEZ development would adversely affect wilderness characteristics in the Palen-McCoy, Rice Valley, Big Maria Mountains, Chuckwalla Mountains, and Little Chuckwalla Mountains WAs and in Joshua Tree NP.	Application of SEZ-specific design features for visual resource impacts may reduce the visual impact on wilderness characteristics
	Solar facility development could adversely affect the scenic view from Joshua Tree National Park, the natural soundscape, and the quality of the night sky environment as viewed from the NP and wilderness areas in the region.	None.
	There is potential for adverse impacts on resources within the seven ACECs in and near the SEZ.	Once construction of solar energy facilities begins, the BLM would monitor resource conditions in the seven ACECs to determine whether additional design features would be required to protect the resources in these areas.
Rangeland Resources: Livestock Grazing	None.	None.
Rangeland Resources: Wild Horses and Burros	None.	None.
Recreation	Recreational users would lose the use of any portions of the SEZ developed for solar energy production, but the amount of recreation that is lost is expected to be small. Roads and trails through areas developed for solar power production could be closed or rerouted, although existing county roads would continue to provide general access where they exist.	None.
	The Midland LTVA is located within the SEZ, and solar development could occur very close to the LTVA. The impact of solar energy development on the use of the LTVA by winter visitors is not known, but it is likely the combination of increased traffic and development could discourage some of this use.	A buffer between the Midland LTVA and solar development should be established to preserve the LTVA area. The size of the buffer should be determined based on the site- and visitor-specific criteria.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Recreation *(Cont.)*	A large-scale change in the overall character of the SEZ would accompany intensive solar development and would discourage recreational use in areas adjacent to the SEZ, including designated wilderness, undesignated lands, and Joshua Tree NP. The potential loss of recreation use is not known.	None.
Military and Civilian Aviation	The development of any solar energy or transmission facilities that encroach into the airspace of MTRs could conflict with military training activities and could create a safety concern.	None.
	Two public airports are located within or in near proximity of the SEZ and could be affected by solar energy development.	Coordination with the FAA and local airport authorities should be required early in the project planning process to identify and mitigate potential impacts on the local airports. Precautions should be taken for pilots to avoid interference with flight paths or related flight operations, and to avoid reflector glare hazards and thermal plumes.
Geologic Setting and Soil Resources	Impacts on soil resources would occur as a result of ground-disturbing activities (e.g., grading, excavating, and drilling) during the construction phase. Impacts include soil compaction, soil horizon mixing, soil erosion and deposition by wind, soil erosion by water and surface runoff, sedimentation, and soil contamination. These may be impacting factors for other resources (e.g., air quality, water quality, and vegetation). Palen and Ford Dry Lakes may not be suitable locations for construction.	None.
Minerals (fluids, solids, and geothermal resources)	None.	None.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Water Resources	Ground-disturbance activities (affecting 4% of the total area in the peak construction year) could affect surface water quality due to surface runoff, sediment erosion, and contaminant spills. Construction activities may require up to 6,813 ac-ft (8.4 million m^3) of water during peak construction year. Construction activities could generate up to 222 ac-ft (273,800 m^3) of sanitary wastewater. Assuming full development of the SEZ, normal operations would use the following amounts of water: • For parabolic trough facilities (32,463-MW capacity), 23,180 to 49,150 ac-ft/yr (28.6 million to 60.6 million m^3/yr) for dry-cooled systems (wet cooling not feasible with respect to water requirements); • For power tower facilities (18,035-MW capacity), 12,827 to 27,255 ac-ft/yr (15.8 million to 33.6 million m^3/yr) for dry-cooled systems (wet cooling not feasible with respect to water requirements); • For dish engine facilities (18,035-MW capacity), 9,220 ac-ft/yr (11.4 million m^3/yr). • For PV facilities (18,035-MW capacity), 922 ac-ft/yr (1.1 million m^3/ yr). Assuming full development of the SEZ, normal operations would generate up to 455 ac-ft/yr (561,200 m^3/yr) of sanitary wastewater and up to 9,222 ac-ft (11.4 million m^3/yr) of blowdown water.	Wet-cooling options would not be feasible; other technologies should incorporate water conservation measures. Land disturbance activities should avoid impacts to the extent possible near the regions surrounding Palen Lake, Ford Dry Lake, and McCoy Wash. During site characterization, hydrologic investigations would need to identify 100-year floodplains and potential jurisdictional water bodies subject to Clean Water Act Section 404 permitting. Siting of solar facilities and construction activities should avoid areas identified as within a 100-year floodplain. During site characterization, coordination and permitting with CDFG regarding California's Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features (both perennial and ephemeral). Groundwater withdrawals should comply with rules and regulations set forth by the PVID for the portions of the SEZ located within PVID boundaries. The use of groundwater in the Chuckwalla Valley and Palo Verde Mesa should be planned for and monitored in cooperation with the BOR and the USGS in reference to the Colorado River Accounting Surface and the rules set forth in the Law of the River.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Water Resources *(Cont.)*	High TDS values of groundwater could produce water that is non-potable and corrosive to infrastructure.	Groundwater monitoring and production wells should be constructed in accordance with standards set forth by the State of California and Riverside County. Stormwater management plans and BMPs should comply with standards developed by the California Stormwater Quality Association. Water for potable uses would have to meet or be treated to meet water quality standards of the California Safe Drinking Water Act.
Vegetation[b]	Up to 80% (162,317 acres [657 km^2]) of the SEZ would be cleared of vegetation. Re-establishment of desert scrub or other communities in temporarily disturbed areas would likely be very difficult because of the arid conditions and might require extended periods of time. Noxious weeds could become established in disturbed areas and colonize adjacent undisturbed habitats, thus reducing restoration success and potentially resulting in widespread habitat degradation. The deposition of fugitive dust from disturbed soil areas in habitats outside a solar project area could result in reduced productivity or changes in plant community composition. Approximately 3,807 acres (15.4 km^2) of wetland habitat occurs within the SEZ and could be adversely affected by project development. Groundwater withdrawals could reduce groundwater discharge along riparian areas, and such reductions at springs and seeps that support riparian habitats could result in degradation of these habitats.	An Integrated Vegetation Management Plan, addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan, addressing habitat restoration and management, should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub communities and other affected habitats and minimize the potential for the spread of tamarisk, Sahara mustard, cheatgrass, or other invasive species. Invasive species control should focus on biological and mechanical methods where possible to reduce the use of herbicides. All wetland, riparian, playa, dry wash (including dry wash microphyll woodland), sand dune and sand transport areas, and chenopod scrub habitats within the SEZ should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetland, riparian, playa, and dry wash communities to reduce the potential for impacts on these communities on or near the SEZ.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Vegetation[b] *(Cont.)*		Appropriate engineering controls should be used to minimize impacts on wetland, riparian, playa, dry wash woodland, and chenopod scrub, including downstream occurrences, resulting from surface-water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls would be determined through agency consultation. Groundwater withdrawals should be limited to reduce the potential for indirect impacts on riparian habitat associated with groundwater discharge or groundwater-dependent communities, such as mesquite bosque or bush seep-weed communities.
Wildlife: Amphibians and Reptiles[b]	The red-spotted toad and Couch's spadefoot are the main amphibian species expected to occur within the Riverside East SEZ. Several other amphibian species could inhabit the Colorado River Aqueduct west of the SEZ. These species, which include the bullfrog, Colorado River toad, Rio Grande leopard frog, and Woodhouse's toad, would not be expected to occur within the SEZ. Thirty-one reptile species (the desert tortoise, which is a federally and state-listed species, 13 lizards, and 17 snakes) could occur within the SEZ. Direct impacts on these species from SEZ development would be moderate (3.5 to 5.9% of potentially suitable habitats identified for the species in the SEZ region would be lost). With implementation of programmatic design features, indirect impacts would be expected to be negligible.	To the extent practicable, avoid ephemeral drainages, Palen Lake and Ford Dry Lake, and wetlands. The potential for indirect impacts on several amphibian species could be reduced by maximizing the distance between solar energy development and the Colorado River Aqueduct.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Wildlife: Birds[b]	More than 100 species of birds have a range that encompasses the Riverside East SEZ region. However, habitats for about 40 of these species either do not occur on or are limited within the SEZ (e.g., habitat for waterfowl and wading birds). Direct impacts from habitat disturbance and long-term habitat reduction/fragmentation would be small to moderate (0.3 to 5.5% of potentially suitable habitats identified for the species in the SEZ region would be lost). Other impacts on birds could result from collision with vehicles and facility structures, surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, noise, lighting, spread of invasive species, accidental spills, and harassment. Indirect impacts on areas outside the SEZ (e.g., impacts caused by dust generation, erosion, and sedimentation) are expected to be negligible with implementation of proposed design features.	Pre-disturbance surveys should be conducted within the SEZ for desert bird focal species and bird species listed under the Migratory Bird Treaty Act. Impacts on potential nesting habitat for these species should be avoided during the nesting season. Plant species that positively influence the presence and abundance of the desert bird focal species should be avoided to the extent practicable. These species include Goodding's willow, yucca, Joshua tree, mesquite, honey mesquite, screwbean, desert mistletoe, big saltbush, smoketree, and catclaw acacia. Take of golden eagles and other raptors should be avoided. Mitigation regarding the golden eagle should be developed in consultation with the USFWS and CDFG. A permit may be required under the Bald and Golden Eagle Protection Act. To the extent practicable, ephemeral drainages, Ford Dry Lake and Palen Lake, wetlands, and the CRA should be avoided.
Wildlife: Mammals[b]	Direct impacts on cougar, mule deer, small game, furbearers, and small mammals on the SEZ from habitat disturbance and long-term habitat reduction/fragmentation would be moderate (3.3 to 7.2% of potentially suitable habitats identified for the species in the SEZ region would be lost).	The fencing around the solar energy development should not block the free passage of mule deer between the Colorado River and mountains or foothills.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Wildlife: Mammals[b] *(Cont.)*	Although the Riverside East SEZ falls within the overall range of the cougar, desert habitat is not the preferred habitat for the species. It is unlikely that impacts from solar energy development within the SEZ would represent an actual loss of occupied habitat. Mule deer could occur within the desert scrub and desert wash habitats of the SEZ for portions of the year, particularly when standing water occurs in Ford Dry Lake and Palen Lake. Fencing around a large solar development within the SEZ could affect movement of mule deer between the Colorado River and mountains or foothills. Other impacts on mammals could result from collision with vehicles and fences, surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, noise, lighting, spread of invasive species, accidental spills, and harassment. Indirect impacts on areas outside the SEZ (e.g., impacts caused by dust generation, erosion, and sedimentation) are expected to be negligible with implementation of proposed design features.	To the extent practicable, ephemeral drainages, Ford Dry Lake and Palen Lake, wetlands, and the Colorado River Aqueduct should be avoided.
Aquatic Biota[b]	No permanent water bodies or streams are present within the boundaries of the Riverside East SEZ. Within the SEZ and the area of potential indirect effects, aquatic biota, if present in Palen Lake, Ford Dry Lake, and wetlands, could be affected by ground disturbance, contaminants inputs, and soil deposition from runoff and fugitive dust.	Ground disturbance near McCoy Wash, Palen Lake, Ford Dry Lake and wetlands should be avoided or minimized to the extent practicable.
	About 31 mi (50 km) of the Colorado River Aqueduct is present primarily along the western edge of the SEZ. Aquatic organisms present in this feature could be affected by airborne particulate deposition originating from the SEZ especially for ground disturbance occurring along the western boundary of the SEZ.	None.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Special Status Species[b]	Potentially suitable habitat for 69 special status species occurs in the affected area of the Riverside East SEZ. For most of these special status species, between 1% and 10% of the potentially suitable habitat in the region occurs in the area of direct effects; for several dune-obligate species, up to 32% of the potentially suitable habitat in the region occurs in the area of direct effects.	Pre-disturbance surveys should be conducted within the SEZ to determine the presence and abundance of special status species. Disturbance to occupied habitats for these species should be avoided or minimized to the extent practicable. If avoiding or minimizing impacts to occupied habitats is not possible for some species, translocation of individuals from areas of direct effect; or compensatory mitigation of direct effects on occupied habitats could reduce impacts. A comprehensive mitigation strategy for special status species that used one or more of these options to offset the impacts of development should be developed in coordination with the appropriate federal and state agencies. Disturbance of desert playa and wash habitats within the SEZ should be avoided or minimized to the extent practicable. In particular, development should be avoided in and near Ford Dry Lake, Palen Lake, and McCoy Wash within the SEZ. Avoiding or minimizing disturbance of these habitats could reduce impacts on 9 special status species. Avoiding or minimizing disturbance of sand dunes and sand transport systems, woodlands, rocky cliffs, and outcrops on the SEZ could reduce impacts on 20 special status species. Consultations with the USFWS and the CDFG should be conducted to address the potential for impacts on the desert tortoise a species listed as

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Special Status Species[b] *(Cont.)*		threatened under the ESA and CESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements. Harassment or disturbance of special status species and their habitats in the affected area should be mitigated by identifying any additional sensitive areas and implementing necessary protection measures based upon consultation with the USFWS and CDFG.
Air Quality and Climate	*Construction*: Temporary exceedances of AAQS for PM_{10} and $PM_{2.5}$ at the SEZ boundaries; higher concentrations would be limited to the immediate area surrounding the SEZ boundary and would decrease quickly with distance. For construction occurring in the west-central portion of the SEZ, fugitive dust emissions could result in considerable impacts at the nearest federal Class I area (Joshua Tree NP). (Conservative assumptions e.g., three simultaneous construction projects occurring in close proximity to the Joshua Tree NP resulted in these estimates). Engine exhaust of heavy equipment and vehicles could cause some impacts on air-quality-related values (e.g., visibility and acid deposition) at the nearest federal Class I area. NO_x emissions from engine exhaust would be the primary contributors to potential impacts on AQRVs.	None.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Air Quality and Climate *(Cont.)*	*Operations*: Positive impact due to avoided emission of air pollutants from combustion-related power generation: 30 to 54% of total emissions of SO_2, NO_x, Hg, and CO_2 from electric power systems in the state of California avoided (up to 7,272 tons/yr SO_2, 11,944 tons/yr NO_x, 0.11 ton/yr Hg, and 28,258,000 tons/yr CO_2).	
Visual Resources	Large visual impacts on the SEZ and surrounding lands within the SEZ viewshed due to major modification of the character of the existing landscape; potential additional impacts from construction and operation of transmission lines and access roads within the SEZ. Residents, workers, and visitors to the area may experience visual impacts from solar energy facilities located within the SEZ (as well as any associated access roads and transmission lines) as they travel area roads. Nearby residents could be subjected to large visual impacts from solar energy development within the SEZ. The SEZ is located within the CDCA. While renewable energy development is allowable within the SEZ under the CDCA management plan, substantial, immitigable visual impacts will occur within the CDCA in the SEZ and surrounding lands. The SEZ is adjacent to Joshua Tree NP and Joshua Tree WA. Because of the open views of the SEZ and/or elevated viewpoints, strong visual contrasts could be observed by NP and WA visitors. The SEZ is adjacent to the Big Maria Mountains WA. Because of the open views of the SEZ and/or elevated viewpoints, strong visual contrasts could be observed by WA visitors. The SEZ is located 1.1 mi (1.8 km) from the Chuckwalla Mountains WA. Because of the open views of the SEZ and elevated viewpoints, weak to strong visual contrasts could be observed by WA visitors.	Within the SEZ, in areas west of the northwest corner of Section 6 of Township 006S Range 017E, and in areas north and west of the northwest corner of Section 30 of Township 005S Range 018E, visual impacts associated with solar energy development in the SEZ should be consistent with VRM Class II management objectives, as determined from KOPs to be selected by the BLM within Joshua Tree NP and the Palen-McCoy WA. Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the Rice Valley or Big Maria Mountains WSAs, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by the BLM) within the WSAs, and in areas visible from between 3 and 5 mi (4.8 and 8.0 km); visual impacts should be consistent with VRM Class III management objectives.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Visual Resources *(Cont.)*	The SEZ is located 5 mi (8 km) from the Little Chuckwalla Mountains WA. Because of the open views of the SEZ and elevated viewpoints, moderate to strong visual contrasts could be observed by WA visitors. The SEZ is adjacent to the Palen-McCoy WA. Because of the open views of the SEZ and/or elevated viewpoints, weak to strong visual contrasts could be observed by WA visitors. The SEZ is located 6 mi (10 km) from the Palo Verde Mountains WA. Because of the open views of the SEZ and elevated viewpoints, weak to moderate visual contrasts could be observed by WA visitors. The SEZ is located 0.5 mi (0.8 km) from the Rice Valley WA. Because of the open views of the SEZ and elevated viewpoints, strong visual contrasts could be observed by WA visitors. The SEZ is located 5 mi (8 km) from the Corn Springs Scenic ACEC. Because of the open views of the SEZ and elevated viewpoints, strong visual contrasts could be observed by ACEC visitors. Approximately 23 mi (37.0 km) of the Bradshaw Trail BLM Backcountry Byway is within the SEZ viewshed. Weak to strong visual contrasts could be observed within and near the SEZ by travelers on the Bradshaw Trail. Approximately 79 mi (127 km) of I-10 is within the SEZ viewshed. Six mi (10 km) of I-10 is within or abuts the SEZ. An additional 34 mi (55 m) is within 0.67 mi (1.1 km). Strong visual contrasts could be observed within and near the SEZ by travelers on I-10. Approximately 27 mi (43 m) of State Route 177 is within the SEZ viewshed. Eight mi (13 km) of State Route 177 is within the SEZ. Strong visual contrasts could be observed within and near the SEZ by travelers on State Route 177.	

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Visual Resources *(Cont.)*	The communities of Blythe, East Blythe, Ehrenberg, Palo Verde, Ripley, Cibola (Arizona), and Desert Center (including the Lake Tamarisk development) are located within the viewshed of the SEZ, although slight variations in topography and vegetation provide some screening. Strong visual contrasts may be observed within Desert Center and Lake Tamarisk. Moderate to strong visual contrasts may be observed within Blythe, East Blythe, and Ripley. Weak to moderate visual contrasts may be observed within Ehrenberg and Palo Verde.	
Acoustic Environment	*Construction*. Estimated noise levels at the nearest residences located just next to the west-central SEZ boundary would be about 74 dBA L_{eq}, which is higher than Riverside County regulation of 45 dBA daytime L_{eq} For a 10-hour daytime work schedule, 70 dBA L_{dn} at the nearest residences would be well above the EPA guideline of 55 dBA L_{dn} for residential areas. *Operations*. Noise levels at the nearest residences from a CSP solar facility would be 51 dBA L_{eq}, which is higher than the Riverside County standard of 45 dBA daytime L_{eq}. For 12-hour daytime operations, the estimated 49 dBA L_{dn} falls below the EPA guideline of 55 dBA L_{dn} for residential areas. However, for facilities with 6-hour TES, the estimated nighttime sound level at the nearest residences would be 61 dBA L_{eq}, which is higher than the Riverside County standard of 45 dBA daytime L_{eq}. The day-night average level is estimated to be about 63 dBA L_{dn}, which is higher than the EPA guideline of 55 dBA L_{dn} for residential areas. If 80% of the SEZ were developed with dish engine facilities, the estimated noise level of 59 dBA L_{eq} at the nearby residence would be higher than the Riverside County regulation of 45 dBA daytime L_{eq}. For 12-hour daytime operations, the estimated 56 dBA L_{dn} at the nearby residence would be a little higher than the EPA guideline of 55 dBA L_{dn} for residential areas.	Noise levels from cooling systems equipped with TES should be managed so that levels at the nearby residences to the west and to the east of the SEZ are kept within applicable guidelines. This could be accomplished in several ways, for example, through placing the power block approximately 1 to 2 mi (1.6 to 3 km) or more from residences, limiting operations to a few hours after sunset, and/or installing fan silencers. Dish engine facilities within the Riverside East SEZ should be located more than 1 to 2 mi (1.6 to 3 km) from the nearby residences to the west and the east of the SEZ (i.e., the facilities should be located in other portions of the proposed SEZ). Direct noise control measures applied to individual dish engine systems could also be used to reduce noise impacts at the nearest residences.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Paleontological Resources	The potential for impacts on significant paleontological resources at the SEZ is relatively unknown, but could be high in some areas. A more detailed investigation of the local geological deposits of the SEZ and their potential depth is needed; a paleontological survey would likely be required prior to project approval.	The need for and the nature of any SEZ-specific design features would depend on findings of paleontological surveys.
Cultural Resources	Direct impacts on significant cultural resources could occur in the proposed Riverside East SEZ; however, a cultural resource survey of the entire area of potential effect of a proposed project would first need to be conducted to identify archaeological sites, historic structures and features, and traditional cultural properties, and an evaluation would then be needed to determine whether any are eligible for listing in the NRHP. Numerous prehistoric and Native American sites and trails are potentially located within the SEZ and could be affected by solar energy development. Potential impacts on locations in the area that are of cultural or religious significance to Native American Tribes must also be evaluated. Activities associated with the WWII DDTC were also prominent in the valley, and physical remnants of those activities are present within the SEZ and could be affected.	Significant resources clustered in specific areas, such as those in the vicinity of Palen and Ford Dry Lakes, focused DTC/C-AMA activity areas that retain sufficient integrity, and Native American trails evident in the desert pavement should be avoided. Troops in training for World War II often used the same locations that Native Americans did for similar purposes. Any excavation of historic sites should take into consideration the potential for the co-location of prehistoric and ethnohistoric components. Other possible design features specific to the SEZ would be determined through consultation with the California SHPO and affected Tribes.
Native American Concerns	Concerns have been expressed in the past over the Salt Song Trail, which passes down Palen Valley and through the Riverside East SEZ. Solar development within the SEZ is likely to be visible from the trail. Additional trail networks also go through or near the SEZ. Additional features of potential concern include Big Maria, Coxcomb, and Eagle Mountains, Alligator Rock, Black Rock, and McCoy Springs.	The need for and nature of SEZ-specific design features would be determined during government-to-government consultation with the affected Tribes.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Native American Concerns *(Cont.)*	As consultations continue, it is possible that other Native American concerns, regarding solar energy development within the SEZ will emerge. The Soboba Band of Luiseno Indians and the Quechan have expressed concerns over highly sensitive areas within their Tribal Traditional Use Areas.	
Socioeconomics	*Construction:* 1,181 to 15,633 total jobs; $70 million to $927 million income in ROI. *Operations:* 498 to 11,670 annual total jobs; $17 million to $424 million annual income in the ROI.	None.
Environmental Justice	There are both minority populations and low-income populations, as defined by CEQ guidelines, within the 50-mi (80-km) radius around the boundary of the SEZ, meaning that any adverse impacts of solar projects could disproportionately affect minority and low-income populations.	None.
Transportation	The primary transportation impacts would result from commuting worker traffic. I-10 provides a regional traffic corridor that would experience small impacts for single projects that may have up to 1,000 daily workers, with an additional 2,000 vehicle trips per day (maximum). Such an increase is less than 10% of the current traffic on I-10. However, the exits on I-10 might experience moderate impacts with some congestion. Should up to three large projects with approximately 1,000 daily workers each be under development simultaneously, an additional 6,000 vehicle trips per day could be added to I-10 in the vicinity of the SEZ, which is about a 25% increase in the current average daily traffic level on most segments of I-10 near the SEZ.	None.

TABLE 9.4.1.3-1 (Cont.)

Resource Area	Environmental Impacts—Proposed Riverside East SEZ	SEZ-Specific Design Features
Transportation *(Cont.)*	Because of the proximity of the Blythe and Desert Center Airports, without proper planning, there could be problems with reflector glare from the SEZ interfering with pilot vision during takeoffs and landings.	None.

Abbreviations: AAQS = ambient air quality standards; ACEC = Area of Critical Environmental Concern; BLM = Bureau of Land Management; BMP = best management practice; BOR = U.S. Bureau of Reclamation; CDCA = California Desert Conservation Area; CDFG = California Department of Fish and Game; CEQ = Council on Environmental Quality; CESA= California Endangered Species Act; CO_2 = carbon dioxide; dBA = A-weighted decibel; DoD = U.S. Department of Defense; DTC = Desert Training Center; EPA = U.S. Environmental Protection Agency; ESA = Endangered Species Act; FAA = Federal Aviation Administration; Hg = mercury; KOP = key observation point; L_{dn} = day-night average sound level; L_{eq} = equivalent continuous sound level; LTVA = long term visitor area; MTR = military training route; NO_x = nitrogen oxides; NP = National Park; NRHP = *National Register of Historic Places*; $PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 μm or less; PM_{10} = particulate matter with an aerodynamic diameter of 10 μm or less; PSD = prevention of significant deterioration;; PVID = Palo Verde Irrigation District; ROI = region of influence; SEZ = solar energy zone; SHPO = State Historic Preservation Office; SO_2 = sulfur dioxide; TDS = total dissolved solids; TES = thermal energy storage; USFWS = U.S. Fish and Wildlife Service; VRM = visual resource management; WA = Wilderness Area; WSA = Wilderness Study Area; WWII = World War II.

[a] The detailed programmatic design features for each resource area to be required under BLM's proposed Solar Energy Program are presented in Appendix A, Section A.2.2. These programmatic design features would be required for development in the proposed Riverside East SEZ.

[b] The scientific names of all plants, wildlife, aquatic biota, and special status species are provided in Sections 9.4.10 through 9.4.12.

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9.4.2 Lands and Realty

9.4.2.1 Affected Environment

The proposed Riverside East SEZ, at approximately 203,000 acres (821 km^2), is by far the largest of the SEZs being considered in this PEIS. It stretches for about 45 mi (72 km) east to west and measures about 25 mi (40 km) north to south. The towns of Blythe and Desert Center mark the approximate eastern and western limits of the SEZ. The western border of the SEZ lies close to much of the eastern border of Joshua Tree NP. The SEZ is located along a critical east–west corridor that contains I-10, numerous pipelines, and transmission lines and surrounds a portion of the Los Angeles Metropolitan Water District (MWD) Colorado River Aqueduct (CRA). Most of the pipelines are south of I-10 and outside of the SEZ, with the exception of the parcel south of I-10 on the eastern side of the SEZ. Five large transmission lines plus one more under construction pass through portions of the SEZ, primarily in the southeast and west (BLM 2009c, 2010a). State Route 177 passes through the west side of the SEZ in a northeasterly direction, and the Midland-Rice Road and a railroad pass through the eastern portion of the SEZ in a northwesterly direction.

In spite of this activity, most of the BLM-administered lands, especially those north of I-10 in the east, those between I-10 and the Palen-McCoy Mountains in the central part of the SEZ, and those on the west side of the Palen-McCoy Mountains and around Palen Lake, retain an undeveloped character. BLM lands in the western portion of the SEZ near I-10 and Desert Center and northwest of State Route 177 are also largely undeveloped, but the presence of developed private land including some residences, the state highway, extensive MWD facilities, a small airport, and the inactive Kaiser Mine and related facilities give the area a more developed setting.

Although the SEZ contains only BLM-administered land, numerous parcels of private land totaling about 11,000 acres (45 km^2) also are scattered throughout the SEZ, with additional private lands in near proximity to its external boundaries. There is also one section of state land surrounded by the SEZ. The city of Blythe, California, on the eastern side of the SEZ, is surrounded by an extensive block of agricultural lands irrigated with water from the Colorado River.

A Section 368 federally designated, 2-mi (3-km) wide energy corridor on BLM administered lands overlaps the SEZ along I-10. This corridor, which was originally established in the CDCA Plan (BLM 1999), was recently also identified as a Section 368 corridor in the West-wide Corridor PEIS (DOE and DOI 2008) (see also Section 3.2.5). There are also two north-south corridors within the SEZ that were designated as part of the CDCA Plan. One corridor is located in the western portion of the SEZ and one in the eastern portion. Although both corridors have one transmission line in them, these corridors now may not be fully functional since the eastern one crosses designated BLM wilderness (Big Maria Mountains and Rice Valley WAs) and the western one crosses Joshua Tree NP. The portions of the corridors south of the designated wildernesses and the park may still be useful.

As of February 2010, there were 15 active solar development applications wholly or partially within the Riverside East SEZ boundaries. Four of these applications are BLM fast-track projects for which environmental reviews have begun.

9.4.2.2 Impacts

9.4.2.2.1 Construction and Operations

Development of the proposed Riverside East SEZ for utility-scale solar energy production would establish a large and continuous industrial area along the 45-mi (72-km) stretch of I-10 and in large blocks of public lands north and south of the highway. The SEZ would exclude many existing and potential uses of the land, perhaps in perpetuity. Since much of the SEZ is undeveloped and rural, utility-scale solar energy development would be a new and discordant land use to the area. Development along the I-10 corridor, State Route 177, and Midland Road would be highly visible to the public traveling these routes. In addition, solar development in the western portion of the SEZ along State Route 177 and County Road 2 could create conflict with existing residential use near Desert Center, Lake Tamarisk Resort, and scattered private residences, including those associated with agricultural development. It also is possible that with private land owner and state agreement, the 11,640 acres (47 km^2) of private and state lands located within the external boundary of the SEZ eventually could be developed in the same or a complementary manner as the public lands.

Current ROW authorizations on the SEZ would not be affected by solar energy development, because they are prior rights. Should the area be identified as an SEZ in the ROD for this PEIS, the BLM would still have discretion to authorize additional ROWs in the area until solar energy development was approved, and then future ROWs would be subject to the rights granted for solar energy development.

The parts of the three designated energy corridors that overlap the proposed SEZ, and solar energy development of the SEZ, are currently in conflict with solar development, because to avoid technical or operational interference with transmission facilities, solar energy facilities cannot be constructed under transmission lines or over pipelines. The designated Section 368 transmission corridor along I-10 overlaps 15,700 acres (64 km^2) within the SEZ and could limit future solar development in that overlap area. The same constraint also may apply to the remaining two corridors on the east and west sides of the SEZ. Alternatively, designation of the SEZ could limit future use of these existing corridors. Transmission capacity is becoming a more critical factor and reducing the east-west corridor capacity through this SEZ may have future but currently unknown consequences. Near the western end of the SEZ, south of I-10, the existing corridor is limited by designated wilderness to the south and existing pipeline and transmission line development; thus opportunities to place new transmission facilities in this corridor are already constrained. This is an administrative conflict that can be addressed by the BLM in the land use planning process, but there would be implications either for the amount of potential solar energy development or for the amount of transmission capacity that can be accommodated.

The current public land ownership pattern, along with terrain and drainage features in the SEZ, could lead to the creation of isolated parcels of BLM-administered land scattered among solar facilities that would be both inaccessible to the public and difficult to manage.

9.4.2.2.2 Transmission Facilities and Other Off-Site Infrastructure

An existing 500-kV transmission line runs east–west along I-10 and parallel to the southern SEZ boundary. In addition, a 230-kV line passes through the far western section of the SEZ and a 69-kV line passes through the eastern portion of the SEZ. Establishing a connection to an existing line would not involve the construction of a new transmission line outside of the SEZ. If a connecting transmission line were constructed in a different location outside of the SEZ in the future, site developers would need to determine the impacts from construction and operation of that line. In addition, developers would need to determine the impacts of line upgrades if they were needed.

Existing road access to the proposed Riverside East SEZ should be adequate to support construction and operation of solar facilities, because I-10 passes along the southern edge of the SEZ and there are several exits from I-10 as it passes by and through the SEZ. Because of the site access provided by I-10, no additional road construction outside of the SEZ was assumed to be required to support solar development of the SEZ.

9.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

No SEZ-specific design features were identified. Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM's proposed Solar Energy Program would provide mitigation for some identified impacts. The exceptions would be impacts related to the exclusion of many existing and potential uses of the public land, perhaps in perpetuity; the visual impact of an industrial-looking solar facility within an otherwise rural area; and induced land use changes on state and private lands.

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9.4.3 Specially Designated Areas and Lands with Wilderness Characteristics

9.4.3.1 Affected Environment

The proposed Riverside East SEZ is located in the CDCA and is surrounded by specially designated areas, including Joshua Tree NP, seven designated WAs (including wilderness in the Joshua Tree NP), and seven ACECs (see Figure 9.4.3.1-1). Corn Springs is the only ACEC within the viewshed of the SEZ that has scenic values as one of its attributes. Alligator Rock, Chuckwalla DWMA, Chuckwalla Valley Dune Thicket, Desert Lily Preserve, Mule Mountains, and Palen Dry Lake ACECs are identified for the protection of plant and animal species and cultural or prehistoric resources. No lands with wilderness characteristics outside of designated WAs and WSAs have been identified within 25 mi (40 km) of the SEZ.

As part of the planning process for the BLM-administered lands in the CDCA, all public lands except for about 300,000 acres (1,214 km^2) of scattered parcels were designated geographically into one of four multiple-use classes. The classification was based on the sensitivity of resources and kinds of uses for each geographic area. The four multiple-use classes are as follows (BLM 1999):

- Class C is for lands either designated as wilderness or for wilderness study areas. These lands are managed to protect their wilderness characteristics.

- Class L (Limited Use) protects sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.

- Class M (Moderate Use) is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources that permitted uses may cause.

- Class I (Intensive use). Its purpose is to provide for concentrated use of lands and resources to meet human needs. Reasonable protection will be provided for sensitive natural and cultural values. Mitigation of impacts on resources and rehabilitation of affected areas will occur insofar as possible.

Lands within the Riverside East SEZ are predominantly Class M with the exception of two parcels around Joshua Tree NP and the Palen McCoy WA, which are Class L. The Multiple-Use Class Guidelines contained in the CDCA Plan indicate that wind, solar, or geothermal electrical generation facilities could be allowed in both of these Classes.

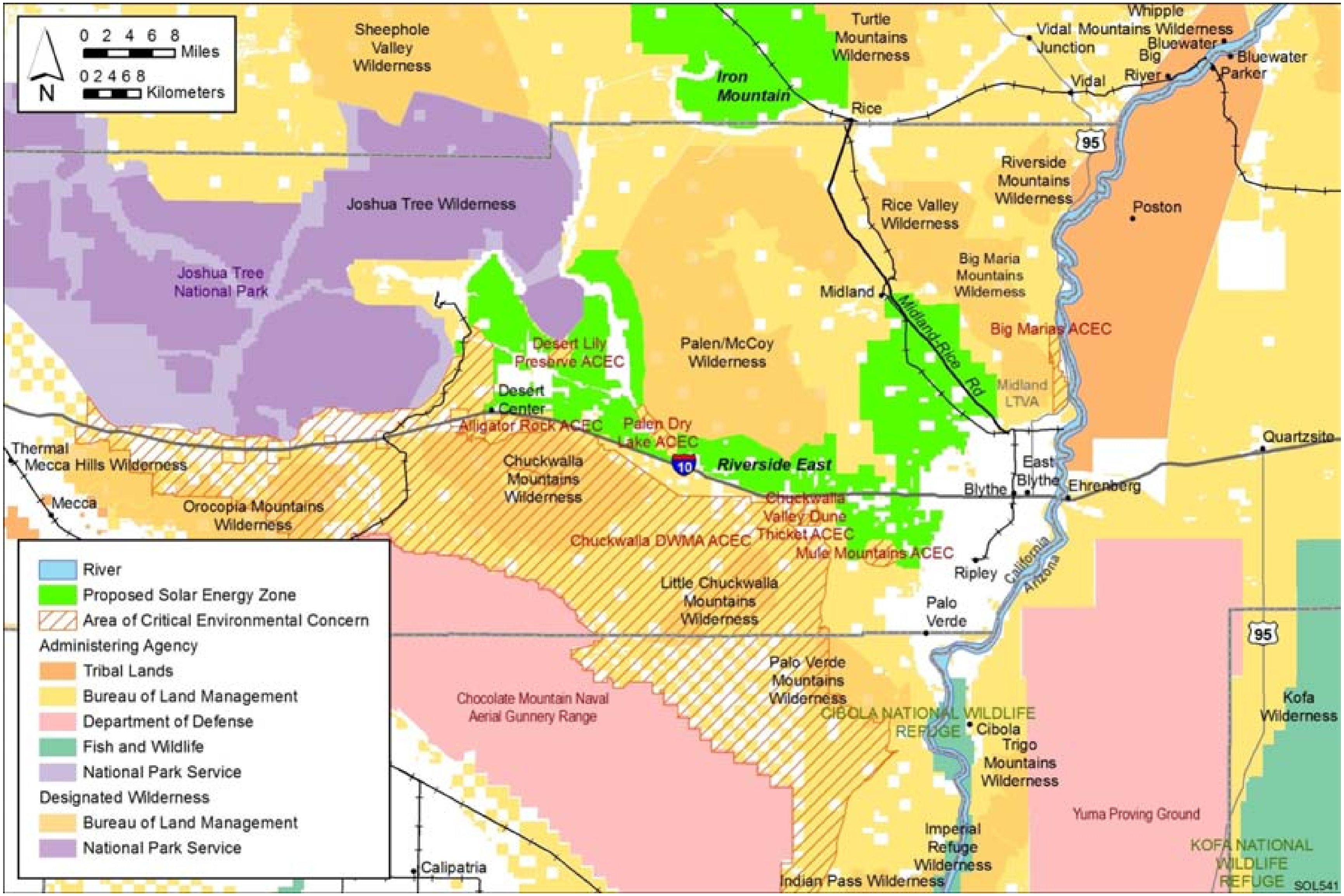

FIGURE 9.4.3.1-1 Specially Designated Areas in the Vicinity of the Proposed Riverside East SEZ

9.4.3.2 Impacts

9.4.3.2.1 Construction and Operations

The potential impact from solar development within the proposed Riverside East SEZ on specially designated areas possessing unique or sensitive visual resources is difficult to quantify and would vary by solar technology employed, the size of the area developed for solar energy facilities, the specific area affected, and the perception of individuals viewing the development. Development of the SEZ, especially full development, would be a dominating factor in the viewshed from large portions of some of these specially designated areas, as summarized in Table 9.4.3.2-1. This table assumes the use of the power tower solar energy technology, which would have the largest potential visual effect because of the height of this type of facility. The potential impacts in terms of acreage of visually sensitive, specially designated areas affected would be somewhat less for smaller solar energy facilities. See Section 9.4.14 for a more complete review of these impacts.

In general, the closer a viewer is to solar development, the greater the apparent size and level of detail visible, usually resulting in greater perceived impacts on various resources. Although impact levels are usually “banded” based on distance (e.g., 0 to 5 mi, 5 to 15 mi [0 to 8 km, 8 to 24 km]), in general, actual perceived impacts decrease gradually as distance increases. Additionally, dense solar facilities and/or large solar facilities may have very large visual impacts, even at longer distances. See Section 9.4.14 for a more thorough discussion of visual impacts associated with solar energy development.

The viewing height above a solar development area also is important to perceived impact levels, since higher elevation viewpoints show more of the facilities and make the regular, man-made geometry of the solar arrays more apparent. In the case of the Riverside East SEZ, the low elevation of the SEZ in relation to surrounding specially designated areas would tend to highlight the industrial development present in the SEZ.

An individual viewer’s expectations can also influence perceived impacts. For example, recreationists seeking a wilderness or national park experience would likely be more adversely affected by the sight of intensive solar development than commuting workers traveling along the highway.

The occurrence of glint and glare at solar facilities could potentially cause large though temporary increases in brightness and visibility of the facilities. The visual contrast levels that were assumed to assess potential impacts on specially designated areas do not account for potential glint and glare effects; however, these effects would be incorporated into a future site- and project-specific assessment that would be conducted for specific proposed utility-scale solar energy projects.

TABLE 9.4.3.2-1 Specially Designated Areas Potentially within the Viewshed of Solar Facilities within the Proposed Riverside East SEZ

		In 5-mi (8-km) Viewshed		In 15-mi (24-km) Viewshed		In 25-mi (40-km) Viewshed	
Area Name	Total Acres	Acres	Percentage	Acres	Percentage	Acres	Percentage
California Desert Conservation Area	25,919,319[a]	763,254	2.9	1,243,222	4.8	1,494,552	5.8
Joshua Tree NP	793,331	53,426	6.7	111,416	14.0	117,591	14.8
Cibola National Wildlife Refuge	18,398			7,336	39.9	17,121	93.1
Corn Springs ACEC	2,463	352	14.3	1,075	43.6	1,080	43.8
WAs							
Big Maria Mountains	46,056	8,873	19.3	8,829	19.2	8,875	19.3
Chuckwalla Mountains	88,202	31,482	35.7	49,952	56.6	49,913	56.6
Joshua Tree	586,623	40,421	6.9	96,117	16.4	99,460	17.0
Little Chuckwalla Mountains	28,708	76	0.3	16,679	58.1	16,729	58.3
Palen/McCoy	224,414	95,559	42.6	170,666	76.0	170,660	76.0
Palo Verde Mountains	30,403			13,254	43.6	13,252	43.6
Rice Valley	43,412	7,881	18.2	35,773	82.4	35,792	82.4

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

There are seven ACECs near the SEZ. Potential impacts on these ACECs are indirect and related to the potential impact from additional human use of the areas because of the construction and operation of solar facilities. Four of these ACECs (Chuckwalla DWMA, Desert Lily Preserve, Palen Dry Lake, and Mule Mountains) are immediately adjacent to the boundaries of the SEZ.

Because the western portion of the SEZ currently contains numerous visible man-made features, impacts on wilderness and scenic values may be somewhat less significant than in areas that are more pristine.

The lack of development in the immediate region of the SEZ makes the night sky very dark and allows very good opportunities for night sky viewing. The NPS has identified concerns that solar facility development in the region both adjacent to and east of Joshua Tree NP could adversely affect the quality of the night sky environment as viewed from the park. The amount of light that may emanate from Riverside East solar facilities is not known but could affect night sky viewing from the NP and the surrounding wilderness areas.

Designated Wilderness

- The border of the Palen-McCoy WA abuts the Riverside East SEZ for about 33 mi (53 km) and is surrounded on three sides by the SEZ. Large portions of the viewshed from this wilderness area are not pristine; it includes an array of human-built structures (e.g., highways, roads, housing, railroads) as close as 2 mi (3 km) from its boundaries, which already have some effect on wilderness characteristics. However, because of the size and density of solar development, especially at full development, the new visual impacts of solar energy facilities generally would be much more intrusive than those that currently exist.

  Designated wilderness within the 5 mi (8 km) viewshed of the SEZ includes about 96,000 acres (388 km^2) (see Table 9.4.3.2-1). Within 15 mi (24 km) of the SEZ, about 171,000 acres (692 km^2) of designated wilderness is included within the viewshed of the SEZ. Cumulatively, this amounts to about 76% of the wilderness area. Additionally, the wilderness area would have clear and close views of the Iron Mountain SEZ to the north of the WA that could result in the WA being completely ringed by solar energy development. It is anticipated that wilderness characteristics throughout this wilderness area would be adversely affected by the solar development in the SEZ and in the region.

- The Big Maria Mountains WA is within 0.25 to 2 mi (0.4 to 3 km) of the boundary of the SEZ for about 13 mi (21 km). The viewshed from the wilderness area is not pristine, but the unpaved road and railroad within the viewshed are located far enough to the west of the boundary of the wilderness area to not have a significant impact on the wilderness area. The affected viewshed is restricted to the western slopes of the wilderness area that are within about 5 mi (8 km) of the SEZ and which constitute about 19% of the wilderness area. This area would be adversely affected by SEZ development that could potentially fill the low-lying valley to the west and below the wilderness area. Because the view of the solar development would be so extensive, it is anticipated that the effect on wilderness characteristics in the portions of the wilderness area within the viewshed of the SEZ would be very large. The majority of the area within the wilderness area to the east is outside of the viewshed of the SEZ and would not be affected by development within the SEZ.

- The southern boundary of the Rice Valley WA ranges from 0.5 to 2 mi (1 to 3 km) from the boundary of the SEZ for about 6 mi (10 km). The viewshed from the southern boundary of the wilderness area is not pristine and is influenced by the presence of an unpaved road, railroad, and several large mining operations. The portion of the wilderness aera that would be in view of development within the SEZ within 5 mi (8 km) is about 7,881 acres (4 km^2), or about 18% of the wilderness area. In this area wilderness characteristics would be adversely affected by solar development in the SEZ that could potentially fill the low-lying valley to the south and below the wilderness area. Although the table shows a large acreage of the wilderness area within15 mi (24 km) of the SEZ, this is actually an anomaly in the viewshed analysis. The large majority of the wilderness area to the north actually is out of the viewshed of development within the SEZ and would not be affected by it (for more information on this, see the description of Rice Valley WA in Section 9.4.14.2.2.1)

- The Chuckwalla Mountains WA is located south of I-10 and the SEZ. The boundary of the wilderness area ranges from 1 to 3 mi (1.6 to 5 km) from the SEZ. The elevation of the wilderness area rises continuously to the south, affording unobstructed views of the SEZ to the north and east. About 31,000 acres (125 km^2) of the wilderness area is within the 5-mi (8-km) viewshed of the SEZ, and it is expected that wilderness characteristics within this area would be adversely affected. The current viewshed from this wilderness area is not pristine and includes an array of human-built structures (e.g., highways, roads, railroads, power lines, residences, and agricultural development) located from 0.5 to 5 mi (0.8 to 8 km) from the WA boundary. These projects already have some effect on wilderness characteristics; however, because of the size and density of solar development that would be in view from the WA, especially at full development, the new visual impacts of solar energy facilities generally would be much more intrusive than those impacts that currently exist. All of the Chuckwalla WA is within about 12 mi (19 km) of the SEZ, and within this distance about 56% of the WA, about 50,000 acres (202 km^2) is within the viewshed of the SEZ. At full development, solar facilities could stretch to about 13 mi to the north of the SEZ and more than 20 mi (32 km) east along I-10. Because of this extensive view of solar development, it is anticipated that the cumulative adverse impact on wilderness characteristics within areas of this wilderness area within view of the solar development would be large.

- The Little Chuckwalla and Palo Verde Mountains WAs are 5 and 6 mi (8 and 10 km), respectively, from the closest boundary of the SEZ. Both are almost completely contained within the 15-mi (24-km) radius of solar development and about 76% and 82% of the wilderness areas. respectively, would be included in the viewshed of the SEZ. The current viewshed from both wilderness areas is not pristine and includes an array of human-built structures; however, solar development, especially full development, would be very visible from within portions of both of these wilderness areas. Because of the extensive potential view of solar development to the north and east, there would be adverse impacts on wilderness characteristics in the Little Chuckwalla WA.

- For the Palo Verde Mountains WA, because of the alignment of the of the wilderness area relative to the SEZ, while the nearest boundary of the wilderness area is 6-mi (9.6-km) from the SEZ, most of the boundary where there is visibility of the SEZ is from 8 to10 mi (13 to 16 km) distant. Viewshed analysis indicates that contrast levels caused by solar facilities within the SEZ are not likely to exceed the moderate level. Because of the distance between the SEZ and the wilderness area, the expected level of contrast, partial screening of the area from the SEZ by the Mule Mountains, and the presence of extensive agricultural development within the viewshed of the SEZ, impacts on wilderness characteristics from solar development are anticipated to be minor.

Areas of Critical Environmental Concern

- The Corn Springs ACEC is designated for many reasons, including scenic resources. The primary scenic portion of the area is in the canyon that runs generally east–west and that is screened from the SEZ and would not be affected by it. Visitors would have clear views of the SEZ as they leave the area and travel down the bajada slopes toward I-10. The cultural resources found in the canyon are sensitive and could be adversely affected if development in the SEZ causes an increase in visitor traffic into the ACEC.

- Chuckwalla DWMA, Desert Lily Preserve, Mule Mountains, and Palen Dry Lake ACECs are located adjacent to the boundary of the SEZ (see Figure 9.4.3.1-1). Alligator Rock, Corn Springs, and Chuckwalla Valley Dune Thicket ACECs are located in close proximity to the SEZ but do not abut it. While these areas would not be directly affected by development of the SEZ, it is possible that additional human traffic could be drawn to the areas because of the solar facilities, and there is potential for unintended impact. The major threat to these areas is uncontrolled vehicle use or vandalism/theft of cultural or prehistoric resources and increased management efforts may be needed to protect the resources of these ACECs. In addition, indirect impacts resulting from edge effects such as non-native species establishment and spread, habitat degradation and fragmentation, and increased predation on desert tortoises by ravens may occur.

Joshua Tree National Park

- Portions of Joshua Tree NP are adjacent or in close proximity to the SEZ and would have extensive views of solar energy development in the valley below the park. About 53,000 acres (214 km^2) of the park is located within the 5-mi (8-km) viewshed of the SEZ, of which about 31,000 acres (125 km^2) is designated as wilderness. A portion of the Coxcomb Mountains in the park is surrounded on three sides by the SEZ. The 15-mi (24-km) viewshed of the SEZ includes about 111,000 acres (449 km^2) of the park, including about 96,000 acres (388 km^2) of wilderness. Although development on private and BLM lands has already reduced wilderness characteristics, the potential development of the SEZ would result in large additional adverse effects on wilderness characteristics in the park.

  The NPS has commented that the combined effects of solar energy development on public lands within and outside the SEZ adjacent to the park have a high potential to directly and negatively impact park resources in the Coxcomb and Eagle Mountains on the eastern boundary of the park. Primary concerns identified include potential for impacts on scenic views from the park, preservation of the desert soundscape, preservation of the night-sky viewing opportunities, and impacts on important wildlife corridors linking NPS- and BLM-managed lands.

  The eastern portion of the Joshua Tree NP affords visitors unimpeded night sky viewing opportunities, while western areas of the park are highly affected by light pollution from the Coachella Valley and Los Angeles areas. Maintaining the high quality of night sky viewing in the eastern portion of the park is a paramount concern of the NPS. The NPS's concerns relate to any artificial light from night time maintenance activity and/or security lighting within 20 mi (32 km) of the park boundaries.

California Desert Conservation Area

- The viewshed within 25 mi (40 km) of the Riverside East SEZ includes about 1,495,000 acres (6,050 km^2), or about 5.8% of the CDCA (Table 9.4.3.2-1). Installation of renewable energy facilities is consistent with the CDCA Plan, but full development of the SEZ would adversely affect wilderness characteristics in six designated wilderness areas including designated wilderness in Joshua Tree NP. Should solar energy development occur, because of the size and visual impact of solar facilities, the current undeveloped character of large portions of the CDCA would be changed.

Cibola National Wildlife Refuge

- The Cibola Refuge is about 10 mi (16 km) southeast of the southeastern portion of the SEZ. Although about 7,300 acres (30 km^2) of the refuge is within the 15-mi (24 km) viewshed of the SEZ, there are no anticipated impacts on the refuge.

9.4.3.2.2 Transmission Facilities and Other Off-Site Infrastructure

Because of the availability of an existing transmission line and access to I-10, no additional construction of transmission or road facilities was assessed. Should additional transmission lines be required outside of the SEZ, there may be additional impacts to specially designated areas. See Section 9.4.1.2 for the development assumptions underlying this analysis.

9.4.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM's proposed Solar Energy Program, would provide some mitigation for identified impacts. The exceptions would be that SEZ development would adversely affect wilderness characteristics in the Palen-McCoy, Rice Valley, Big Maria Mountains, Chuckwalla Mountains, and Little Chuckwalla Mountains WAs and in Joshua Tree NP. These impacts would not be fully mitigable. The night sky viewing experience in the Joshua Tree NP could also be adversely affected. Required programmatic design features included in Appendix A, Section A.2.2, may reduce visual impacts on wilderness characteristics, scenic resources, and night sky viewing opportunities. It is anticipated that even with the adoption of the design features, adverse impacts on wilderness characteristics would not be completely mitigated and residual impacts would remain.

A proposed design feature specific to the proposed SEZ is as follows:

- Once construction of solar energy facilities begins, the BLM would monitor whether there are increases in traffic to the seven ACECs in and near the SEZ and determine whether additional design features are required to protect the resources in these areas.

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9.4.4 Rangeland Resources

Rangeland resources include livestock grazing and wild horses and burros, all of which are managed by the BLM. These resources and possible impacts on them from solar development within the proposed Riverside East SEZ are discussed in Sections 9.4.4.1 and 9.4.4.2.

9.4.4.1 Livestock Grazing

9.4.4.1.1 Affected Environment

A portion of the SEZ was at one time part of the Ford Dry Lake grazing allotment, but the allotment has been closed to grazing through a land use plan decision (BLM 2009c); no livestock grazing is authorized within the SEZ.

9.4.4.1.2 Impacts

There would be no impacts on livestock grazing.

9.4.4.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

No SEZ-specific design features would be necessary to protect or minimize impacts on livestock grazing.

9.4.4.2 Wild Horses and Burros

9.4.4.2.1 Affected Environment

Section 4.4.2 discusses wild horses (*Equus caballus*) and burros (*E. asinus*) that occur within the six-state study area. Twenty-two BLM wild horse and burro HMAs occur within California. Also, several HMAs in Arizona are located near the Arizona–California border. Portions of three HMAs are located within 50 mi (80 km) of the proposed Riverside East SEZ. The closest is the Cibola-Trigo HMA, located 9 mi (14 km) east of the SEZ (Figure 9.4.4.2-1). The Chemehuevi HMA is located about 27 mi (43 km) northeast of the SEZ, and the Chocolate-Mule Mountains HMA is about 15 m (24 km) south of the SEZ (Figure 9.4.4.2-1). The Cibola-Trigo HMA contains an estimated 285 horses and 393 burros, the Chemehuevi HMA an estimated 201 burros, and the Chocolate-Trigo HMA an estimated 120 burros (BLM 2009b).

In addition to the HMAs managed by the BLM, the U.S. Forest Service (USFWS) has 51 established wild horse and burro territories in Arizona, California, Nevada, New Mexico, and

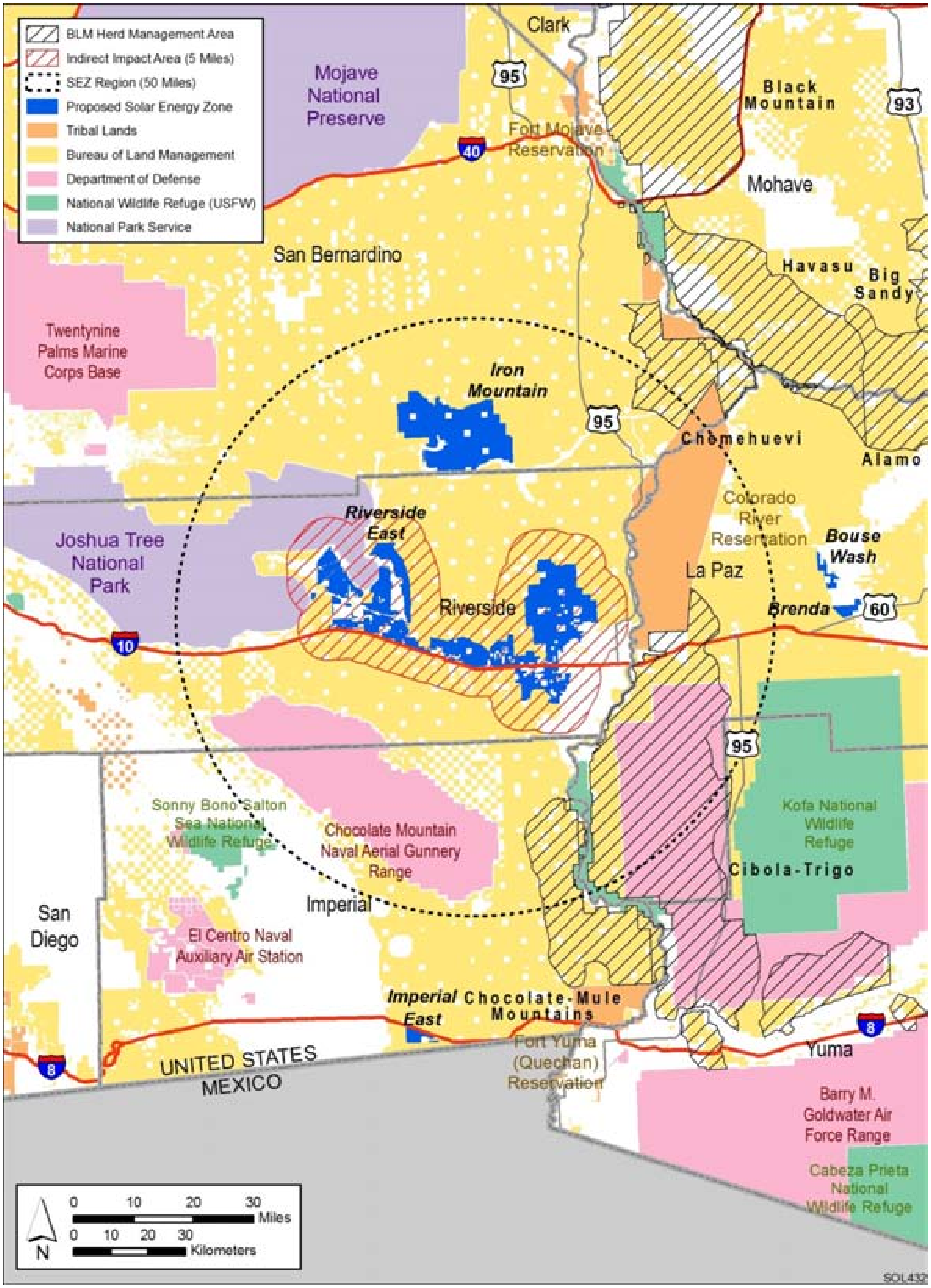

FIGURE 9.4.4.2-1 BLM Wild Horse and Burro HMAs Located near the Proposed Riverside East SEZ Region (Source: BLM 2009a)

Utah, and is the lead management agency that administers 37 of these territories (Giffen 2009; USFS 2007). The territory closest to the proposed Riverside East SEZ is the Big Bear Territory within the San Bernardino National Forest. It is located more than 70 mi (113 km) northwest of the SEZ. This territory is managed for a population of 60 wild burros (USFS 2007).

9.4.4.2.2 Impacts

Because the proposed Riverside East SEZ is 9 mi (14 km) or more from any wild horse and burro HMA and more than 70 mi (113 km) from any wild horse and burro territory administered by the USFS, solar energy development within the SEZ would not affect wild horses and burros managed by the BLM or the USFWS.

9.4.4.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

The implementation of required programmatic design features described in Appendix A, Section A.2.2, would reduce the potential for effects on wild horses and burros. No SEZ-specific design features would be necessary to protect or minimize impacts on wild horses and burros.

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9.4.5 Recreation

9.4.5.1 Affected Environment

Although the proposed Riverside East SEZ is very flat, it has diverse vegetation and offers a range of seasonal recreation opportunities. While much of the area is dominated by creosote shrublands or areas with very little vegetation, the eastern portion of the SEZ, especially along McCoy Wash and its tributaries, contains a well-developed ironwood/palo verde community. During the hottest summer months, the SEZ does not provide an environment conducive to non-motorized recreation, but in the cooler months recreation opportunities are abundant. The area has been traditionally used by the residents of Desert Center, Blythe, and urban areas to the west. While no area-wide recreation data are available, the CDCA, like many remote areas of the public lands, attracts individuals and families who are seeking undeveloped recreation opportunities. Opportunities for exploration of old townsites, mining operations, and old roads as well as for wilderness activities, hunting and backcountry camping, hiking, and wildlife and wildflower viewing are important attractions throughout the CDCA. There are areas both in and adjacent to the Riverside East SEZ that provide these kinds of attractions.

The Midland Long-Term Visitor Area (LTVA) managed by the BLM provides long-term camping opportunities in the winter months and is located along Midland Road in the eastern portion of the SEZ. This area hosted an estimated 605,000 visitor days of use in the 2009 to 2010 recreation season and 437,000 visitor days in the 2008 to 2009 season. Many of the visitors likely access areas within the SEZ while they are staying at the LTVA.

The SEZ area was included in the Northern and Eastern Colorado Desert Coordinated Management Plan approved in 2002 (BLM 2002a,b). In the plan all routes of travel outside of closed and OHV open areas were designated as open, closed, or limited. Numerous routes of travel within the SEZ have been designated as available for use by vehicles. The Palen Pass Road is a popular route; the route leaves State Route 177 in the northwest corner of the SEZ, crosses between units of the Palen-McCoy WA, and travels to the southeast through portions of the eastern side of the SEZ, eventually ending at Blythe. There are many OHV routes designated as open within the proposed Riverside East SEZ; these are discussed in Section 9.4.21 and shown in Figure 9.4.21-1.

9.4.5.2 Impacts

9.4.5.2.1 Construction and Operations

Although there are no recreation use data for the SEZ and surrounding lands, it is not anticipated that there would be a significant loss of recreational use caused by development of the Riverside East SEZ. However, some recreation visitors would be displaced from the portions of the SEZ developed for solar energy production, and because of the impact of a large and highly visible industrial-type development in the SEZ, opportunities for undeveloped and primitive recreation experiences in and around the SEZ would be lost or reduced. Roads and trails through areas developed for solar power production could be closed or rerouted, although existing county roads would continue to provide general access where they exist. Because the Midland LTVA is located within the SEZ, solar development could occur very close to it and the impact on winter visitors is not known. The combination of increased traffic and solar development in the areas around the LTVA could discourage some use of this area.

Open OHV routes crossing areas granted ROWs for solar facilities would be redesignated as closed. However, a programmatic design feature addressing recreational impacts would require consideration of development of alternative routes that would retain a similar level of access across and to public lands as a part of the project proposal (see Section 5.5.1 for more details on how routes coinciding with proposed solar facilities would be treated).

Based on viewshed analysis, the SEZ would be visible from a wide area. Development of solar facilities in the SEZ would cause the loss of the currently expansive and undeveloped views throughout the SEZ. The viewshed within 25 mi (40 km) of the SEZ alone includes about 1,495,000 acres (6,050 km^2) within the CDCA (Table 9.4.3.2-1). The viewshed analysis shows the SEZ would be visible from portions of Joshua Tree NP, designated wilderness areas, other specially designated areas outside of the SEZ. Because of the anticipated adverse impact on wilderness characteristics in about 184,000 acres (745 km^2) of designated wilderness within the most sensitive 5-mi (8-km) visual zone surrounding the proposed SEZ, losses in opportunities for wilderness recreation use are anticipated. Recreational use of wilderness and other areas in Joshua Tree NP within the viewshed of the SEZ would also be adversely affected.

9.4.5.2.2 Transmission Facilities and Other Off-Site Infrastructure

Because of the availability of an existing transmission line and access to I-10, no additional construction of transmission or road facilities was assessed. Should additional transmission lines be required outside of the SEZ, there may be additional impacts on specially designated areas. See Section 9.4.1.2 for the development assumptions underlying this analysis.

9.4.5.3 SEZ-Specific Design Features and Design Feature Effectiveness

Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM's proposed Solar Energy Program, would provide adequate mitigation for some identified impacts. The exceptions would be that some recreational use would be lost from the area within the SEZ, and this loss would not be mitigated. In addition, adverse impacts on wilderness recreation use in six designated wilderness areas, including within Joshua Tree NP, would also not be completely mitigated.

A proposed design features specific to the proposed SEZ is as follows:

- A buffer area between the Midland LTVA and solar development should be established to preserve the LTVA area. The size of the buffer should be determined based on the site and visitor specific criteria.

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9.4.6 Military and Civilian Aviation

9.4.6.1 Affected Environment

With the exception of a large portion of the eastern side of the SEZ, the SEZ is largely covered under eight MTRs that include a mixture of visual and instrument routes. Consequently, the BLM has identified this as an area for which advance consultation with the DoD is required prior to approval of activities that could adversely affect the use of the MTRs.

The Blythe public airport is located about 2 mi (3 km) southeast of the eastern portion of the SEZ, while the Desert Center public airport is located within the external boundaries of the SEZ on the western side.

9.4.6.2 Impacts

The development of any solar energy or transmission facilities that encroach into the airspace of an MTR could interfere with military training activities and could create a safety concern. While the military has indicated that solar development on portions of the Riverside East SEZ is compatible with its existing uses, it has also commented that other portions should have height limits for facilities, and some areas may be incompatible with existing military use (Brasher 2009).

The system of military airspace in the Southwest overlaps much of the area of highest interest for solar development, and there is the potential for solar development to result in cumulative effects on the system of MTRs that stretch beyond only one SEZ or solar project.

Thermal plumes from the air-cooled condensers could be hazardous to low-flying aircraft approaching or departing from either of the airports. In addition, glint and glare from reflective mirrors is a potential source of glare that could cause flash blindness to pilots approaching or departing the airports.

The proximity of the two public airports to the SEZ would require close coordination with airport authorities and the FAA to ensure solar energy facilities do not interfere with airport operation.

9.4.6.3 SEZ-Specific Design Features and Design Feature Effectiveness

Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM’s proposed Solar Energy Program, would provide adequate mitigation for some identified impacts. An exception could be the potential impact on pilots using the two local airports caused by glint and glare from reflective surfaces and from thermal plumes from solar facilities.

Proposed design features specific to the proposed SEZ include the following:

- Coordination with the FAA and local airport authorities should be required early in the project planning process to identify and mitigate potential impacts on the local airports.

Precautions for pilots should be taken to avoid interference with flight paths or related flight operations and to avoid reflector glare hazards and thermal plumes.

9.4.7 Geologic Setting and Soil Resources

9.4.7.1 Affected Environment

9.4.7.1.1 Geologic Setting

Regional Geology

The proposed Riverside East SEZ lies within the eastern Mojave Desert region of the Basin and Range physiographic province in southeastern California. The western part of the SEZ covers land north of I-10 along the entire length of the Chuckwalla Valley and the southern part of Palen Valley. The Chuckwalla Valley is a 40-mi (64-km) long, northwest-trending intermontane basin that is bounded on the northwest by the Eagle Mountains and on the southwest by the Chuckwalla Mountains. The north-to-northwest-trending Coxcomb, Palen, and McCoy Mountains are to the north. The SEZ extends northward from Chuckwalla Valley into Palen Valley, a 20-mi (32-km) long, northwest-trending basin bounded on the southwest by the Coxcomb Mountains and on the northeast and east by the Granite and Palen Mountains, respectively (Figure 9.4.7.1-1).

The eastern portion of the proposed Riverside East SEZ sits on the Palo Verde Mesa, covering land both north and south of I-10. The mesa is bounded on the west-southwest by the McCoy Mountains and on the north and northeast by the Little Maria and Big Maria Mountains. The Palo Verde Valley, a river valley of the Colorado River, lies to the east (Figure 9.4.7.1-1).

Exposed sediments in the Chuckwalla Valley consist mainly of modern alluvium, playa deposits, and dune sands (Figure 9.4.7.1-2). These sediments are underlain by basin-fill deposits of alluvium and fanglomerate of the Pinto (Pleistocene) and Bouse (Pliocene) Formations. Basin-fill is estimated to be as thick as 1 mi (1.6 km) in the central part of the valley and is the principal water-bearing units in the region (Rotstein et al. 1976; CDWR 2003; CEC 2010b). A good portion of the SEZ is covered by dune sand, especially along the central Chuckwalla Valley. Playa lake sediments, associated with Palen and Ford Dry Lakes, occur in the western and central parts of the SEZ. The surrounding mountains are composed of various igneous and metamorphic rocks of pre-Tertiary age covered by younger residual material.

Topography

The proposed Riverside East SEZ spans the length of the Chuckwalla Valley; its western end covers portions of the northern Chuckwalla and Palen Valleys and its eastern end covers the Palo Verde Mesa. The northern part of the Chuckwalla Valley (between the Eagle and Coxcomb Mountains) slopes to the southeast, with elevations ranging from greater than 820 ft (250 m) on the alluvial fan surfaces flanking the surrounding mountains to less than 660 ft (200 m) in the

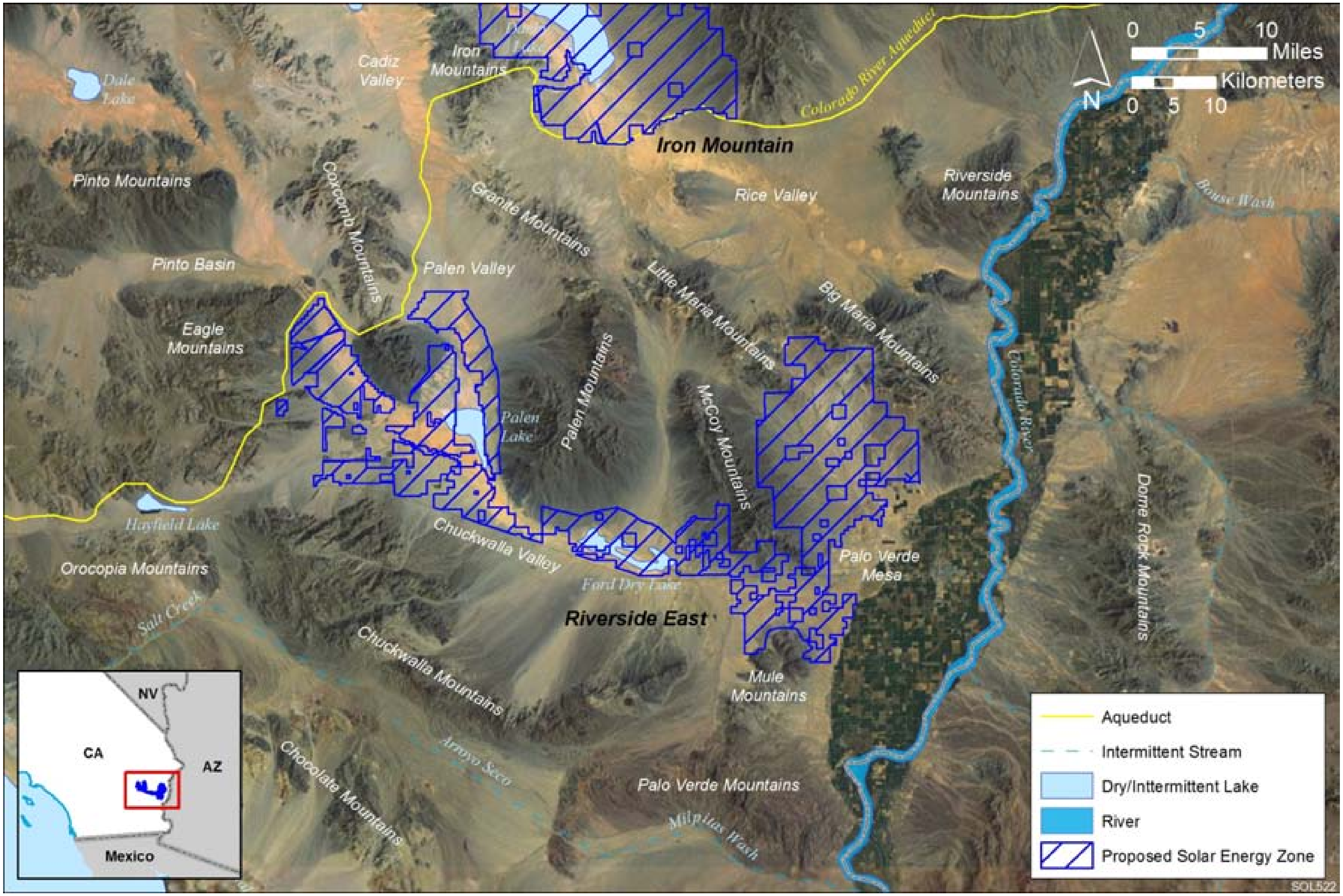

FIGURE 9.4.7.1-1 Physiographic Features in the Proposed Riverside East SEZ Region

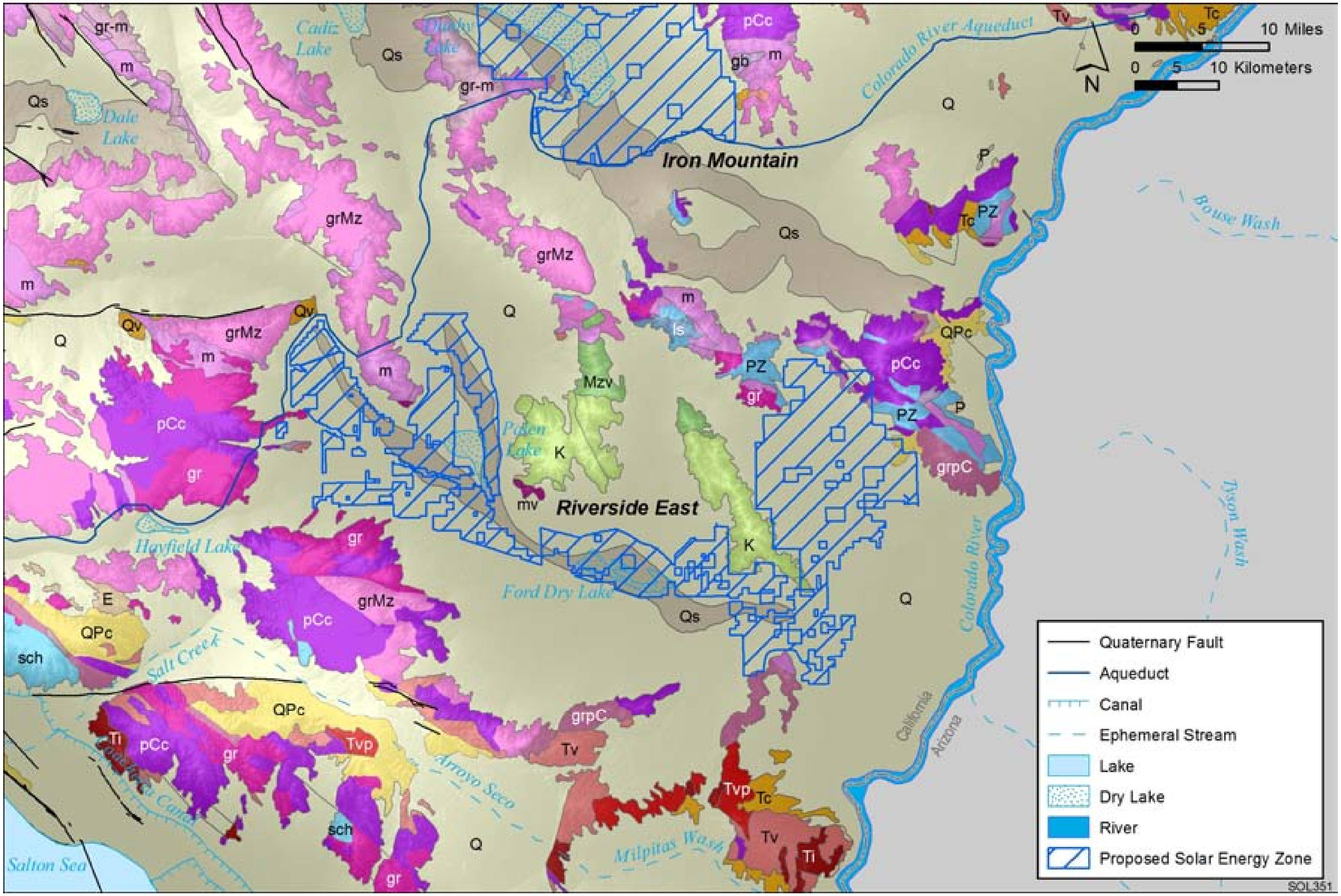

FIGURE 9.4.7.1-2 Geologic Map of the Proposed Riverside East SEZ Region (adapted from Ludington et al. 2007 and Gutierrez et al. 2010)

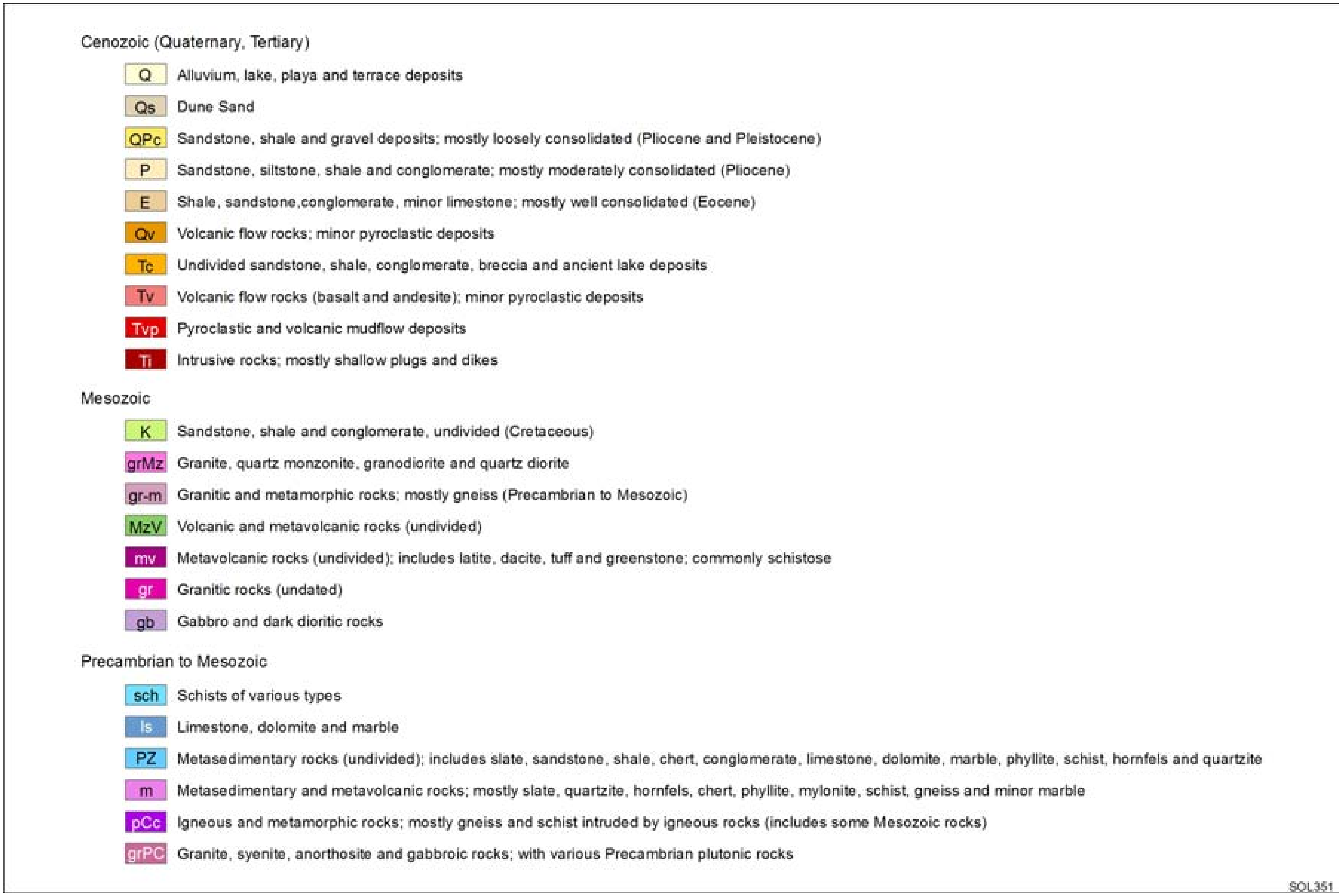

FIGURE 9.4.7.1-2 (Cont.)

center of the valley. The Palen Valley slopes to the south-southeast. It is rimmed with alluvial fans that coalesce in the center of the valley. Streams discharging to the valley drain to the lowest elevation (about 430 ft [130 m]) at Palen Lake (Figure 9.4.7.1-3).

The central part of the Chuckwalla Valley trends to the east-southeast and is nearly flat. The lowest elevations occur within Ford Dry Lake (Figure 9.4.7-3).

Palo Verde Mesa is situated between the McCoy, Little Maria, and Big Maria Mountains. It slopes to the southeast and ranges in elevation from 820 ft (250 m) along the flanks of the surrounding mountain to less than 330 ft (100 m) along the its southeast-facing edge, which borders the Mesa Verde (Colorado River) Valley. The mesa is drained by the McCoy Wash, a perennial stream that flows to the southeast and discharges to a series of canals in the Mesa Verde Valley (Figure 9.4.7.1-3).

Geologic Hazards

The types of geologic hazards that could potentially affect solar project sites and their mitigation are discussed in Sections 5.7.3 and 5.7.4.2. The following sections provide a preliminary assessment of these hazards at the proposed Riverside East SEZ. Solar project developers may need to conduct a geotechnical investigation to assess geologic hazards locally to better identify facility design criteria and site-specific mitigation measures to minimize their risk.

Seismicity. The proposed Riverside East SEZ is located to the southeast of the Eastern California Shear Zone and due east of the San Andreas Fault Zone—both seismically active regions dominated by northwest-trending right-lateral strike slip faulting and categorized as "potentially active" (i.e., having surface displacement within the last 11,000 years [Holocene]) under the Alquist-Priolo Earthquake Fault Zoning Act (Figure 9.4.7.1-4). The term "potentially active" generally denotes that a fault has shown evidence of surface displacement during Quaternary time (the last 1.6 million years). However, because there are numerous such faults in California, the State Geologist has introduced new, more discriminating criteria for zoning faults under the Alquist-Priolo Act. Currently, zoned faults include those that are "sufficiently active," showing evidence of surface displacement within the past 11,000 years along one or more of its segments or branches, and "well-defined," having a clearly detectable trace at or just below the ground surface (Bryant and Hart 2007).

The Chuckwalla Valley is about 50 mi (80 km) to the southeast of the Pinto Mountain Fault Zone in Riverside County. The active left-lateral strike-slip fault forms a south-facing escarpment along the south margin of the eastern San Bernardino Mountains and marks the boundary between the Transverse Range and the Mojave Desert. Offsets of late Pleistocene and Holocene sediments place the most recent movement along the fault at less than 15,000 years ago. Slip rate and recurrence interval data for the Pinto Mountain fault have not been reported; however, minor slip occurred along traces of the fault zone during the 7.3 magnitude Landers earthquake (a few miles to the south) on June 27, 1992 (Bryant 2000).

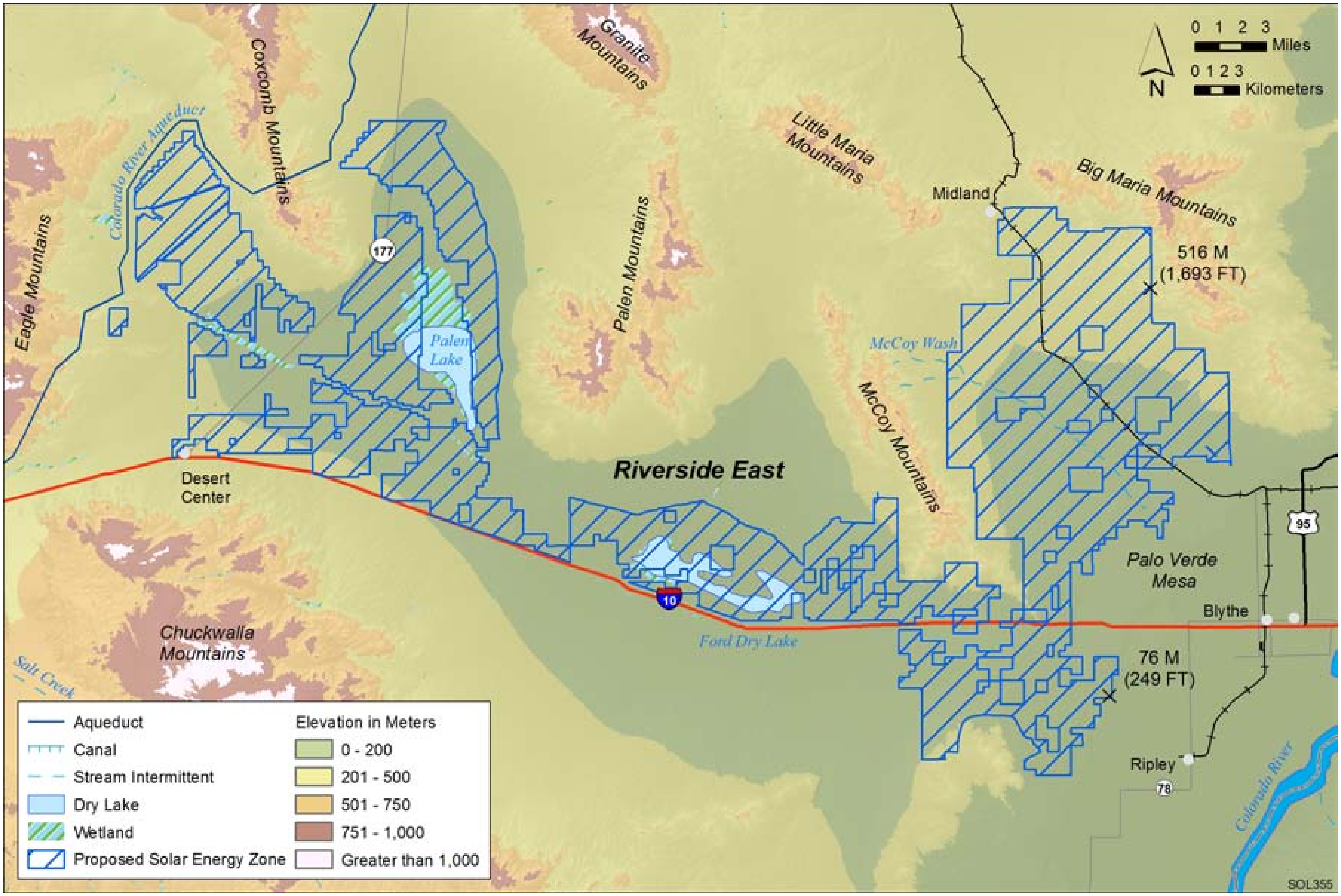

FIGURE 9.4.7.1-3 General Terrain of the Proposed Riverside East SEZ

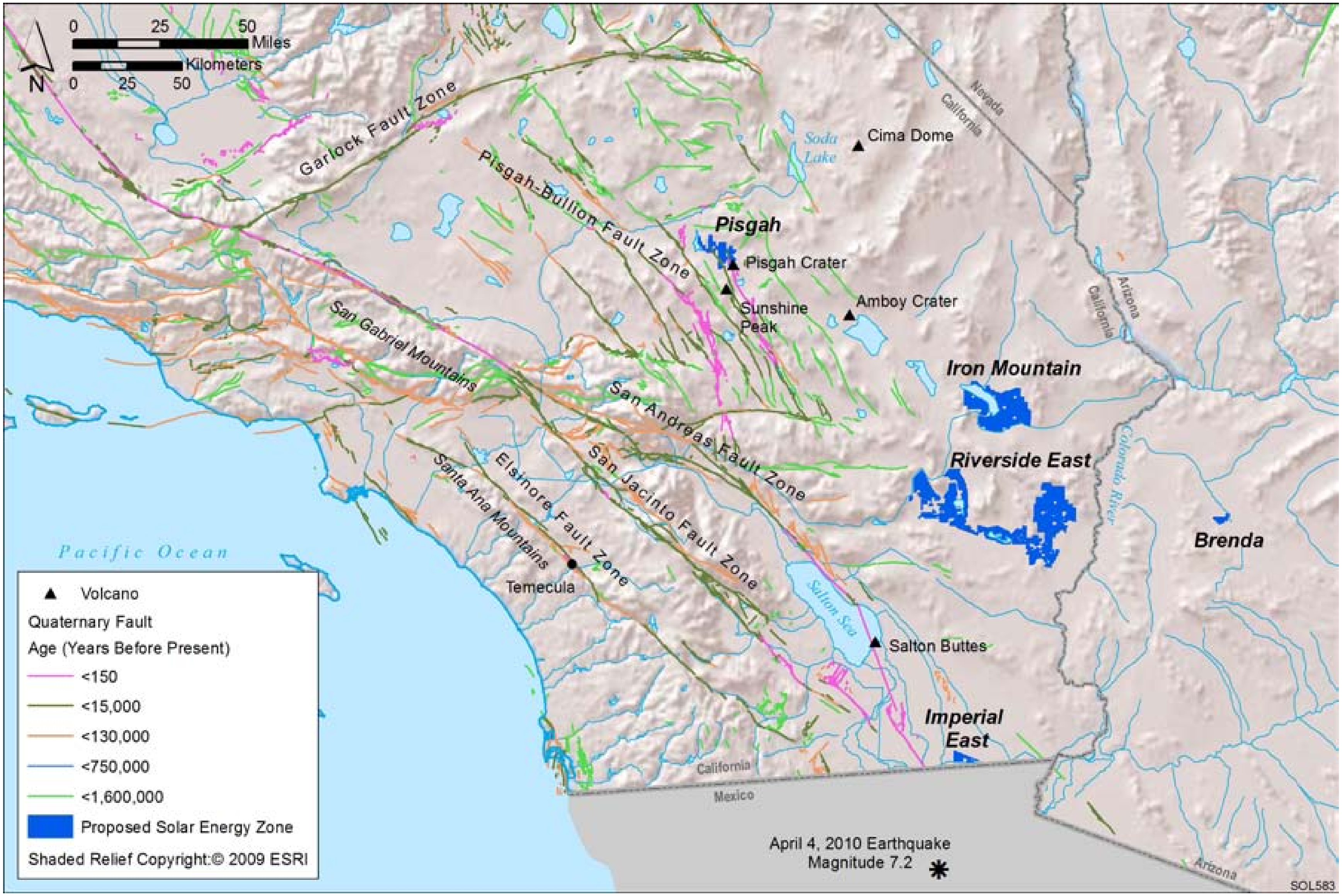

FIGURE 9.4.7.1-4 Quaternary Faults and Volcanoes in Southern California (Sources: USGS and CGS 2009; USGS 2010e)

The Coachella Valley and San Bernardino Mountains sections of the San Andreas Fault Zone are located about 35 mi (56 km) southwest of Chuckwalla Valley. The fault zone is a network of historically active right-lateral strike-slip faults that together compose the transverse boundary between the North American and Pacific plates. It stretches along most of California's coastline southeast to the northern Transverse Range and inland to the Salton Sea (Figure 9.4.7.1-4). Two major historic earthquakes have occurred along the San Andreas Fault: the 1857 Fort Tejon earthquake (magnitude 7.9) and the 1906 San Francisco earthquake (magnitude 7.8). Several smaller surface-rupturing earthquakes have also occurred in historic time. Quaternary to Holocene creep rates ranging from 0.9 to 1.4 in./yr (23 to 35 mm/yr) have been reported for the Coachella Valley and San Bernardino Mountains sections of the fault zone. Average recurrence intervals are estimated to range from 150 to 275 years for the San Bernardino Mountains section and 207 to 233 years for the Coachella Valley section (Bryant and Lundberg 2002a; Matti et al. 1992; USGS 1988). The USGS (1988) estimates that the most recent activity along the Coachella Valley section was about 1,680 ± 40 years ago.

Since 1973, about 835 earthquakes have been recorded within a 61-mi (100-km) radius of the Riverside East SEZ. Three of these earthquakes registered Richter scale magnitudes greater than 6.0: October 16, 1979 (ML[1] 6.1); April 26, 1981 (ML 6.3); and November 24, 1987 (ML 6.5). These earthquakes were centered along segments of the San Jacinto Fault Zone and Brawley Seismic Zone located south of the Salton Sea (USGS 2010e).

Liquefaction. The proposed Riverside East SEZ lies within an area where the peak horizontal acceleration with a 10% probability of exceedance in 50 years is between 0.06 and 0.20 g. Shaking associated with this level of acceleration is generally perceived as weak to light; damage to structures would not be expected (USGS 2008b).

A regional evaluation for liquefaction hazards was completed for the San Bernardino Valley and vicinity in western San Bernardino county by Matti and Carson (1991); the study did not include the eastern part of San Bernardino county or Riverside county where the proposed Riverside East SEZ is located. San Bernardino Valley is located between the San Andreas and San Jacinto Fault Zones, where the peak horizontal acceleration with a 10% probability of exceedance in 50 years is much higher (between 0.88 and 1.62 g) than that calculated for the Chuckwalla Valley; therefore, only general conclusions from the study are presented here.

The evaluation considered three aspects of liquefaction: susceptibility, opportunity, and potential. Susceptibility identifies sedimentary materials that are likely to liquefy during a seismic event on the basis of their physical properties, depth to groundwater, expected earthquake magnitude, and strength of ground shaking. Opportunity considers the recurrence intervals for earthquake shaking strong enough to cause liquefaction in susceptible materials. The potential for ground failure due to liquefaction evaluation then combines the results of the

[1] Richter scale magnitude (ML) was the original magnitude defined by Richter and Gutenberg for local earthquakes in 1935. It was based on the maximum amplitude recorded on a Wood-Anderson torsion seismograph but is currently calculated for earthquakes with magnitudes ranging from 2 to 6, using modern instruments with adjustments (USGS 2010f).

susceptibility and opportunity evaluations and identifies areas that are most and least likely to experience liquefaction (Matti and Carson 1991).

Investigators found that the level of liquefaction susceptibility was most dependent on two factors: (1) depth to the groundwater table and (2) the intensity and duration of ground shaking as determined by an earthquake's magnitude and the distance from the causative fault. These factors in combination with penetration-resistance data from various locations within the San Bernardino valley allowed them to conclude that liquefaction susceptibility gradually decreases with increasing depth to groundwater, increasing distance away from the causative fault, and increasing geologic age (and induration) of sedimentary materials. Although the playa sediments at Palen and Ford Dry Lakes could be considered susceptible to liquefaction since groundwater occurs near the surface (Section 9.4.9.1.2), the low intensity of ground shaking estimated for the general area indicates that the potential for liquefaction in the Chuckwalla Valley sediments is also likely to be low.

Volcanic Hazards. The nearest volcanoes are in the Amboy Crater and lava field (part of the Lavic Lake volcanic field), about 70 mi (110 km) northwest of the Riverside East SEZ and immediately northwest of Bristol Dry Lake (Figure 9.4.7.1-4). Amboy Crater is a 250-ft (76-m) high complex basaltic cinder cone surrounded by about 24.1 mi^2 (62 km^2) of mafic lava flows. The basalt fields erupted from several vents about 10,000 years ago. Hazards resulting from these eruptions likely would be less severe than those from more silicic sources; they include the formation of cinder cones, small volumes of tephra, and lava flows (Parker 1963; Miller 1989).

The Pisgah Crater (also part of the Lavic Lake volcanic field), is immediately adjacent to the southeast corner of the Pisgah SEZ, about 105 mi (170 km) northwest of the Riverside East SEZ (Figure 9.4.7.1-4). The 328-ft (100-m) high cinder cone is the youngest vent in the basalt field. Lava flows issuing from vents within the basalt field sit above alluvial fan and playa lake deposits. A similar, lesser known cinder cone and lava field also is present in the Sunshine Peak area, about 6 mi (10 km) south. Researchers date the most recent activity associated with the Pisgah volcano to about 25,000 years ago (Smithsonian 2010; Bassett and Kupfer 1964). Because of the basaltic composition of the Pisgah Crater lava, hazards likely would be similar to those described for the Amboy Crater but would depend on factors such as location, size, and timing (season).

The Cima dome and volcanic field east of Soda Lake is about 120 mi (190 km) north–northwest of the Riverside East SEZ (Figure 9.4.7.1-4). The volcanic field consists of about 40 basaltic cones and more than 60 associated mafic lava flows covering an area of about 58 mi^2 (150 km^2). It has had three periods of activity from the late Miocene through the late Pleistocene, the most recent having occurred about 15,000 years ago (Dohrenwend et al. 1984). Because of its basaltic nature, hazards associated with the Cima volcanic field would like be similar to those described for the Lavic Lake volcanic field, but would depend on factors such as location, size, and timing (season).

The nearest active volcano is Mount St. Helens in the Cascade Range (Washington), about 935 mi (1,505 km) north–northwest of the Chuckwalla Valley, which has shown some activity as recently as 2008. The nearest volcano that meets the criterion for an unrest episode is the Long Valley Caldera in east-central California, about 350 mi (565 km) northwest, which has experienced recurrent earthquake swarms, changes in thermal springs and gas emissions, and uplift since 1980 (Diefenbach et al. 2009). The Long Valley Caldera is part of the Mono-Inyo Craters volcanic chain, which extends from Mammoth Mountain (on the caldera rim) northward about 25 mi (40 km) to Mono Lake. Small to moderate eruptions have occurred at various sites along the volcanic chain in the past 5,000 years at intervals ranging from 250 to 700 years. Wind-blown ash from some of these eruptions is known to have drifted as far east as Nebraska. While the probability of an eruption within the volcanic chain in any given year is small (less than 1%), serious hazards could result from a future eruption. Depending on the location, size, timing (season), and type of eruption, hazards could include mudflows and flooding, pyroclastic flows, small to moderate volumes of tephra, and falling ash (Hill et al. 1998, 2000; Miller 1989).

Earthquake swarms also occurred at Medicine Lake Volcano in northern California (Cascade Range) for a few months in 1988. Medicine Lake is about 650 mi (1,050 km) northwest of the Riverside East SEZ (Diefenbach et al. 2009). The most recent eruption at Medicine Lake was rhyolitic in composition and occurred about 900 years ago (USGS 2010f). Nearby Lassen Peak last erupted between 1914 and 1917; at least two blasts during this period produced mudflows that inundated the valley floors of Hut and Lost Creeks to the east. Tephra from the most violent eruption, occurring on May 22, 1915, was carried by prevailing winds and deposited as far as 310 mi (500 km) to the east (Miller 1989).

Slope Stability and Land Subsidence. The incidence of rock falls and slope failures can be moderate to high along mountain fronts and can present a hazard to facilities on the relatively flat terrain of valley floors like the northern Chuckwalla and Palen Valleys if they are located at the base of steep slopes. The risk of rock falls and slope failures decreases toward the center of the flat valleys.

There has been no land subsidence monitoring within the Chuckwalla Valley to date; however, 32- to 64-ft (10- to 20-m) long earth fissures and 3-ft (1-m) wide sinkholes associated with subsidence have been documented in the Temecula area of southwestern Riverside County, about 105 mi (170 km) west–southwest of the proposed Riverside East SEZ (Figure 9.4.7.1-4). The subsidence is the result of groundwater overdrafts in the Temecula-Wolf Valley that have caused differential compaction in the sediments of the underlying aquifer. Land failure caused by sinkholes and fissures has been significant enough to damage buildings, roads, potable water and sewer lines, and other infrastructure (Corwin et al. 1991; Shlemon 1995). Land subsidence has also been documented as far back as the 1970s in southern California's San Joaquin Valley, where the maximum subsidence due to extensive groundwater withdrawals for irrigation is greater than 28 ft (9 m) (Galloway et al. 1999), and in the Wilmington Oil Field as a result of oil extraction from the Los Angeles basin in southern Los Angeles County (Kovach 1974).

Other Hazards. Other potential hazards at the proposed Riverside East SEZ include those associated with soil compaction (restricted infiltration and increased runoff), expanding clay soils (destabilization of structures), and hydro-compactable or collapsible soil (settlement). Disturbance of soil crusts and desert varnish (and pavement) on soil surfaces may also increase the likelihood of soil erosion by wind.

Alluvial fan surfaces, such as those typical of the northern Chuckwalla and Palen Valleys, can be the sites of damaging high-velocity flash floods and debris flows during periods of intense and prolonged rainfall. The nature of the flooding and sedimentation processes (e.g., streamflow versus debris flow) will depend on specific morphology of the fan (National Research Council 1996). Currently, a series of levees rim parts of the northern border of the proposed Riverside East SEZ in the northern Chuckwalla Valley (between the Eagle and Coxcomb Mountains) and Palen Valley (along the eastern flank of the Coxcomb Mountains). The levees channel runoff to the CRA and offer some protection from flash floods and debris flows (see Section 9.4.9.1.1). A series of diversion dikes also border the southern boundary of the SEZ along the central Chuckwalla Valley to channel drainage issuing from the Chuckwalla Mountains to the south.

9.4.7.1.2 Soil Resources

Because soil mapping is not complete for the Colorado Desert area, the map unit composition within the proposed Riverside East SEZ has not been delineated. Therefore, only soil series are shown in Figure 9.4.7.1-5 and described in Table 9.4.7.1-1. Soils within the SEZ are predominantly gravelly loams typical of alluvial fan terraces, which together make up about 64% of the site's soil coverage. These soils are gently to strongly sloping and characterized as well to excessively well drained, with low to high runoff, and moderate to moderately rapid permeability. Dune land soils, characterized by very rapid permeability and a high susceptibility for wind erosion, cover about 24% of the SEZ. The poorly drained soils of Ford Dry Lake make up only about 1% of the site's soil coverage. These soils are typical of ancient playa lake deposits, with iron oxide and high salinity precipitates near the surface (Worley-Parsons 2010). Biological soil crusts and desert pavement have not been documented in the SEZ, but may be present.

9.4.7.2 Impacts

Impacts on soil resources would occur mainly as a result of ground-disturbing activities (e.g., grading, excavating, and drilling), especially during the construction phase of a solar project. These include soil compaction, soil horizon mixing, soil erosion and deposition by wind, soil erosion by water and surface runoff, sedimentation, and soil contamination. Such impacts are common to all utility-scale solar energy facilities in varying degrees and are described in more detail for the four phases of development in Section 5.7.1.

Because impacts on soil resources result from ground-disturbing activities in the project area, soil impacts would be roughly proportional to the size of a given solar facility, with larger areas of disturbed soil having a greater potential for impacts than smaller areas (Section 5.7.2). The magnitude of impacts would also depend on the types of components built for a given facility since some components would involve greater disturbance and would take place over a longer time frame.

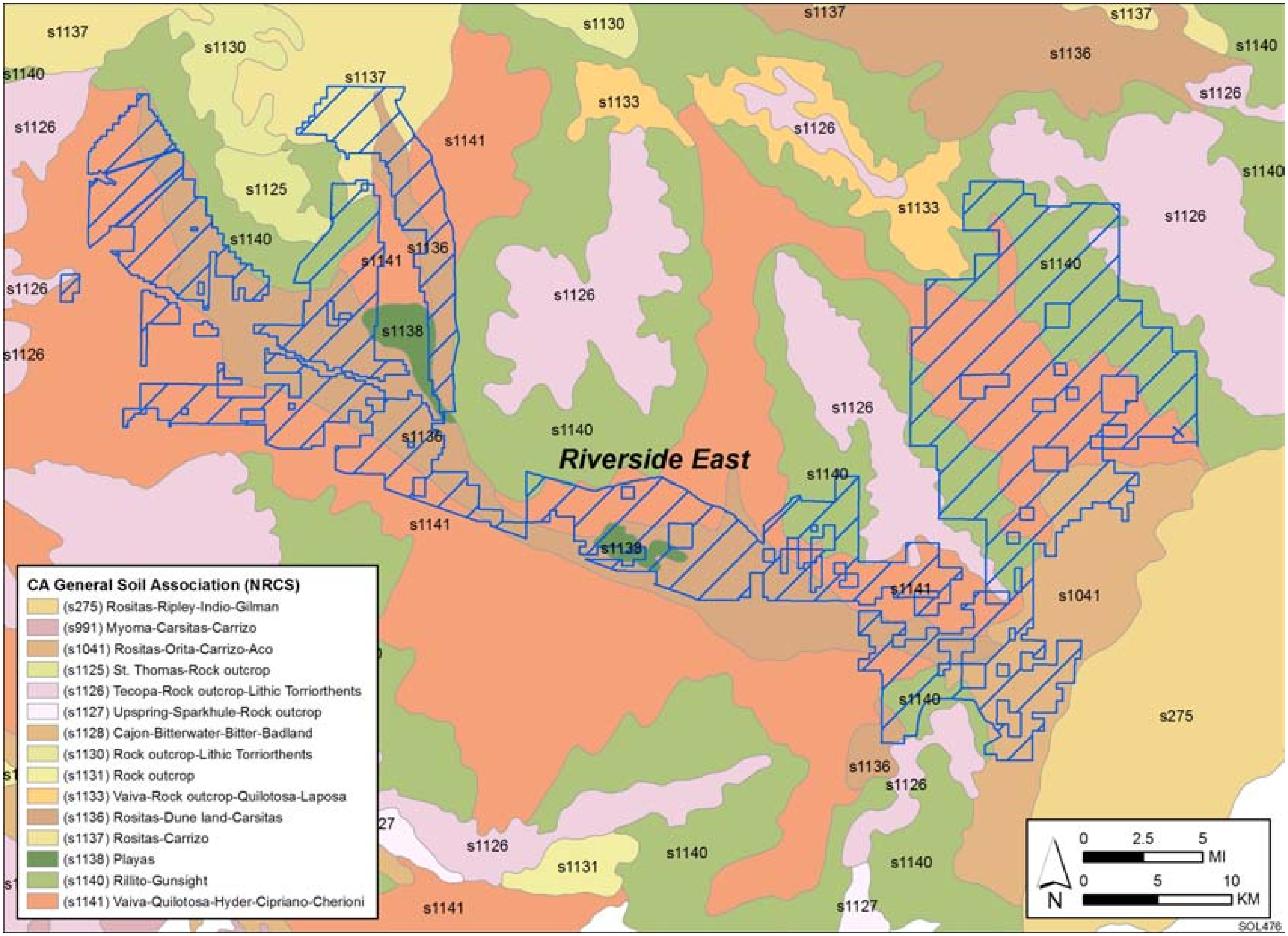

FIGURE 9.4.7.1-5 Soil Map for the Proposed Riverside East SEZ (Source: NRCS 2008)

TABLE 9.4.7.1-1 Summary of Soil Series within the Proposed Riverside East SEZ

Map Unit Symbol	Map Unit Name	Water Erosion Potential	Wind Erosion Potential	Description	Area in Acres[b] (% of SEZ)
s1136	Rositas-Dune land-Carsitas	–[a]	–[a]	*Rositas series* are gently sloping soils on dunes and sand sheets (gradients of 0 to 30%). Very deep and somewhat excessively drained with low surface runoff potential (high infiltration rate) and rapid permeability. Typically fine sand. *Dune land* soils are constantly shifting medium-grained sand deposited by wind blowing across the valley. Parent material consists of eolian sands. Little or no vegetation; very rapid permeability. *Carsitas series* are nearly level to strongly sloping soils on alluvial fans, moderately steep valley fills, and dissected alluvial fan remnants. Excessively drained with slow surface runoff (except during torrential events) and rapid permeability. Typically gravelly sand. Used for watershed and recreation; commercial source of sand and gravel.	48,237 (24)
s1141	Rositas-Orita-Carrizo-Aca	–	–	*Rositas series* described above. *Orita series* are nearly level to gently sloping soils on fan remnants and terraces (gradients of 0 to 2%). Parent material consists of alluvium from mixed sources. Very deep and well-drained soils with very low to medium surface runoff potential and moderate permeability. Well suited for cultivation if irrigated but not as rangeland. *Carrizo series* are gently sloping soils on floodplains, alluvial fans, fan piedmonts, and bolson floors (gradients of 0 to 15%). Parent material consists of alluvium from mixed sources. Very deep and excessively drained soils with negligible to very low surface runoff potential and rapid to very rapid permeability. Typically extremely gravelly sand. Aridic soil moisture regime.	14,564 (7)

TABLE 9.4.7.1-1 (Cont.)

Map Unit Symbol	Map Unit Name	Water Erosion Potential	Wind Erosion Potential	Description	Area in Acres[b] (% of SEZ)
s1137	Rositas-Carrizo	–	–	Used mainly as rangeland and wildlife habitat. *Aco series* are gently sloping soils on terraces above the flood plain (gradients of 0 to 8%). Parent material consists of alluvium from mixed sources. Very deep and well-drained to somewhat excessively drained soils with low to medium surface runoff potential and moderately rapid permeability. Typically sandy loam. Used for cropland if irrigated. *Rositas series* as described above. *Carrizo series* are gently sloping soils on floodplains, alluvial fans, fan piedmonts, and bolson floors (gradients of 0 to 15%). They are very deep, excessively drained soils formed in mixed alluvium. Negligible to very low surface runoff potential; rapid to very rapid permeability. Typically extremely gravelly sand. Aridic soil moisture regime. Used mainly as rangeland and wildlife habitat.	5,774 (3)
s1138	Playas	–	–	Very poorly drained soils formed in flats and closed basins; moderately to strongly saline. Medium surface runoff potential and low permeability.	2,741 (1)
s1126	Tecopa-Rock outcrop Lithic torriorthents	–	–	*Tecopa series* are sloping soils on low hills and low mountain side slopes (gradients of 15 to 75%). Very shallow and well-drained soils formed in residuum and colluvium weathered from metamorphic rocks with medium to rapid surface runoff and moderate permeability. Typically very gravelly sandy loam. Used mainly as desert rangeland. *Rock outcrop* occurs as low ridges or boulder piles and consists of variable rock types. Rapid surface runoff and barren of vegetation. *Lithic Torriorthents* are sloping soils on steep hill and mountain side slopes (gradients 15 to 60% or more) with rapid surface runoff. Typically very gravelly sand loam or loam.	2,168 (1)

[a] A dash indicates water and wind erosion potential not rated at the Soil Series taxonomic level.

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

Source: NRCS (2006); CEC (2010).

Palen and Ford Dry Lakes may not be suitable locations for construction since lakebed sediments are often saturated with shallow groundwater and likely collapsible. The lakes sit within low elevation areas and serve as sumps for drainage in the Palen and Chuckwalla Valleys.

9.4.7.3 SEZ-Specific Design Features and Design Feature Effectiveness

No SEZ-specific design features were identified for soil resources at the proposed Riverside East SEZ. Implementing the programmatic design features described in Appendix A, Section A.2.2., as required under BLM's proposed Solar Energy Program, would reduce the potential for soil impacts during all project phases.

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9.4.8 Minerals (Fluids, Solids, and Geothermal Resources)

9.4.8.1 Affected Environment

Public land in the Riverside East SEZ was closed to locatable mineral entry in June 2009 pending the outcome of this solar energy PEIS. Currently, there are nine mill site claims within the SEZ (BLM and USFS 2010a) located in Township 4 South, Range 21 East, SBM, in Sections 22 and 27. The claims cover the southwest quarter of both sections.

There are no oil and gas leases within the proposed SEZ, although the area was largely leased at one time (BLM and USFS 2010a). There was also a geothermal lease in the area east of Desert Center, which is now closed (BLM and USFS 2010a) The area is still open for discretionary mineral leasing, including leasing for oil and gas and other leasable and saleable minerals.

9.4.8.2 Impacts

If the BLM identifies the area as an SEZ to be used for utility-scale solar development, it would continue to be closed to all incompatible forms of mineral development with the exception of the areas covered by existing mining claims. The existing claims represent prior existing rights that, if valid, would preclude solar energy development as long as they are in place. Development of solar resources in areas with mining claims could only occur if (1) the claims are abandoned, (2) the claims are demonstrated to not be valid and are vacated by the BLM, or (3) the claims are purchased by a solar developer. The latter two of these approaches could require considerable time, negotiation, and money to accomplish. Although they encumber only a small percentage of the SEZ, the mining claims represent an impediment to moving forward with planning solar development where they are located and are likely to prevent that development in the immediate future.

Since there are no other mining claims within the SEZ, it is assumed there would be no loss of locatable mineral production.

Since there are no current oil and gas leases within the SEZ, it is assumed there would be no impacts on these resources if the SEZ were developed for solar energy production. In addition, should any oil and gas resources be found, they could be accessible via directional drilling from outside of the SEZ.

Solar energy development of the SEZ would preclude future surface use of the site to produce geothermal energy, although geothermal resources, should any be found, might be accessed through directional drilling. Because of this option and the lack of current geothermal leases within the SEZ, solar energy development is anticipated to have no impact on development of geothermal resources.

If the area is identified as a solar energy development zone, some other mineral uses might be allowed on all or portions of the SEZ. For example, the sale of common minerals, such as sand, gravel, and mineral materials used for road construction, might take place in areas not directly developed for solar energy production.

9.4.8.3 SEZ-Specific Design Features and Design Feature Effectiveness

No SEZ-specific design features were identified. Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM's proposed Solar Energy Program would provide adequate mitigation for some identified impacts.

9.4.9 Water Resources

9.4.9.1 Affected Environment

The proposed Riverside East SEZ is located within the Southern Mojave-Salton Sea subbasin of the California hydrologic region (USGS 2010a) and the Basin and Range physiographic province characterized by intermittent mountain ranges and desert valleys (Planert and Williams 1995). The proposed SEZ has surface elevations ranging between 450 and 1,000 ft (137 and 305 m) and contains several small alluvial fans between the surrounding mountains generating flow patterns toward Palen Lake and Ford Dry Lake, as well as a general drainage pattern from the northwest to the southeast toward the Colorado River (Figures 9.4.9.1-1 and 9.4.9.1-2). This region is located within the Mojave Desert, which is characterized by extreme daily temperature ranges with low precipitation and humidity (CDWR 2009). Arid conditions exist because of low rainfall (annual precipitation is between 4 and 6 in./yr [10 and 15 cm/yr])(CDWR 2003), as well as high pan evaporation rates (130 in./yr [330 cm/yr]) (Cowherd et al. 1988; WRCC 2010a).

9.4.9.1.1 Surface Waters (Including Drainages, Floodplains, and Wetlands)

There are no perennial streams located in the proposed Riverside East SEZ. Palen Lake and Ford Dry Lake are located in the western and central portions of the SEZ, respectively (Figure 9.4.9.1-1). Palen Lake is a wet playa having groundwater located near the surface and covering an area of 4,260 acres (17 km^2) with only 750 acres (3 km^2) within the boundaries of the SEZ. Ford Dry Lake is a dry lakebed covering 4,400 acres (18 km^2), most of which is within the SEZ boundaries. The primary surface water features within the proposed Riverside East SEZ are several ephemeral washes coming off the surrounding mountains. A reach of the CRA is located along the northwestern boundary of the SEZ with several levees along the base of the Eagle Mountains and the Coxcomb Mountains that channel runoff from the mountains to culvert crossings over the CRA and into the boundaries of the SEZ. The McCoy Wash drains the eastern slope of the McCoy Mountains and flows to the southeast across the eastern portion of the SEZ (Figure 9.4.9.1-2). Annual runoff estimates for the McCoy Wash are on the order of 800 ac-ft/yr (987,000 m^3/yr) (Metzger et al. 1973).

Flood hazards have not been identified (Zone D) for the region surrounding the proposed Riverside East SEZ (FEMA 2009). The CDWR awareness floodplain mapping initiative indicates that several areas of the proposed Riverside East SEZ are potentially within 100-year floodplains (CDWR 2010b). These potential floodplain areas are concentrated around the surrounding areas of Ford Dry Lake and Palen Lake, and the ephemeral washes draining the Eagle Mountains and Coxcomb Mountains (Figure 9.4.9.1-1), as well as the ephemeral washes that drain the McCoy Mountains and Little Maria Mountains that feed McCoy Wash (Figure 9.4.9.1-2). Intermittent flooding may occur along the many ephemeral washes within the proposed SEZ with potential for channel incision and sedimentation. Temporary ponding may occur in the low drainage areas near Palen Lake and Ford Dry Lake.

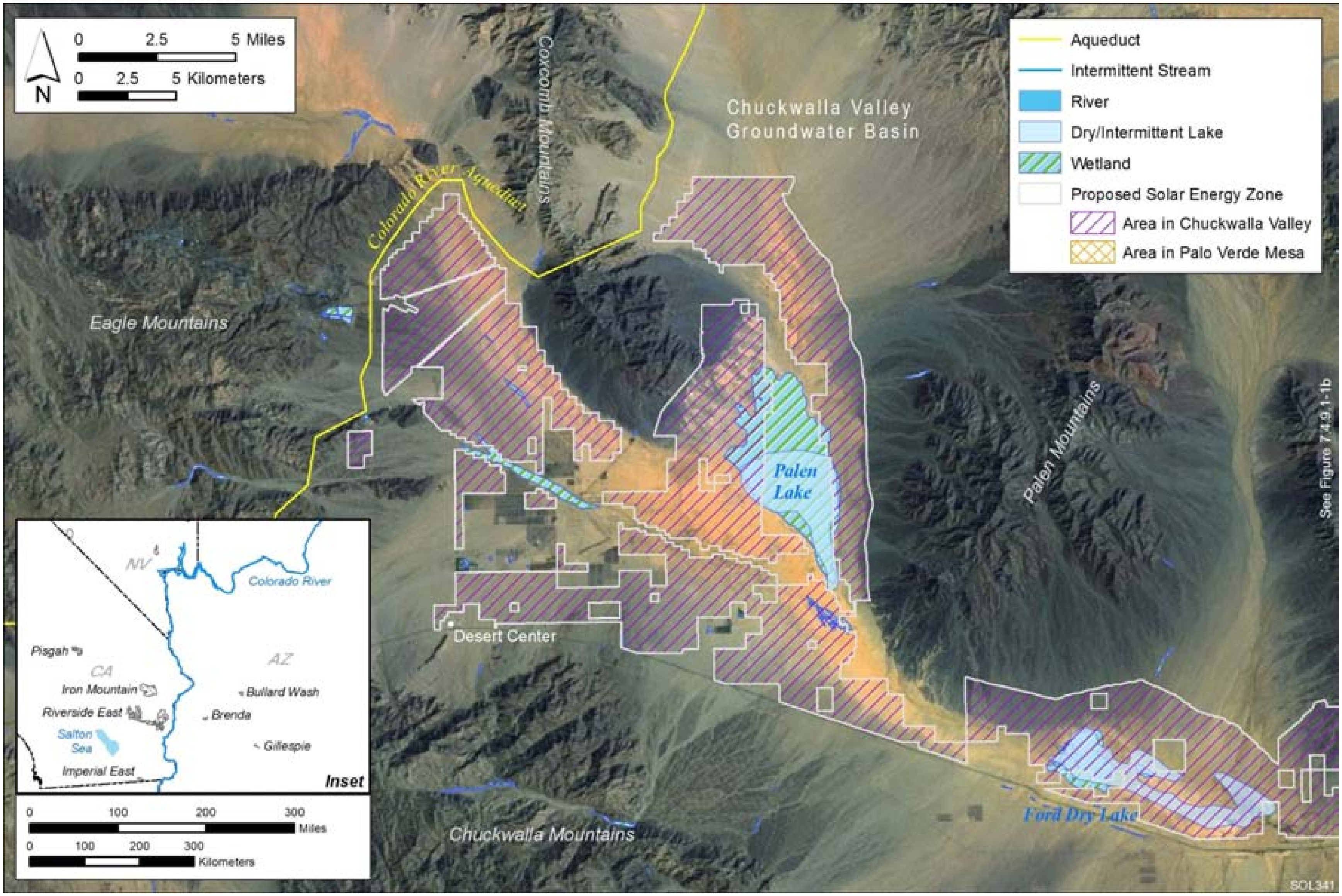

FIGURE 9.4.9.1-1 Surface Water Features near the Western Half of the Proposed Riverside East SEZ

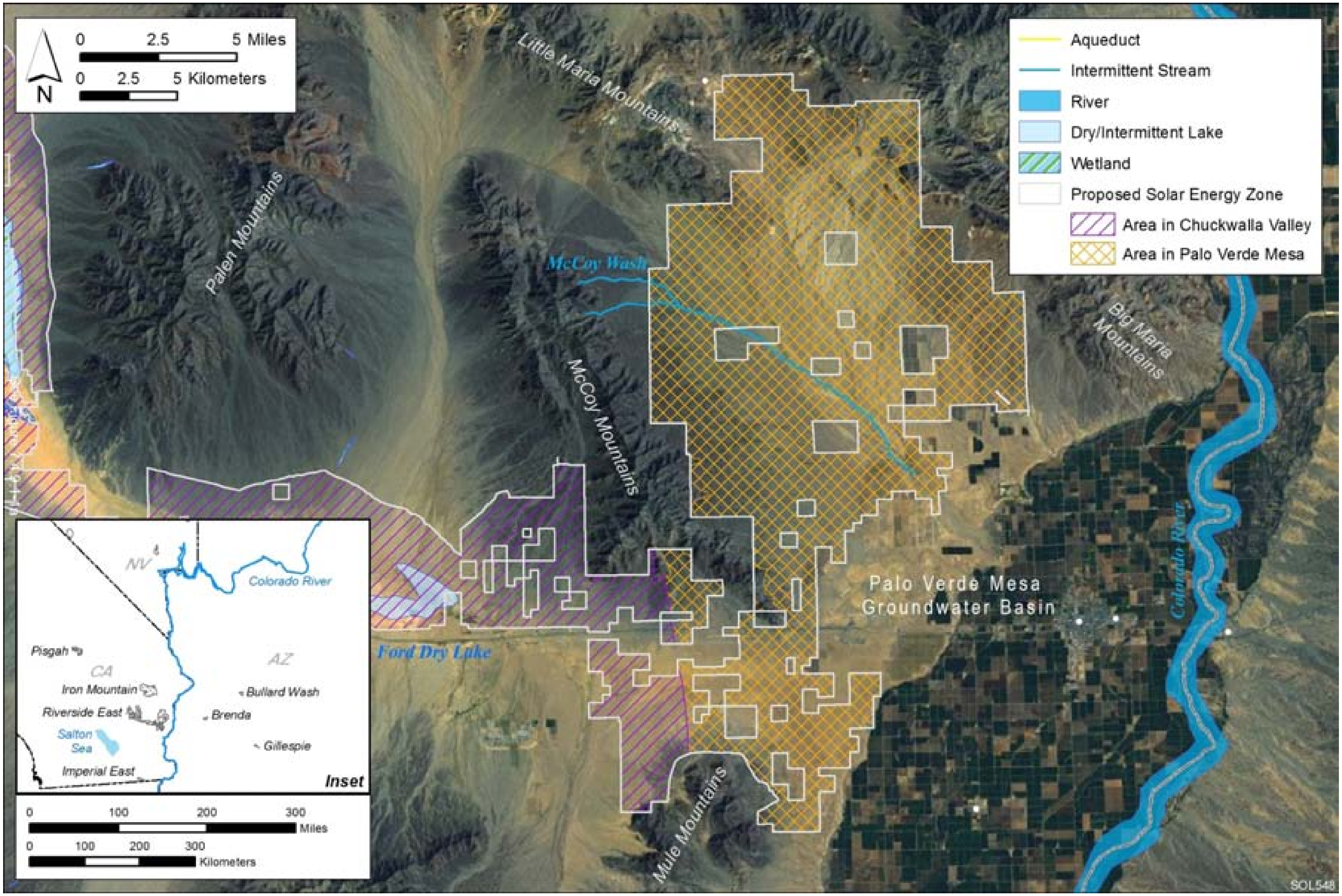

FIGURE 9.4.9.1-2 Surface Water Features near the Eastern Half of the Proposed Riverside East SEZ

Several small to large wetlands were identified in the western and central portions of the SEZ, according to the NWI (USFWS 2009). The largest wetland area is the lacustrine wetland that surrounds Palen Lake (Figure 9.4.9.1-1), which is intermittently flooded with unconsolidated shore sediments. Further information regarding the small wetlands near the proposed SEZ is given in Section 9.4.10.1.

9.4.9.1.2 Groundwater

The proposed Riverside East SEZ is located within two groundwater basins: Chuckwalla Valley and Palo Verde Mesa. The divide between these two groundwater basins is a surface drainage divide between the McCoy Mountains and the Mule Mountains, as well as a buried bedrock ridge located below the primary water-bearing aquifer (Wilson and Owen-Joyce 1994; CDWR 2003, groundwater basin numbers 7-5 and 7-39), so there are no restrictive structures between the two groundwater basins. The principal aquifer consists of alluvium and fanglomerate deposits on top of a metamorphic bedrock basement complex (CDWR 2003). The Quaternary age alluvium sediments consist of alluvial fan and river deposits of fine to coarse sands intermixed with layers of gravel, silt, and clay sediments. The late Tertiary age fanglomerate deposits are a part of the Bouse Formation consisting of alluvial fan and marine deposits of limestone interbedded with clays, silt and sand (Wilson and Owen-Joyce 1994). The total thickness of the principal aquifer is on the order of 1,200 ft (366 m) (CDWR 2003), and the alluvium layer thickness is on the order of 100 to 150 ft (30 to 46 m) in the region of the SEZ (Metzger et al. 1973).

Groundwater recharge in the Chuckwalla Valley is by subsurface underflow and from direct infiltration of precipitation runoff. Subsurface underflow is from the Pinto Valley and Cadiz Valley groundwater basins to the west of the Chuckwalla Valley. The natural groundwater flow pattern is from west to east across the Chuckwalla Valley toward the Colorado River. Estimates of natural recharge have not been quantified in the Chuckwalla Valley. Natural recharge is estimated to be 800 ac-ft/yr (987,000 m^3/yr) in the neighboring Palo Verde Mesa and the Cadiz Valley, which have similar climate and precipitation conditions (CDWR 2003). Recharge from precipitation runoff is not suspected to be significant given the limited precipitation in the region (Metzger et al. 1973). Discharge in the Chuckwalla Valley is primarily by evapotranspiration at Palen Lake and subsurface underflow to the Palo Verde Mesa; the evapotranspiration rate at Palen Lake is unknown, and the subsurface underflow is estimated to be 400 ac-ft/yr (493,000 m^3/yr) to Palo Verde Mesa (CDWR 2003). Groundwater withdrawal rates were 9,100 ac-ft/yr (11.2 million m^3/yr) in 1966 (CDWR 2003), and between 4,400 and 5,700 ac-ft/yr (5.4 million and 7.0 million m^3/yr) during dry and wet years occurring in the period 1998 to 2001 (CDWR 2005). The majority of groundwater withdrawals in the region of the proposed SEZ are for agricultural and domestic uses.

Groundwater surface elevations are routinely monitored in the Chuckwalla Valley and Palo Verde Mesa as a part of the methodology used to determine groundwater that is replenished by Colorado River water, as outlined in the 2006 consolidated decree of the U.S. Supreme Court (*Arizona v. California* 2006) (see Section 9.4.9.1.3 for further information). Depth to groundwater ranges between 80 and 270 ft (24 and 82 m) below the surface across the Chuckwalla Valley and into the Palo Verde Mesa (USGS 2010b). Groundwater surface elevations have remained steady for several decades (USGS 2010c, monitoring wells 334438115211101, 333939114411501). Groundwater well yields average 1,800 gpm (6,814 L/min) with a maximum of 3,900 gpm (14,760 L/min) in the Chuckwalla Valley. However, the majority of the groundwater extractions are clustered on the western and eastern edges of the valley around Desert Center and the Palo Verde Mesa. It is suspected that further groundwater development in this region may lead to declines in groundwater elevations (Metzger et al. 1973; Steinemann 1989). Transmissivity values for the principal aquifer have been reported to range from 13 to 94,000 ft^2/day (1.2 to 8,733 m^2/day) (Metzger et al. 1973).

TDS concentrations range from 274 to 12,300 mg/L in the Chuckwalla Valley and from 730 to 4,500 mg/L in the Palo Verde Mesa (CDWR 2003). The best water quality, in terms of low TDS values, comes from the western portion of the Chuckwalla Valley around Desert Center, where the average TDS is 2,100 mg/L; TDS values increase as the groundwater flows eastward towards the Colorado River (Steinemann 1989). In the region of Palen Lake, TDS values range between 2,960 and 4,370 mg/L (CDWR 2003). Additional concerns relating to groundwater quality are high concentrations of arsenic, selenium, fluoride, chloride, boron, sulfate, and TDS, which impair its use for domestic and agricultural applications in certain areas of the Chuckwalla Valley and Palo Verde Mesa (CDWR 2003).

9.4.9.1.3 Water Use and Water Rights Management

In 2005, water withdrawals from surface waters and groundwater in Riverside County were 1.4 million ac-ft/yr (1.7 billion m^3/yr), of which 74% came from surface waters and 26% from groundwater. The largest water use category was municipal and domestic supply, at 519,000 ac-ft/yr (640 million m^3/yr). However, the majority of this water is used in the larger cities located in the western portion of Riverside County. Agricultural water uses accounted for 874,000 ac-ft/yr (1.1 billion m^3/yr), and industrial water uses on the order of 7,000 ac-ft/yr (8.6 million m^3/yr) (Kenny et al. 2009). The primary water use in the eastern portion of Riverside County relevant to the proposed Riverside East SEZ is for agriculture, representing 59% to 77% of total groundwater withdrawals during the dry and wet years, respectively, in the period 1998 to 2001 (CDWR 2005).

To manage water resources, California uses a “plural” system, which consists of a mixture of riparian and prior appropriation doctrines for surface waters, a separate doctrine for groundwater, and pueblo rights (BLM 2001). Several agencies are involved with the management of California’s water resources, including federal, state, local, and water/irrigation districts. For example, water rights and water quality are managed by the State Water Board, while the CDWR manages water conveyance, infrastructure, and flood management (CDWR 2009). Surface water appropriations for nonriparian rights begin with a permit application to the State Water Board and a review process that examines the application’s beneficial use, pollution potential, and water quantity availability; the permitting, review, and licensing procedure should not take more than 6 months to complete unless the application is protested (BLM 2001).

Groundwater management in California is primarily implemented at the local level of government through local agencies or ordinances; it can also be subject to court adjudications. State statute provides authority and revenue mechanisms to several types of local agencies to provide water for beneficial uses, as well as to manage withdrawals in order to prevent overdraft[2] of the aquifers. Local ordinances (typically at the county level) can also be used to manage groundwater resources and have been adopted in 27 counties in California. Many of these local groundwater ordinances are focused on controlling water exports out of the basin through permitting processes. Court adjudications are the strongest form of groundwater management used in California and often result in the creation of a court-appointed "watermaster" agency to manage withdrawals for all users to ensure that the court-determined safe yield[3] is maintained (CDWR 2003).

The most significant water management issue relating to the proposed Riverside East SEZ is the assemblage of compacts, federal laws, court decrees, and contracts that form the "Law of the River," which pertains to the management of the Colorado River. The key aspects of the Law of the River relevant to the proposed SEZ are as follows (BOR 2008):

- 1922 Colorado River Compact, which defines the Upper and Lower Colorado River Basins and allots to each basin 7.5 million ac-ft/yr (9.3 billion m^3/yr) for beneficial use;

- 1928 Boulder Canyon Project Act, which grants California 4.4 million ac-ft/yr (9.3 billion m^3/yr) of the lower Colorado River Basin's allotment;

- 1931 California Seven Party Agreement, which prioritizes California's allotment among local water management entities; and

- 1964 U.S. Supreme Court decision, along with the Consolidation Decree of 2006, which provides a single reference to the 1964 decision (*Arizona v. California* 2006).

In accordance with the Law of the River, the USGS developed a method for identifying groundwater wells outside of the Colorado River's floodplain, where groundwater is replenished by Colorado River water. This method is known as the Accounting Surface, and it establishes a surface of static groundwater elevations, below which water is accounted for as Colorado River water and above which water is accounted for as local tributary replenished water (Wilson and Owen-Joyce 1994; Wiele et al. 2008). Groundwater below the Accounting Surface is subject to water management by the Law of the River, which is administered by the BOR (Wilson and Owen-Joyce 1994), and water above the Accounting Surface is subject to water management by state and local entities.

[2] Groundwater overdraft is the condition in which water extractions from an aquifer exceed recharge processes in such excess as to cause substantial and sustained decreases in groundwater flows and groundwater elevations.

[3] Safe yield is the amount of groundwater that can be withdrawn from a groundwater basin over a period of time without exceeding the long-term recharge of the basin or unreasonably affecting the basin's physical and chemical integrity.

The Colorado River Accounting Surface is at an elevation between 238 and 240 ft (72.5 and 73 m) for most of the Chuckwalla Valley and Palo Verde Mesa area (Wiele et al. 2008). From west to east across the Chuckwalla Valley and into the Palo Verde Mesa, static groundwater elevations are approximately 488 ft (149 m) near Desert Center, 288 ft (88 m) near Palen Lake, and 245 ft (75 m) near the split between the two groundwater basins (USGS 2010b). Groundwater above the Accounting Surface is subject to State of California laws, because there are no local management entities in this area. Landowners in California may withdraw groundwater for beneficial use without approval from the State Water Board in regions where no local-level management or court adjudication takes precedence, so long as their use does not impair the availability of neighboring water rights (CDWR 2010a).

Approximately 3% of the proposed SEZ is located in the boundaries of the Palo Verde Irrigation District (PVID) along the very eastern edge of the SEZ. The PVID manages water rights for the Palo Verde Valley and portions of the Palo Verde Mesa. The PVID shares a priority right to develop up to 3.85 million ac-ft/yr (4.75 billion m^3/yr) with the Yuma Project and the Imperial Irrigation District according to the California Seven Party Agreement of 1931. The majority of the consumptive use of water in the Palo Verde Valley is irrigation with water supplied by surface water diversions, and any groundwater development on the Palo Verde Mesa in the PVID boundaries would have to make prior arrangements with the PVID. Additionally, the MWD has an indirect stake regarding consumptive water use in the PVID boundaries, because in 2004 the MWD and PVID started a 35-year agreement in 2004 for land fallowing within the PVID boundaries in order to supply MWD with Colorado River water (MWD 2007).

Water management issues pertaining to the CRA are described in Section 9.2.9.1.3.

9.4.9.2 Impacts

Potential impacts on water resources related to utility-scale solar energy development include direct and indirect impacts on surface waters and groundwater. Direct impacts occur at the place of origin and at the time of the proposed activity, while indirect impacts occur away from the place of origin or later in time. Impacts on water resources considered in this analysis are the result of land disturbance activities (construction, final developed site plan, as well as off-site activities such as road and transmission line construction) and water use requirements for solar energy technologies that take place during the four project phases: site characterization, construction, operations, and decommissioning/reclamation. Both land disturbance and consumptive water use activities can affect groundwater and surface water flows, cause drawdown of groundwater surface elevations, modify natural drainage pathways, obstruct natural recharge zones, and alter surface water-wetland-groundwater connectivity. Water quality also can be degraded through the generation of wastewater, chemical spills, increased erosion and sedimentation, and increased salinity (e.g., by the excessive withdrawal from aquifers).

9.4.9.2.1 Land Disturbance Impacts on Water Resources

Impacts related to land disturbance activities are common to all utility-scale solar energy facilities and are described in more detail for the four phases of development in Section 5.9.1; these impacts will be minimized through the implementation of programmatic design features described in Appendix A, Section A.2.2. In addition to the hydrologic evaluation (including identifying 100-year floodplains and jurisdictional waters) described in the design features, coordination and permitting with the CDFG would be needed for any proposed alterations of surface water features (both perennial and ephemeral) in accordance with the Lake and Streambed Alteration Program (CDFG 2010a). Siting of solar energy facilities near Palen Lake and Ford Dry Lake (Figure 9.4.9.1-1) could disrupt the natural drainage patterns to these receiving bodies, resulting in erosion and sedimentation issues. Additional concerns of land disturbance in the vicinity of Palen Lake are associated with the surrounding wetland habitat and groundwater recharge/discharge process, which could be adversely affected by alterations to natural drainage patterns. The McCoy Wash represents a significant surface drainage across the eastern portion of the SEZ (Figure 9.4.9.1-2) and a large portion of its watershed is suspected to be within a 100-year floodplain according to CDWR awareness floodplain maps (CDWR 2010b). Several smaller washes feed this incised channel, so land disturbance in the vicinity of McCoy Wash should be minimized in order to prevent further channel incision, erosion, and sedimentation impacts.

9.4.9.2.2 Water Use Requirements for Solar Energy Technologies

Analysis Assumptions

A detailed description of the water use assumptions for the four utility-scale solar energy technologies (parabolic trough, power tower, dish engine, and PV systems) is presented in Appendix M. Assumptions regarding water use calculations specific to the proposed Riverside East SEZ are as follows:

- On the basis of a total area of greater than 30,000 acres (121 km^2), it is assumed that three solar projects would be constructed during the peak construction year;
- Water needed for making concrete would come from an off-site source;
- The maximum land disturbance for an individual solar facility during the peak construction year is assumed to be 3,000 acres (12 km^2);
- Assumptions on individual facility size and land requirements (Appendix M), along with the assumed number of projects and maximum allowable land disturbance, result in the potential to disturb up to 4% of the total area of the proposed SEZ;

- Water use requirements for hybrid cooling systems are assumed to be on the same order of magnitude as those using dry cooling (see Section 5.9.2.1); and

- Water from the CRA is assumed to be unavailable to solar energy facilities (see Section 9.2.9.1.3 and Section 9.2.9.2.2 for further details).

Site Characterization

During site characterization, water would be used mainly for controlling fugitive dust and supplying potable water for the workforce. Impacts on water resources during this phase of development are expected to be negligible, because activities would be limited in area, extent, and duration; water needs could be met by trucking water in from an off-site source.

Construction

During construction, water would be used mainly for fugitive dust control and the workforce potable water supply. Because there are no perennial surface water bodies on the proposed Riverside East SEZ, the water requirements for construction activities could be met by either trucking water to the sites or by using on-site groundwater resources. TDS levels in groundwater used for a potable supply must be less than 1,500 mg/L and are recommended to be less than 500 mg/L to meet secondary maximum contaminant levels (California Code Title 22, Article 16, Section 64449). Given the potential for nonpotable TDS values in groundwater of the Chuckwalla Valley and the Palo Verde Mesa, workforce water supplies may have to be brought in from off-site.

Water requirements for dust suppression and potable water supply during construction, shown in Table 9.4.9.2-1, could be as high as 6,813 ac-ft (8.4 million m^3). Groundwater wells would have to yield an estimated 2,896 to 4,221 gpm (10,963 to 15,978 L/min) to meet the estimated construction water requirements. These yields are on the order of large municipal and agriculture production wells (Harter 2003), so multiple wells may be needed to obtain the water requirements. In addition, up to 222 ac-ft (273,800 m^3) of sanitary wastewater generated would need to be treated either on-site or sent to an off-site facility.

The total water use requirements for the peak construction year, listed in Table 9.4.9.2-1, are on the same order of magnitude as the current groundwater withdrawals in the Chuckwalla Valley, as described in Section 9.4.9.1.2. Under the current conditions of groundwater extractions, groundwater surface elevations have remained steady over time. Groundwater withdrawals for solar energy development during the peak construction year could essentially double the current groundwater withdrawal rate for the region, which would likely cause drawdown of groundwater surface elevations and potentially lead to land subsidence issues. Further characterization of the aquifer properties, including pumping tests, would need to be performed during the site characterization phase to better determine the storage capacity and safe yield of the aquifer.

TABLE 9.4.9.2-1 Estimated Water Requirements during the Peak Construction Year for the Proposed Riverside East SEZ

Activity	Parabolic Trough	Power Tower	Dish Engine	PV
Water use requirements[a]				
Fugitive dust control (ac-ft)[b,c]	4,452	6,678	6,678	6,678
Potable supply for workforce (ac-ft)	222	135	56	28
Total water use requirements (ac-ft)	4,674	6,813	6,734	6,706
Wastewater generated				
Sanitary wastewater (ac-ft)	222	135	56	28

[a] Assumptions of water use for fugitive dust control, potable supply for workforce, and wastewater generation are presented in Appendix M.

[b] Fugitive dust control estimation assumes a local pan evaporation rate of 130 in./yr (330 cm/yr) (Cowherd et al. 1988; WRCC 2010a).

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

Operations

During operations, water would be required for mirror/panel washing, the workforce potable water supply, and cooling (parabolic trough and power tower only) (Table 9.4.9.2-2). Water needs for cooling are a function of the type of cooling used (dry, wet, hybrid). Further refinements to water requirements for cooling would result from the percentage of operational time for the option employed (30% to 60% range assumed) and the power of the system. The differences between the water requirements reported in Table 9.4.9.2-2 for the parabolic trough and power tower technologies are attributable to the assumptions of acreage per megawatt. As a result, the water usage for the more energy-dense parabolic trough technology is estimated to be almost twice as large as that for power tower technology.

At full build-out capacity, water needs for mirror/panel washing are estimated to range from 902 to 16,232 ac-ft/yr (1.1 million to 20.0 million m^3/yr) and for the workforce potable water supply, from 20 to 455 ac-ft/yr (24,700 to 561,200 m^3/yr). As mentioned previously, TDS values in a potable water supply must be lower than 1,500 mg/L for short durations and less than 500 mg/L for prolonged use to meet California drinking water standards (*California Code*, Title 22, Article 16, Section 64449). Because of the high TDS concentrations that exist near the SEZ, water treatment may be required for the workforce potable water supply. The maximum total water usage during operation at full build-out capacity is estimated to be greatest for those technologies using the wet-cooling option, as high as 487,406 ac-ft/yr (601 million m^3/yr). Water usage for dry-cooling systems would be as high as 49,150 ac-ft/yr (60.6 million m^3/yr), approximately a factor of 10 times less than that for the wet-cooling option. Noncooled technologies, dish engine and PV systems, require substantially less water at full build-out capacity at 9,220 ac-ft/yr (11.4 million m^3/yr) and 922 ac-ft/yr (1.1 million m^3/yr), respectively (Table 9.4.9.2-2). Operations would produce up to 455 ac-ft/yr (561,200 m^3/yr) of sanitary

TABLE 9.4.9.2-2 Estimated Water Requirements during Operations at Full Build-Out Capacity at the Proposed Riverside East SEZ

Activity	Parabolic Trough	Power Tower	Dish Engine	PV
Full build-out capacity (MW)[a,b]	32,463	18,035	18,035	18,035
Water use requirements				
Mirror/panel washing (ac-ft/yr)[c,d]	16,232	9,018	9,018	902
Potable supply for workforce (ac-ft/yr)	455	202	202	20
Dry-cooling (ac-ft/yr)[e]	6,493–32,463	3,607–18,035	NA[f]	NA
Wet-cooling (ac-ft/yr)[e]	146,085–470,719	81,158–261,510	NA	NA
Total water use requirements				
Noncooled technologies (ac-ft/yr)	NA	NA	9,220	922
Dry-cooled technologies (ac-ft/yr)	23,180–49,150	12,827–27,255	NA	NA
Wet-cooled technologies (ac-ft/yr)	162,772–487,406	90,378-270,730	NA	NA
Wastewater generated				
Blowdown (ac-ft/yr)[g]	9,222	5,123	NA	NA
Sanitary wastewater (ac-ft/yr)	455	202	202	20

[a] Land area for parabolic trough was estimated at 5 acres/MW (0.02 km^2/MW); land area for power tower, dish engine, and PV technologies was estimated at 9 acres/MW (0.04 km^2/MW).

[b] Water needs are linearly related to power. Water usage for any other size project can be estimated by using multipliers provided in Table M.9-2 (Appendix M).

[c] Value assumes a usage rate of 0.5 ac-ft/yr/MW for mirror washing for parabolic trough, power tower, and dish engine technologies and a rate of 0.05 ac-ft/yr/MW for panel washing for PV systems.

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

[e] Dry-cooling value assumes 0.2 to 1.0 ac ft/yr per MW and wet-cooling value assumes 4.5 to 14.5 ac ft/yr per MW (range in these values represents 30 and 60% operating times) (DOE 2009).

[f] NA = not applicable.

[g] Value scaled from 250-MW Beacon Solar project with an annual discharge of 44 gpm (167 L/min) (AECOM 2009c). Blowdown estimates are relevant to wet cooling only.

wastewater. In addition, for wet-cooled technologies, 5,123 to 9,222 ac-ft/yr (6.3 million to 11.4 million m^3/yr) of cooling system blowdown water would need to be treated either on- or off-site. Any on-site treatment of wastewater would have to ensure that treatment ponds are effectively lined in order to prevent any groundwater contamination.

Groundwater is the primary water resource available for solar energy development at the proposed Riverside East SEZ. The current estimates of recharge and discharge processes in the Chuckwalla Valley and Palo Verde Mesa groundwater basin suggest that the groundwater aquifer is near a condition of equilibrium, as indicated by steady groundwater surface elevations and little development in the Chuckwalla Valley. The highest groundwater extraction rate in the Chuckwalla Valley was reported to be 9,100 ac-ft/yr (11.2 million m^3/yr) in 1966. Based on the limited information on groundwater aquifer characteristics, this groundwater extraction rate serves as an estimate of the maximum groundwater withdrawal rate that would likely not induce drawdown of groundwater surface elevations. However, further characterization of the groundwater resources in the Chuckwalla Valley is needed in order to fully quantify the safe yield of groundwater from this basin. Using the maximum historical groundwater withdrawal as a guide for assessing available water resources, only dish engine and PV systems would be feasible for the full build-out scenario of the proposed Riverside East SEZ. Power tower technologies at the lower operational times (30%) may be feasible as well. Technologies using wet-cooling have water requirement estimates that are a factor of 10 to 80 times greater than the maximum historical groundwater extraction rate for the region. Wet-cooled facilities would most likely cause significant drawdown of the groundwater surface elevations, so the use of wet-cooling technologies is not feasible for the proposed Riverside East SEZ.

The drawdown of groundwater surface elevations can generate impacts on the natural hydrology, as well as on ecosystem processes. Additional constraints affecting the region of the proposed Riverside East SEZ are the issues relating to the Colorado River Accounting Surface and the laws and management practices associated with the Law of the River, as described in Section 9.4.9.1.3. Current groundwater levels are on the order of 240 ft (73 m) above the Accounting Surface near Desert Center, but these levels above the Accounting Surface quickly drop to about 40 ft (12 m) near Palen Lake and 5 ft (1.5 m) near the Palo Verde Mesa. Groundwater below the Colorado River Accounting Surface is not available for solar energy development, because it is accounted for as Colorado River water, which is fully allocated by the treaties, compacts, and court decisions that make up the Law of the River.

Decommissioning/Reclamation

During decommissioning/reclamation, all surface structures associated with the solar project would be dismantled, and the site reclaimed to its preconstruction state. Activities and water needs during this phase would be similar to those during the construction phase (dust suppression and workforce potable supply) and may also include water to establish vegetation in some areas. However, the total volume of water needed is expected to be less. Because quantities of water needed during the decommissioning/reclamation phase would be less than those for construction, impacts on surface and groundwater resources also would be less.

9.4.9.2.3 Off-Site Impacts: Roads and Transmission Lines

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. The proposed Riverside East SEZ is located adjacent to existing roads and transmission lines, as described in Section 9.4.1.2, so it is assumed that no additional construction outside of the SEZ would be required and there would be no impacts.

9.4.9.2.4 Summary of Impacts on Water Resources

The impacts on water resources associated with developing solar energy at the proposed Riverside East SEZ are associated with land disturbance effects on the natural hydrology, water quality concerns, and water use requirements for the various solar energy technologies. Land disturbance activities can cause localized erosion and sedimentation issues, as well as alter groundwater recharge and discharge processes. The impacts of land disturbance are of particular concern in the areas near Palen Lake, Ford Dry Lake, and the McCoy Wash. Palen Lake is a drainage outlet for several washes coming off the Coxcomb Mountains and the Palen Mountains, as well as a significant groundwater discharge point with shallow groundwater levels supporting wetland vegetation. Ford Dry Lake is a drainage outlet for washes coming off the Palen Mountains and the McCoy Mountains. McCoy Wash is a large, incised drainage that conveys significant flows during rainfall events, and much of its watershed is located within a suspected 100-year floodplain. Water quality concerns specific to the proposed SEZ deal with contamination of groundwater through surface spills and with potable water supplies meeting California drinking water standards, for which TDS values exceed standards in certain areas of the SEZ.

Impacts from water use requirements vary depending on the type of solar technology built and, for technologies using cooling systems, the type of cooling (wet, dry, or hybrid) used. Groundwater is the primary water resource available to solar energy facilities in the proposed Riverside East SEZ; however, aquifer characteristics and the region's safe yield are not fully quantified. The estimates of groundwater recharge, discharge, and underflow from adjacent basins and historical data on groundwater extractions and groundwater surface elevations suggest that there may not be groundwater available to support the water-intensive technologies, such as those using wet cooling. An additional constraint on groundwater development in the proposed Riverside East SEZ is the water rights issue related to the Colorado River Accounting Surface, which defines a groundwater elevation below which the groundwater is accounted for as fully allocated Colorado River water.

The estimated values of water requirements for the solar energy technologies are a function of the full build-out capacity of the proposed SEZ. Full build-out of the large area of the proposed Riverside East SEZ has the theoretical potential to generate 18,035 to 32,463 MW, but would require very large water supplies for water-intensive technologies (Table 9.4.9.2-2). For the purpose of evaluating a more realistic build-out scenario reflecting the available water supplies, an estimate of the maximum power capacity for each technology was made assuming a value for available groundwater resources in the Chuckwalla Valley. The maximum historical groundwater withdrawal rate was 9,100 ac-ft/yr (11.2 million m^3/yr) in 1966, which did not result in significant overdraft conditions. Using this historical withdrawal rate as an estimate of the available groundwater resources, wet-cooling technologies could potentially support 2 to 10% of the full build-out power capacity, while dry cooling could potentially support only 19 to 71%. This analysis of the potential power production capacity based on limited water resources should serve as an estimate only. Further characterization of the groundwater safe-yield for the Chuckwalla Valley and Palo Verde Mesa basins would be needed prior to the evaluation of impacts associated with project-specific groundwater withdrawals. Additionally, any proposed project-specific groundwater withdrawals will need to be analyzed with respect to drawdown effects and the Colorado River Accounting Surface. While there is limited information on groundwater resources at the proposed Riverside East SEZ, this analysis suggests that wet-cooling technologies would be unfeasible and that substantial water conservation strategies would be needed for dry cooled and dish engine. The relatively small quantities of water estimated to support PV systems for the full build-out scenario suggest that this would be the preferred technology for large-scale solar energy production at the proposed Riverside East SEZ.

9.4.9.3 SEZ-Specific Design Features and Design Feature Effectiveness

The program for solar energy development on BLM-administered lands will require the programmatic design features given in Appendix A, Section A.2.2, to be implemented, thus mitigating some impacts on water resources. Programmatic design features would focus on coordinating with federal, state, and local agencies that regulate the use of water resources to meet the requirements of permits and approvals needed to obtain water for development, and conducting hydrological studies to characterize the aquifer from which groundwater would be obtained (including drawdown effects, if a new point of diversion is created). The greatest consideration for mitigating water impacts would be in the selection of solar technologies. The mitigation of impacts would be best achieved by selecting technologies with low water demands.

Proposed design features specific to the proposed Riverside East SEZ are as follows:

- Wet-cooling options would not be feasible; other technologies should incorporate water conservation measures.

- Land disturbance activities should avoid impacts to the extent possible near the regions surrounding Palen Lake, Ford Dry Lake, and McCoy Wash.

- During site characterization, hydrologic investigations would need to identify 100-year floodplains and potential jurisdictional water bodies subject to Clean Water Act Section 404 permitting. Siting of solar facilities and construction activities should avoid areas identified as within a 100-year floodplain.

- During site characterization, coordination and permitting with CDFG regarding California's Lake and Streambed Alteration Program would be required for any proposed alterations to surface water features (both perennial and ephemeral).

- Groundwater withdrawals should comply with rules and regulations set forth by the PVID for the portions of the SEZ located within PVID boundaries.

- The use of groundwater in the Chuckwalla Valley and Palo Verde Mesa should be planned for and monitored in cooperation with the BOR and the USGS in reference to the Colorado River Accounting Surface and the rules set forth in the Law of the River.

- Groundwater monitoring and production wells should be constructed in accordance with standards set forth by the State of California (CDWR 1991) and Riverside County.

- Stormwater management plans and BMPs should comply with standards developed by the California Stormwater Quality Association (CASQA 2003).

- Water for potable uses would have to meet or be treated to meet water quality standards in the California Safe Drinking Water Act (*California Health and Safety Code*, Chapter 4).

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9.4.10 Vegetation

This section addresses vegetation that could occur or is known to occur within the potentially affected area of the proposed Riverside East SEZ. The affected area considered in this assessment includes the areas of direct and indirect effects. The area of direct effects was defined as the area that would be physically modified during project development (i.e., where ground-disturbing activities would occur) and included only the SEZ. The area of indirect effects was defined as the area within 5 mi (8 km) of the SEZ boundary where ground-disturbing activities would not occur but that could be indirectly affected by activities in the area of direct effect. No area of direct or indirect effects was assumed for new transmission lines or access roads because they are not expected to be needed for facilities on the proposed Riverside East SEZ due to the proximity of an existing transmission line and state highway.

Indirect effects considered in the assessment included effects from surface runoff, dust, and accidental spills from the SEZ, but do not include ground-disturbing activities. The potential degree of impacts from indirect effects would decrease with increasing distance from the SEZ. This area of indirect effect was identified on the basis of professional judgment and was considered sufficiently large to bound the area that would potentially be subject to indirect effects. The affected area is the area bounded by the areas of direct and indirect effects. These areas are defined and the impact assessment approach is described in Appendix M.

9.4.10.1 Affected Environment

The proposed Riverside East SEZ is located in a transitional area that includes many species associated with the Mojave and Sonoran Deserts. Most of the SEZ is located within the Sonoran Basin and Range Level III ecoregion (EPA 2007), which supports creosotebush (*Larrea tridentata)*-white bur sage (*Ambrosia dumosa*) plant communities with large areas of palo verde (*Cercidium microphyllum*)-cactus shrub and saguaro cactus (*Carnegiea gigantea*) communities (EPA 2002). The dominant species of the Lower Colorado River Valley subdivision of the Sonoran Desert are primarily creosotebush, white bursage, and all-scale (*Atriplex polycarpa*), with big galleta (*Pleuraphis rigida*), Palmer alkali heath (*Frankenia palmeri*), brittlebush (*Encelia farinosa*), and western honey mesquite (*Prosopis glandulosa* var. *torreyana*) dominant in some areas (Turner and Brown 1994). Larger drainageways and washes support species of small trees and shrubs that may also occur in adjacent areas, such as western honey mesquite, ironwood (*Olneya tesota*), and blue palo verde (*Cercidium floridum*), as well as species such as smoketree (*Psorothamnus spinosa*), which are mostly restricted to drainageways. Shrub species found in minor drainages include cat-claw acacia (*Acacia greggii*), burrobrush (*Hymenoclea salsola* var. *pentalepis*), Anderson thornbush (*Lycium andersonii*), and desert broom (*Baccharis sarothroides*). Annual precipitation in the Sonoran Desert occurs in winter and summer (Turner and Brown 1994) and is very low in the area of the SEZ, averaging about 3.5 in. (89.7 mm) at the Blythe Airport (see Section 9.4.13).

The western portion of the SEZ lies within the Mojave Basin and Range Level III ecoregion, which is characterized by broad basins and scattered mountains. The boundary between the Sonoran and Mojave Deserts represents a transitional area that includes many species associated with both deserts. Communities of sparse, scattered shrubs and grasses including creosotebush, white bursage (*Ambrosia dumosa*), and big galleta grass (*Pleuraphis rigida*) occur in basins; Joshua tree (*Yucca brevifolia*), other Yucca species, and cacti occur on arid footslopes; woodland and shrubland communities occur on mountain slopes, ridges, and hills (Bryce et al. 2003). Creosote bush, all-scale (*Atriplex polycarpa*), brittlebush (*Encelia farinosa*), desert holly (*Atriplex hymenelytra*), white burrobrush (*Hymenoclea salsola*), shadscale (*Atriplex confertifolia*), blackbrush (*Coleogyne ramosissima*), and Joshua tree (*Yucca brevifolia*) are dominant species within the Mojave desertscrub biome (Turner 1994).

Land cover types described and mapped under CAReGAP (NatureServe 2010) were used to evaluate plant communities in and near the SEZ. Each cover type encompasses a range of similar plant communities. Land cover types that occur within the potentially affected area of the proposed Riverside East SEZ are shown in Figure 9.4.10.1-1. Table 9.4.10.1-1 provides the surface area of each cover type within the potentially affected area.

Lands within the Riverside East SEZ are classified primarily as Sonora-Mojave Creosotebush-White Bursage Desert Scrub. Additional cover types within the SEZ are given in Table 9.4.10.2-1. Creosotebush was observed to be the dominant species over much of the SEZ in August 2009; associated shrubs included brittlebush, white burrobrush, and desert holly. Western honey mesquite occurs in sand dune areas. Biological soil crusts are present in some areas. Characteristic Sonoran Desert species observed on the SEZ include ironwood, western honey mesquite, smoketree, and blue palo verde. Cacti species observed within the SEZ were barrel cactus (*Ferocactus cylindraceus*) and cholla (*Opuntia* sp.). Community types present on the SEZ that are considered sensitive by the California Resources Agency (BLM 2002a,b) include desert dry wash woodlands, desert chenopod scrub/mixed salt desert scrub, sand dune communities, and playa communities. Plant communities that are dependent on groundwater include mesquite bosque and bush seep-weed (*Suaeda moquinii*) communities (BLM and CEC 2010b), both primarily associated with Palen Lake, located in the western portion of the SEZ, where groundwater is relatively shallow (see Section 9.4.9).

The area surrounding the SEZ, within 5 mi (8 km), includes 16 cover types, which are listed in Table 9.4.10.1-1. The predominant cover types are Sonora-Mojave Creosotebush-White Bursage Desert Scrub, North American Warm Desert Volcanic Rockland, and North American Warm Desert Bedrock Cliff and Outcrop.

Wetlands mapped by the NWI that occur within the proposed Riverside East SEZ and within the 5-mi (8-km) area of indirect effects are shown in Figure 9.4.10.1-2 and summarized in Table 9.4.10.1-2. NWI maps are produced from high-altitude imagery and are subject to uncertainties inherent in image interpretation (USFWS 2009). Thirty-seven wetlands are located entirely or in part within the SEZ, primarily in the central and western portions of the SEZ, with a total of 3,807 acres (15.4 km^2) occurring within the boundaries of the SEZ. These wetlands are all intermittently flooded, indicating that surface water is usually absent but may be present for variable periods. Six wetlands are classified as lacustrine unconsolidated shore wetlands, with a total of 3,517 acres (14.2 km^2) mapped within the SEZ. Unconsolidated shore wetlands have a sparse vegetation cover. The lacustrine wetlands are primarily associated with Palen Lake and

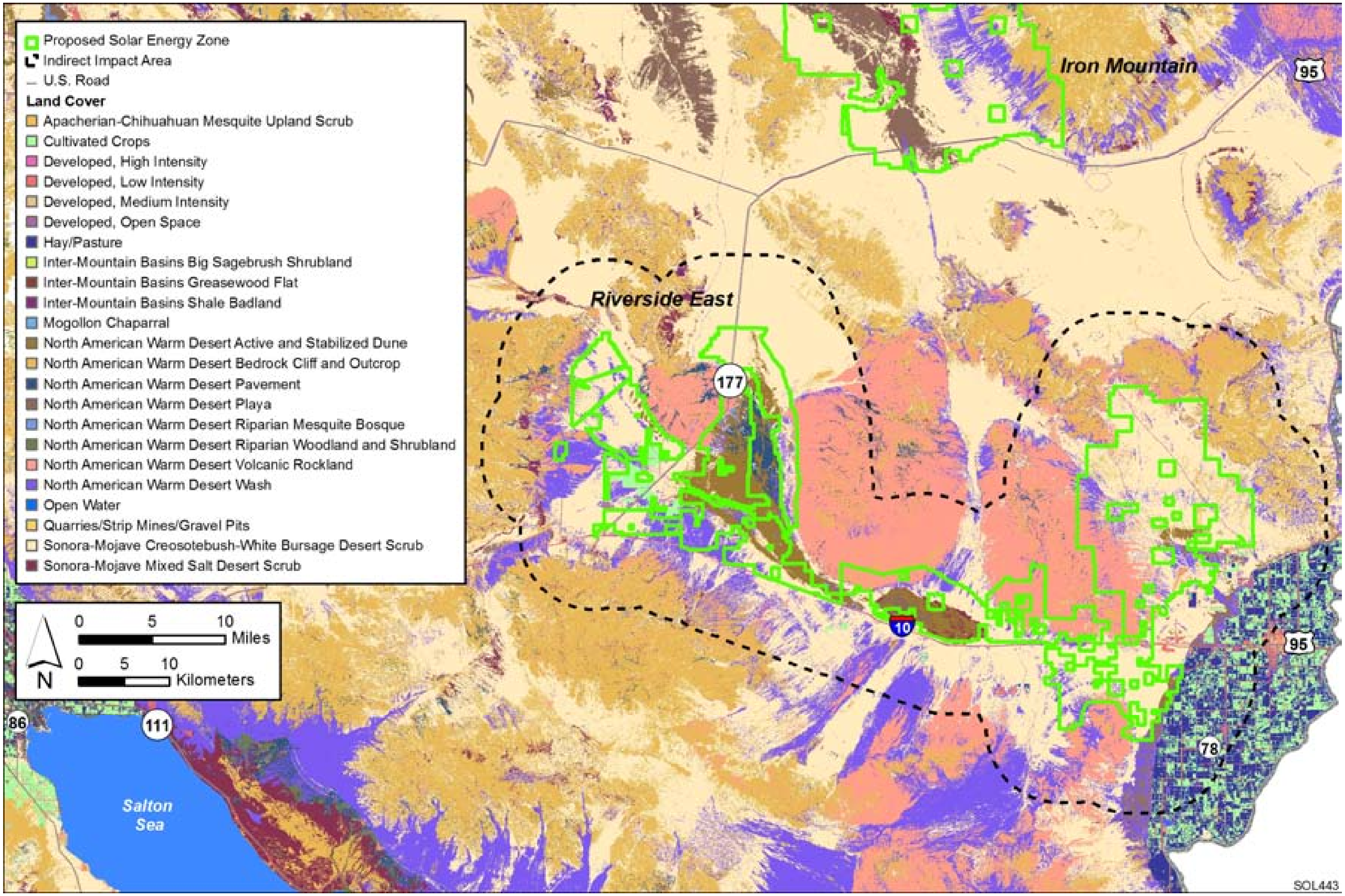

FIGURE 9.4.10.1-1 Land Cover Types within the Proposed Riverside East SEZ (Source: NatureServe 2010)

TABLE 9.4.10.1-1 Land Cover Types within the Potentially Affected Area of the Proposed Riverside East SEZ and Potential Impacts

Land Cover Type[a]	Area of Cover Type Affected (acres)[b] Within SEZ[c] (Direct Effects)	Outside SEZ[d] (Indirect Effects)	Overall Impact Magnitude[e]
5264 Sonora-Mojave Creosotebush-White Bursage Desert Scrub: Occurs in broad valleys, lower bajadas, plains, and low hills in the Mojave and Sonoran Deserts. Shrubs form a sparse to moderately dense cover (2–50%), although the ground surface may be mostly barren. The dominant species are typically creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Other shrubs, dwarf-shrubs, and cacti may also be dominant or form sparse understories. Herbaceous species are typically sparse, but may be seasonally abundant.	109,933 acres[f] (5.0%, 8.0%)	229,999 acres (10.4%)	Moderate
3180 North American Warm Desert Volcanic Rockland: Consists of barren and sparsely vegetated (<10% plant cover) areas. Vegetation is variable and typically includes scattered desert shrubs.	29,579 acres (8.5%, 10.4%)	135,364 acres (38.8%)	Moderate
3121 North American Warm Desert Active and Stabilized Dune: Consists of unvegetated to sparsely vegetated (generally <10% plant cover) active dunes and sand sheets. Vegetation includes shrubs, forbs, and grasses. Includes unvegetated "blowouts" and stabilized areas.	26,798 acres (31.8%, 41.6%)	15,987 acres (19.0%)	Large
9151 North American Warm Desert Wash: Consists of intermittently flooded linear or braided strips within desert scrub or grassland landscapes on bajadas, mesas, plains, and basin floors. Although often dry, washes are associated with rapid sheet and gully flow. The vegetation varies from sparse and patchy to moderately dense and typically occurs along the banks, but may occur within the channel. Shrubs and small trees are typically intermittent to open. Common upland shrubs often occur along the edges.	24,976 acres (3.9%, 6.8%)	79,324 acres (12.4%)	Moderate
3120 North American Warm Desert Bedrock Cliff and Outcrop: Occurs on subalpine to foothill steep cliff faces, narrow canyons, rock outcrops, unstable scree, and talus slopes. Consists of barren and sparsely vegetated areas (generally <10% plant cover) with desert species, especially succulents. Lichens are predominant in some areas.	5,640 acres (0.6%, 1.0%)	115,696 acres (12.2%)	Small

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TABLE 9.4.10.1-1 (Cont.)

Land Cover Type[a]	Area of Cover Type Affected (acres)[b] Within SEZ[c] (Direct Effects)	Outside SEZ[d] (Indirect Effects)	Overall Impact Magnitude[e]
3143 North American Warm Desert Pavement: Consists of unvegetated to very sparsely vegetated (<2% plant cover) areas, usually in flat basins, with ground surfaces of fine to medium gravel coated with "desert varnish." Desert scrub species are usually present. Herbaceous species may be abundant in response to seasonal precipitation.	1,588 acres (4.3%, 9.1%)	9,797 acres (26.6%)	Moderate
3161 North American Warm Desert Playa: Consists of barren and sparsely vegetated areas (generally <10% plant cover) that are intermittently flooded; salt crusts are common. Sparse shrubs occur around the margins, and patches of grass may form in depressions. In large playas, vegetation forms rings in response to salinity. Herbaceous species may be periodically abundant.	1,570 acres (2.3%, 2.7%)	828 acres (1.2%)	Moderate
5265 Sonora-Mojave Mixed Salt Desert Scrub: Extensive open-canopied shrublands in the Mojave and Sonoran Deserts, usually occurring around playas and in valley bottoms or basins with saline soils. Vegetation is typically composed of one or more *Atriplex* species; other salt-tolerant plants are often present or even co-dominant. Grasses occur at varying densities.	1,563 acres (2.8%, 7.2%)	5,103 acres (9.1%)	Moderate
21, 22 Developed, Open Space—Low Intensity: Includes housing, parks, golf courses, and other areas planted in developed settings. Impervious surfaces compose up to 49% of the total land cover.	898 acres (2.5%, 8.6%)	9,243 acres (26.2%)	Moderate
9178 North American Warm Desert Riparian Mesquite Bosque: Occurs along perennial and intermittent streams as relatively dense riparian corridors composed of trees and shrubs. Honey mesquite (*Prosopis glandulosa*) and velvet mesquite (*P. velutina*) are the dominant trees. Vegetation is supported by groundwater when surface water is absent.	223 acres (2.5%, 13.3%)	8 acres (0.1%)	Moderate
23, 24 Developed, Medium-High Density: Includes housing and commercial/industrial development. Impervious surfaces compose 50–100% of the total land cover.	67 acres (0.9%, 6.0%)	649 acres (9.1%)	Small
81, 82 Hay/Pasture, Cultivated Crops: Areas where pasture/hay or cultivated crops account for more than 20% of total vegetation cover.	54 acres (<0.1%, 0.6%)	49,248 acres (10.1%)	Small

TABLE 9.4.10.1-1 (Cont.)

	Area of Cover Type Affected (acres)[b]		
Land Cover Type[a]	Within SEZ[c] (Direct Effects)	Outside SEZ[d] (Indirect Effects)	Overall Impact Magnitude[e]
3139 Inter-Mountain Basins Shale Badland: Typically occurs on rounded hills and plains. Consists of barren and sparsely vegetated areas (<10% plant cover) with high rate of erosion and deposition. Vegetation consists of sparse dwarf shrubs and herbaceous plants.	23 acres (0.2%, 0.4%)	3,335 acres (22.7%)	Small
9182 North American Warm Desert Riparian Woodland and Shrubland: Occurs along medium to large perennial streams in canyons and desert valleys. Consists of a mix of riparian woodlands and shrublands. Vegetation is dependent upon annual or periodic flooding, along with substrate scouring, and/or a seasonally shallow water table.	0 acres	326 acres (1.2%)	Small
5259 Mojave Mid-Elevation Mixed Desert Scrub: Vegetation composition is quite variable. Dominant species include shrubs forbs, and grasses and may include *Yucca* spp.	0 acres	248 acres (2.2%)	Small
11 Open Water: Plant or soil cover is generally less than 25%.	0 acres	101 acres (0.4%)	Small

a Land cover descriptions are from NatureServe (2010). Full descriptions of land cover types, including plant species, can be found in Appendix J.

b Area in acres, determined from Sanborn Mapping (2008).

c Includes the area of the cover type within the SEZ, the percentage that area represents of all occurrences of that cover type within the SEZ region (i.e., a 50-mi [80-km] radius from the center of the SEZ), and the percentage that area represents of all occurrences of that cover type on BLM lands within the SEZ region. The SEZ region intersects portions of California and Arizona. However, the SEZ and affected area occur only in California.

d Area of indirect effects was assumed to be the area adjacent to the SEZ within 5 mi (8 km) of the SEZ boundary where ground-disturbing activities would not occur. Indirect effects include effects from surface runoff, dust, and other factors from project facilities. The potential degree of indirect effects would decrease with increasing distance from the SEZ. Includes the area of the cover type within the indirect effects area and the percentage that area represents of all occurrences of that cover type within the SEZ region.

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

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

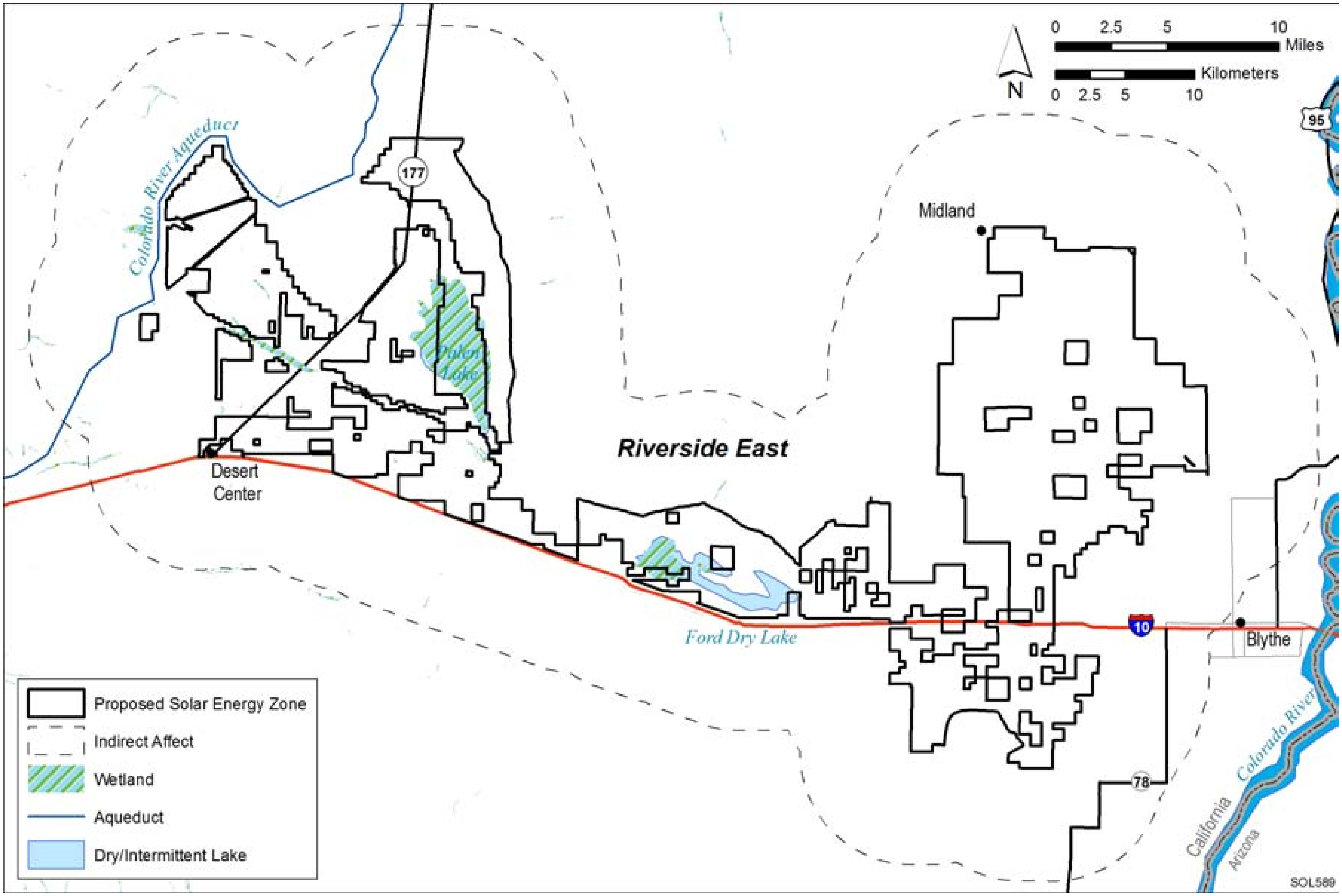

FIGURE 9.4.10.1-2 Wetlands within the Proposed Riverside East SEZ (Source: USFWS 2009)

TABLE 9.4.10.1-2 Wetlands of the Proposed Riverside East SEZ

Wetland Type and Size Range	Area within SEZ	Number/Total Wetland Area/ Area within SEZ
Lacustrine, unconsolidated shore 23–8,178 acres[a]	23–2,214 acres	6/9,860 acres/3,517 acres
Palustrine, emergent 0.2–14 acres	0.2–14 acres (100%)	10/32 acres/32 acres
Palustrine, scrub shrub 1–117 acres	1–117 acres	8/124 acres/124 acres
Palustrine, unconsolidated shore 0.3–10 acres	0.3–10 acres	10/38 acres/38 acres
Riverine, unconsolidated shore 5–717 acres	5–53 acres	3/774 acres/96 acres

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

Source: USFWS (2009).

Ford Dry Lake, which is located in the central portion of the SEZ. Ten wetlands are classified as palustrine wetlands with emergent plant communities, with a total of 32 acres (0.1 km^2) mapped within the SEZ. Emergent plant communities are composed primarily of herbaceous species rooted in shallow water or saturated soil. Eight wetlands are classified as palustrine wetlands with scrub shrub plant communities, with a total of 124 acres (0.5 km^2) mapped within the SEZ. Scrub shrub plant communities are composed primarily of short woody species, although herbaceous species may also be present. Ten wetlands are classified as palustrine unconsolidated shore wetlands, with a total of 38 acres (0.2 km^2) mapped within the SEZ. Three wetlands are classified as riverine unconsolidated shore wetlands, with a total of 96 acres (0.4 km^2) mapped within the SEZ. Desert dry washes in the SEZ support microphyll woodlands that include ironwood, smoketree, and blue palo verde. An ironwood forest, identified by BLM as a Unique Plant Assemblage, occurs in the upper reaches of McCoy Wash. Numerous vegetated and unvegetated ephemeral washes occur within the SEZ, as well as washes and swales that support communities of creosotebush and big galleta grass (*Pleuraphis rigida*) (BLM and CEC 2010a–c). These dry washes typically contain water for short periods during or following precipitation events and include temporarily flooded areas. Ephemeral washes provide surface flows to downstream habitats including playas. One-hundred-thirteen wetlands are located within the indirect impact area. These include lacustrine unconsolidated shore, palustrine emergent, palustrine scrub shrub, palustrine unconsolidated shore, palustrine unconsolidated bottom, and palustrine and riverine unconsolidated shore wetlands.

The proposed Riverside East SEZ is located within the Low Desert Weed Management Area (LDWMA). Table 9.4.10.1-3 provides a list of weed species of the California Sonoran

TABLE 9.4.10.1-3 Weed Species of the California Sonoran Desert Region

Common Name	Scientific Name
Barbwire Russian thistle	*Salsola paulsenii*
Bermudagrass	*Cynodon dactylon*
Camelthorn	*Alhagi maurorum*
Common Russian thistle	*Salsola tragus*
Field bindweed	*Convolvulus arvensis*
Giant reed	*Arundo donax*
Giant salvinia	*Salvinia auriculata*
Hydrilla	*Hydrilla verticillata*
Scarlet wisteria	*Sesbania punicea*
Tamarisk	*Tamarix ramosissima*
Tocalote	*Centaurea melitensis*
White horsenettle	*Solanum elaeagnifolium*

Source: CDFA (2010).

Desert Region, which includes the LDWMA. Invasive species known to occur within the SEZ include tamarisk, which occurs along wet areas, Sahara mustard (*Brassica tournefortii*), cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola* sp.), Mediterranean grass (*Schismus arabicus, S. barbatus*), and red brome (*Bromus madritensis* ssp. *rubens*) (BLM and CEC 2010a–c).

9.4.10.2 Impacts

The construction of solar energy facilities within the Riverside East SEZ would result in direct impacts on plant communities because of the removal of vegetation within the facility footprint during land-clearing and land-grading operations. Approximately 80% of the SEZ (162,345 acres [657 km^2]) would be expected to be cleared with full development of the SEZ. The plant communities affected would depend on facility locations and could include any of the communities that occur on the SEZ. Therefore, for the purposes of this analysis, all the area of each cover type within the SEZ is considered to be directly affected by removal with full development of the SEZ.

Indirect effects (caused, for example, by surface runoff or dust from the SEZ) have the potential to degrade affected plant communities and may reduce biodiversity by promoting the decline or elimination of species sensitive to disturbance. Indirect effects can also cause an increase in disturbance-tolerant species or invasive species. High impact levels could result in the elimination of a community or the replacement of one community type by another. The proper implementation of programmatic design features, however, would reduce indirect effects to a minor or small level of impact.

Possible impacts from solar energy facilities on vegetation encountered within the SEZ, as well as general mitigation measures, are described in more detail in Section 5.10.5. Any such impacts will be minimized through the implementation of required programmatic design features described in Appendix A, Section A.2.2, and through additional SEZ-specific design features given in Section 9.4.10.3.

9.4.10.2.1 Impacts on Native Species

The impacts of construction, operation, and decommissioning were considered small if the impact affected a relatively small proportion (<1%) of the cover type in the SEZ region (within 50 mi [80 km] of the center of the SEZ); a moderate impact (>1 but <10%) could affect an intermediate proportion of cover type; a large impact could affect greater than 10% of a cover type.

Solar facility construction and operation would primarily affect communities of the Sonora-Mojave Creosotebush-White Bursage Desert Scrub cover type. Additional cover types within the SEZ that would be affected include North American Warm Desert Volcanic Rockland, North American Warm Desert Active and Stabilized Dune, North American Warm Desert Wash, North American Warm Desert Bedrock Cliff and Outcrop, North American Warm Desert Pavement, North American Warm Desert Playa, Sonora-Mojave Mixed Salt Desert Scrub, North American Warm Desert Riparian Mesquite Bosque, and Inter-Mountain Basins Shale Badland. Although Hay/Pasture, Cultivated Crops, Developed, Open Space—Low Intensity, and Developed, Medium-High Density cover types occur within the SEZ, these areas likely support few native plant communities. Table 9.4.10.1-1 summarizes the potential impacts on native species cover types that would result from solar energy facilities in the proposed Riverside East SEZ. Many of these cover types are relatively common in the SEZ region; however, several are relatively uncommon, representing less than 1% of the land area within the SEZ region: North American Warm Desert Pavement (0.7%), Inter-Mountain Basins Shale Badland (0.3%), and North American Warm Desert Riparian Mesquite Bosque (0.2%).

The construction, operation, and decommissioning of solar projects within the SEZ would result in large impacts on North American Warm Desert Active and Stabilized Dune and moderate impacts on Sonora-Mojave Creosotebush-White Bursage Desert Scrub, North American Warm Desert Volcanic Rockland, North American Warm Desert Wash, North American Warm Desert Pavement, North American Warm Desert Playa, Sonora-Mojave Mixed Salt Desert Scrub, Developed, Open Space—Low Intensity, and North American Warm Desert Riparian Mesquite Bosque. Most of the playa cover type is associated with Ford Dry Lake. Solar project development within the SEZ would result in small impacts on the remaining cover types in the affected area. Sand dune, playa, desert chenopod scrub/mixed salt desert scrub (primarily associated with Ford Dry Lake), desert ephemeral dry wash communities, and dry wash microphyll woodlands are important sensitive habitats in the region.

Disturbance of vegetation in dune communities within the SEZ, such as from heavy equipment operation, could result in the loss of substrate stabilization. Re-establishment of dune species could be difficult due to the arid conditions and unstable substrates. Because of the arid conditions, reestablishment of desert scrub or other communities in temporarily disturbed areas would likely be very difficult and might require extended periods of time. In addition, noxious weeds could become established in disturbed areas and colonize adjacent undisturbed habitats, thus reducing restoration success and potentially resulting in widespread habitat degradation. Cryptogamic soil crusts occur in many of the shrubland communities in the region and likely occur on the SEZ. Damage to these crusts, by the operation of heavy equipment or other vehicles, can alter important soil characteristics, such as nutrient cycling and availability, and affect plant community characteristics (Lovich and Bainbridge 1999).

The deposition of fugitive dust from disturbed soil areas in habitats outside a solar project area could result in reduced productivity or changes in plant community composition. Fugitive dust deposition could affect plant communities of each of the cover types occurring within the indirect impact area identified in Table 9.4.10.1-1.

Potential impacts on wetlands as a result of solar energy facility development are described in Section 5.6.1. Specific to the affected area of the proposed Riverside East SEZ, approximately 3,807 acres (15.4 km^2) of wetland habitat occurs within the SEZ and could be affected by project development.

Grading could result in direct impacts on the wetlands within the SEZ if fill material is placed within wetland areas. Grading near the wetlands in or near the SEZ could disrupt surface water or groundwater flow characteristics, resulting in changes in the frequency, duration, depth, or extent of inundation or soil saturation, and could potentially alter wetland plant communities and affect wetland function adjacent to or downgradient from solar projects. Increases in surface runoff from a solar energy project site could also affect wetland hydrologic characteristics. The introduction of contaminants into wetlands in or near the SEZ could result from spills of fuels or other materials used on a project site. Soil disturbance could result in sedimentation in wetland areas, which could degrade or eliminate wetland plant communities. Sedimentation effects or hydrologic changes could also extend to wetlands outside of the SEZ. Grading could also affect dry washes within the SEZ, and alteration of surface drainage patterns or hydrology could adversely affect downstream dry wash, playa, or chenopod scrub communities. Vegetation within these communities could be lost by erosion or desiccation. See Section 9.4.9 for further discussion of impacts on washes and playas.

Although the use of groundwater within the Riverside East SEZ for technologies with high water requirements, such as wet-cooling systems, is considered unlikely, groundwater withdrawals for such systems could reduce groundwater discharge along riparian areas. Reductions in groundwater discharges at springs and seeps that support riparian habitats could result in degradation of these habitats. Communities that depend on accessible groundwater, such as mesquite bosque or bush seep-weed communities, could become degraded or lost as a result of lowered groundwater levels (BLM and CEC 2010b).

9.4.10.2.2 Impacts from Noxious Weeds and Invasive Plant Species

On February 8, 1999, the President signed E.O. 13112, "Invasive Species," which directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts of invasive species (*Federal Register*, Volume 64, page 61836, Feb. 8, 1999). Potential impacts of noxious weeds and invasive plant species resulting from solar energy facilities are described in Section 5.10.1. Despite required programmatic design features to prevent the spread of noxious weeds, project disturbance could potentially increase the prevalence of noxious weeds and invasive species in the affected area of the proposed Riverside East SEZ, such that weeds could be transported into areas that were previously relatively weed-free, which could result in reduced restoration success and possible widespread habitat degradation.

Invasive species, including tamarisk, Sahara mustard, cheatgrass, Russian thistle, Mediterranean grass, and red brome, occur on the SEZ. Weed species known to occur in the Sonoran Desert Region are given in Table 9.4.10.1-3.

Past or present land uses may affect the susceptibility of plant communities to the establishment of noxious weeds and invasive species. Small areas of Developed, Open Space—Low Intensity, totaling about 898 acres (3.6 km^2), occur within the SEZ, and approximately 9,243 acres (37.4 km^2) occur in the indirect impact area; about 67 acres (0.3 km^2) of Developed, Medium-High Density occur within the SEZ and 649 acres (2.6 km^2) occur within the indirect impact area. The developed areas likely support few native plant communities. Because disturbance may promote the establishment and spread of invasive species, developed areas may provide sources of such species. Existing roads, transmission lines, and recreational OHV use within the SEZ area of potential impact also likely contribute to the susceptibility of plant communities to the establishment and spread of noxious weeds and invasive species.

9.4.10.3 SEZ-Specific Design Features and Design Feature Effectiveness

In addition to programmatic design features, SEZ-specific design features would reduce the potential for impacts on plant communities. While some SEZ-specific design features are best established when project details are considered, some design features can be identified at this time, as follows.

- An Integrated Vegetation Management Plan, addressing invasive species control, and an Ecological Resources Mitigation and Monitoring Plan, addressing habitat restoration and management, should be approved and implemented to increase the potential for successful restoration of creosotebush-white bursage desert scrub communities and other affected habitats and minimize the potential for the spread of tamarisk, Sahara mustard, cheatgrass, or other invasive species. Invasive species control should focus on biological and mechanical methods where possible to reduce the use of herbicides.

- All wetland, riparian, playa, dry wash (including dry wash microphyll woodland), sand dune and sand transport areas, and chenopod scrub habitats within the SEZ should be avoided to the extent practicable, and any impacts minimized and mitigated. A buffer area should be maintained around wetland, riparian, playa, and dry wash communities to reduce the potential for impacts on these communities on or near the SEZ.

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

- Groundwater withdrawals should be limited to reduce the potential for indirect impacts on riparian habitat that is associated with groundwater discharge or groundwater-dependent communities, such as mesquite bosque or bush seep-weed communities.

If these SEZ-specific design features are implemented in addition to programmatic design features, it is anticipated that a high potential for impacts from invasive species and potential impacts on wetland, riparian, playa, dry wash (including dry wash microphyll woodland), sand dune, and chenopod scrub habitats would be reduced to a minimal potential for impact.

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9.4.11 Wildlife and Aquatic Biota

This section addresses wildlife (amphibians, reptiles, birds, and mammals) and aquatic biota that could occur within the potentially affected area of the proposed Riverside East SEZ. Wildlife known to occur within 50 mi (80 km) of the SEZ (i.e., the SEZ region) was determined from the California Wildlife Habitat Relationships System (CDFG 2008). Land cover types suitable for each species were determined from SWReGAP (USGS 2004, 2005, 2007). The amount of aquatic habitat within the SEZ region was determined by estimating the length of linear perennial stream and canal features and the area of standing water body features (i.e., ponds, lakes, and reservoirs) within 50 mi (80 km) of the SEZ with available GIS surface water data sets.

The affected area considered in this assessment included the areas of direct and indirect effects. The area of direct effects was defined as the area that would be physically modified during project development (i.e., where ground-disturbing activities would occur within the SEZ). The area of indirect effects was defined as the area within 5 mi (8 km) of the SEZ boundary, where ground-disturbing activities would not occur but that could be indirectly affected by activities in the area of direct effects (e.g., surface runoff, dust, noise, lighting, and accidental spills from the SEZ). The potential degree of indirect effects would decrease with increasing distance from the SEZ. This area of indirect effects was identified on the basis of professional judgment and was considered sufficiently large to bound the area that would potentially be subject to indirect effects.

The affected area is the area bounded by the areas of direct and indirect effects. These areas are defined and the impact assessment approach is described in Appendix M. No area of direct or indirect effects was assumed for a new transmission line or access road, because of the proximity of existing transmission lines and roads to the SEZ.

Dominant vegetation in the affected area is desertscrub, and the primary land cover habitat type within the affected area is Sonora-Mojave creosotebush-white bursage desertscrub (see Section 9.4.10). Potentially unique habitats in the affected area in which wildlife species may reside include desert dunes, cliffs and rock outcrops, volcanic rocklands, desert washes, and playa wetland habitats. Playa wetland habitats in the affected area include Ford Dry Lake and Palen Lake as well as the CRA. Palen Lake is located in the western portion of the SEZ; Ford Lake is in the center of the SEZ. The CRA is located along the western border of the SEZ (Figure 9.4.12.1-1). There are also a number of desert washes on the SEZ that may provide habitat for unique plant assemblages.

9.4.11.1 Amphibians and Reptiles

9.4.11.1.1 Affected Environment

This section addresses amphibian and reptile species that are known to occur, or for which potentially suitable habitat occurs, on or within the potentially affected area of the proposed Riverside East SEZ. The list of amphibian and reptile species potentially present in the project area was determined from range maps and habitat information available from CWHRS (CDFG 2008). Land cover types suitable for each species were determined from SWReGAP (USGS 2004, 2005, 2007). See Appendix M for additional information on the approach used.

Based on the range, habitat preferences, and/or presence of potentially suitable land cover for the amphibian species that occur within southeastern California (CDFG 2008; USGS 2004, 2005, 2007), the Couch's spadefoot (*Scaphiopus couchii*) and red-spotted toad (*Bufo punctatus*) would be expected to occur within the proposed Riverside East SEZ. The most likely areas for these species to occur within the SEZ are in the area of Ford Dry Lake (near the center of the SEZ) and Palen Lake (in the western portion of the SEZ). Several other amphibian species could inhabit the CRA along the western boundary of the SEZ. These species include the bullfrog (*Rana catesbeiana*), Colorado River toad (*Bufo alvarius*), Rio Grande leopard frog (*Rana berlandieri*), and Woodhouse's toad (*Bufo woodhousii*). Because these species tend to occur within 300 ft (100 m) of permanent water (USGS 2007), they would not be expected to occur with any regularity in the SEZ.

Thirty-one reptile species could occur within the Riverside East SEZ (CDFG 2008): one tortoise, 13 lizard, and 17 snake species. The desert tortoise (*Gopherus agassizii*) is a federal and state-listed threatened species. This species is discussed in Section 9.4.12. Among the more common lizard species that could occur within the SEZ are the desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard (*Gambelia wislizenii*), Mojave fringe-toed lizard (*Uma scoparia*), side-blotched lizard (*Uta stansburiana*), western banded gecko (*Coleonyx variegatus*), and zebra-tailed lizard (*Callisaurus draconoides*).

The most common snake species expected to occur within the Riverside East SEZ are the coachwhip (*Masticophis flagellum*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), groundsnake (*Sonora semiannulata*), and long-nosed snake (*Rhinocheilus lecontei*). The Mojave rattlesnake (*Crotalus scutulatus*) and sidewinder (*C. cerastes*) would be the most common poisonous snake species expected to occur on the SEZ.

Table 9.4.11.1-1 provides habitat information for the amphibian and reptile species that could occur on or in the affected area of the proposed Riverside East SEZ.

9.4.11.1.2 Impacts

The potential for impacts on amphibians and reptiles from utility-scale solar energy development within the proposed Riverside East SEZ is presented in this section. The types of impacts that amphibians and reptiles could incur from construction, operation, and decommissioning of utility-scale solar energy facilities are discussed in Section 5.10.2.1. Any such impacts would be minimized through the implementation of required programmatic design features described in Appendix A, Section A.2.2, and the application of any additional mitigation. Section 9.4.11.1.3, below, identifies SEZ-specific design features of particular relevance to the Riverside East SEZ.

TABLE 9.4.11.1-1 Representative Amphibians and Reptiles That Could Occur on or in the Affected Area of the Proposed Riverside East SEZ and Potential Impacts

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]		Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
		Within SEZ (Direct Effects)[b]	Outside SEZ (Indirect Effects)[c]	
Amphibians				
Couch's spadefoot (*Scaphiopus couchii*)	Desert washes, desert riparian, palm oasis, desert succulent shrub, and desert scrub habitats. Requires pools or potholes with water that lasts longer than 10 to 12 days for breeding sites. About 2,225,100 acres[f] of potentially suitable habitat occurs in the SEZ region.	110,156 acres of potentially suitable habitat lost (5.0% of available potentially suitable habitat)	230,007 acres of potentially suitable habitat (10.3% of available potentially suitable habitat)	Moderate. Avoid development in Ford Dry Lake and Palen Lake.
Red-spotted toad (*Bufo punctatus*)	Rocky canyons and gullies in deserts, grasslands, and dry woodlands. When inactive, it occurs under rocks, in rock crevices, or underground. Often found near rocky areas associated with spring seepages, intermittent streams, and cattle tanks. Breeds in shallow water of temporary rain pools, spring-fed pools, and pools along intermittent streams. About 2,522,400 acres of potentially suitable habitat occurs in the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate. Avoid development in Ford Dry Lake and Palen Lake.
Lizards				
Desert horned lizard (*Phrynosoma platyrhinos*)	Deserts dominated by sagebrush, creosote bush, greasewood, or cactus. Occurs on sandy flats, alluvial fans, washes, and edges of dunes. Burrows in soil during periods of inactivity. Common throughout Mojave and Colorado Deserts. About 4,698,800 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	596,015 acres of potentially suitable habitat (12.7% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects.

TABLE 9.4.11.1-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Lizards (Cont.)				
Long-nosed leopard lizard (*Gambelia wislizenii*)	Desert and semidesert areas with scattered shrubs. Prefers sandy or gravelly flats and plains. Also prefers areas with abundant rodent burrows, which it occupies when inactive. Widely distributed in the Mojave, Colorado, and other desert areas in California. About 2,522,500 acres of potentially suitable habitat occurs in the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate
Mojave fringe-toed lizard (*Uma scoparia*)	Restricted to sparsely vegetated windblown sand of dunes, flats, riverbanks, and washes. Requires fine, loose sand for burrowing. About 2,303,800 acres of potentially suitable habitat occurs in the SEZ region.	136,731 acres of potentially suitable habitat lost (5.9% of available potentially suitable habitat)	245,986 acres of potentially suitable habitat (10.7% of available potentially suitable habitat)	Moderate
Side-blotched lizard (*Uta stansburiana*)	Arid and semiarid locations with scattered bushes or scrubby trees. Often occurs in sandy washes with scattered rocks and bushes. About 4,053,700 acres of potentially suitable habitat occurs in the SEZ region.	140,549 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	425,267 acres of potentially suitable habitat (10.5% of available potentially suitable habitat)	Moderate
Western banded gecko (*Coleonyx variegatus*)	Wide variety of habitats including deserts with creosotebush and sagebrush and pinyon-juniper woodlands. Inhabits both rocky areas and barren dunes. Most abundant in sandy flats and desert washes. Uses rocks, burrows, and spaces beneath vegetative debris or trash during periods of inactivity. About 3,265,500 acres (of potentially suitable habitat occurs in the SEZ region.	138,265 acres of potentially suitable habitat lost (4.2% of available potentially suitable habitat)	315,836 acres of potentially suitable habitat (9.7% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.1-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Lizards (Cont.)				
Zebra-tailed lizard (*Callisaurus draconoides*)	Sparsely vegetated deserts on open sandy washes, dunes, floodplains, beaches, or desert pavement. Common and widely distributed throughout Mojave and Colorado Deserts. About 3,734,800 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	476,984 acres of potentially suitable habitat (12.8% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects.
Snakes				
Coachwhip (*Masticophis flagellum*)	Wide variety of open terrain habitats. Most abundant in deserts, grasslands, scrub, chaparral, and pastures. Prefers relatively dry open terrain. It seeks cover in burrows, rocks, or vegetation. About 3,488,700 acres of potentially suitable habitat occurs in the SEZ region.	142,371 acres of potentially suitable habitat lost (4.1% of available potentially suitable habitat)	361,682 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate
Glossy snake (*Arizona elegans*)	Variety of habitats including barren to sparsely shrubby deserts, sagebrush flats, grasslands, and sandhills. Prefers sandy areas with scattered brush, but also occurs in rocky areas. Shelters and lays eggs underground. Common throughout southern California, particularly the desert regions. About 3,186,500 acres of potentially suitable habitat occurs in the SEZ region.	161,930 acres of potentially suitable habitat lost (5.1% of available potentially suitable habitat)	325,318 acres of potentially suitable habitat (10.2% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects.

TABLE 9.4.11.1-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a] Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a] Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Snakes (Cont.)				
Gophersnake (*Pituophis catenifer*)	Wide variety of habitats including deserts, prairies, shrublands, woodlands, and farmlands. May dig its burrow or occupy mammal burrows. Eggs are laid in burrows or under large rocks or logs. Most widespread and common snake in California. About 3,483,600 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (4.7% of available potentially suitable habitat)	341,715 acres of potentially suitable habitat (9.8% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects.
Groundsnake (*Sonora semiannulata*)	Arid and semiarid areas including desert flats, sand hummocks, and rocky hillsides with pockets of loose soil. Ranges from prairie and desert lowlands to pinyon-juniper and oak-pine zone. About 2,502,900 acres of potentially suitable habitat occurs in the SEZ region.	110,156 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	230,581 acres of potentially suitable habitat (9.2% of available potentially suitable habitat)	Moderate
Long-nosed snake (*Rhinocheilus lecontei*)	Typically inhabits deserts, dry prairies, and river valleys. Occurs by day and lays eggs underground or under rocks. Burrows rapidly in loose soil. Common in desert regions. About 997,700 acres of potentially suitable habitat occurs in the SEZ region.	51,997 acres of potentially suitable habitat lost (5.2% of available potentially suitable habitat)	95,645 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate
Mojave rattlesnake (*Crotalus scutulatus*)	Mostly upland desert and lower mountain slopes including barren desert, grasslands, open woodland, and scrubland. Generally avoids broken rocky terrain or densely vegetated areas. Takes refuge in animal burrows or spaces under or among rocks. Widely distributed throughout the Mojave and extreme northern Colorado Deserts. About 2,502,800 acres of potentially suitable habitat occurs in the SEZ region.	110,156 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	239,581 acres of potentially suitable habitat (9.2% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.1-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a] Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a] Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Snakes (Cont.)				
Sidewinder (*Crotalus. cerastes*)	Open desert terrain with fine windblown sand, desert flats with sandy washes, or sparsely vegetated sand dunes. Concentrates near washes and areas of relatively dense vegetation where mammal burrows are common. During periods of inactivity, uses underground burrows, occurs under bushes, or almost completely snuggles under sand. Widely distributed and locally abundant in the Mojave and Colorado Deserts. About 2,577,500 acres of potentially suitable habitat occurs in the SEZ region.	136,731 acres of potentially suitable habitat lost (5.3% of available potentially suitable habitat)	246,560 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate

[a] Maximum area of potentially suitable habitat affected relative to total available potentially suitable habitat within the SEZ region (i.e., a 50-mi [80-km] radius from the center of the SEZ). Habitat availability was determined from potentially suitable land cover for each species (USGS 2004, 2005, 2007).

[b] Direct effects within the SEZ consist of ground-disturbing activities associated with construction and the maintenance of an altered environment associated with operations. A maximum of 162,473 acres would be developed in the SEZ.

[c] The area of indirect effects was assumed to be the area adjacent to the SEZ within 5 mi (8 km) of the SEZ boundary. Indirect effects include effects from surface runoff, dust, noise, lighting, etc., from the SEZ, but do not include ground-disturbing activities. The potential degree of indirect effects would decrease with increasing distance from the SEZ boundary.

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

Footnotes continued on next page.

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TABLE 9.4.11.1-1 (Cont.)

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[e] Species-specific mitigation is presented for those species that have particular habitat features that could be readily avoided. For species or individuals occurring outside the SEZ (in the area of indirect effects), no mitigation measures beyond required programmatic design features have been identified.

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

Sources: CDFG (2008); NatureServe (2010); USGS (2004, 2005, 2007).

The assessment of impacts on amphibians and reptile species is based on available information on the presence of species in the affected area as presented in Section 9.4.11.1.1, following the analysis approach described in Appendix M. Additional NEPA assessments and coordination with state natural resource agencies may be needed to address project-specific impacts more thoroughly. These assessments and consultations could result in additional required actions to avoid or mitigate impacts on amphibians and reptiles (see Section 9.4.11.1.3).

In general, impacts on amphibians and reptiles would result from habitat disturbance (i.e., habitat reduction, fragmentation, and alteration) and from disturbance, injury, or mortality to individual amphibians and reptiles. Table 9.4.11.1-1 summarizes the potential impacts on representative amphibian and reptile species resulting from solar energy development that could occur on or in the affected area in the proposed Riverside East SEZ. Direct impacts on representative amphibian and reptile species would be moderate, because 3.5 to 5.9% of potentially suitable habitats for the species in the SEZ region would be lost (Table 9.4.11.1-1). Larger areas of potentially suitable habitats for the amphibian and reptile species occur within the area of potential indirect effects (e.g., up to 12.8% of available habitat for the zebra-tailed lizard). Other impacts on amphibians and reptiles could result from surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, accidental spills, collection, and harassment. These indirect impacts are expected to be negligible with implementation of programmatic design features.

Decommissioning of facilities and reclamation of disturbed areas after operations cease could result in short-term negative impacts on individuals and habitats adjacent to project areas, but long-term benefits would accrue if suitable habitats were restored in previously disturbed areas. Section 5.10.2.1.4 provides an overview of the impacts of decommissioning and reclamation on wildlife. Of particular importance for amphibian and reptile species would be the restoration of original ground surface contours, soils, and native plant communities associated with semiarid shrublands.

9.4.11.1.3 SEZ-Specific Design Features and Design Feature Effectiveness

The implementation of required programmatic design features described in Appendix A, Section A.2.2, would reduce the potential for effects on amphibians and reptiles, especially for species using habitat types that can be avoided (e.g., the ephemeral drainages, playa, dry lake, wetlands, and the CRA). Indirect impacts could be reduced to negligible levels by implementing programmatic design features, especially those engineering controls that would reduce runoff, sedimentation, spills, and fugitive dust. While SEZ-specific design features are best established when project details are considered, design features that can be identified at this time include the following:

- The potential for indirect impacts on several amphibian species could be reduced by maximizing the distance between solar energy development and the CRA.

- To the extent practicable, avoid ephemeral drainages, Palen Lake and Ford Dry Lake, and wetlands.

If these SEZ-specific design features are implemented in addition to other programmatic design features, impacts on amphibian and reptile species could be reduced. However, because potentially suitable habitats for a number of the amphibian and reptile species occur throughout much of the SEZ, additional species-specific mitigation of direct effects for those species would be difficult or infeasible.

9.4.11.2 Birds

9.4.11.2.1 Affected Environment

This section addresses bird species that are known to occur, or for which potentially suitable habitat occurs, on or within the potentially affected area of the proposed Riverside East SEZ. The list of bird species potentially present in the project area was determined from range maps and habitat information available from the California Wildlife Habitat Relationships System (CDFG 2008). Land cover types suitable for each species were determined from SWReGAP (USGS 2004, 2005, 2007). See Appendix M for additional information on the approach used.

More than 100 species of birds have a range that encompasses the proposed Riverside East SEZ region. However, habitats for about 40 of these species either do not occur on or are limited within the SEZ (e.g., habitat for waterfowl and wading birds). In addition, the SEZ region is only within the winter or summer range for some of the bird species. Eleven bird species that could occur on or in the affected area of the SEZ are considered focal species for the California Partners in Flight's *Desert Bird Conservation Plan* (CalPIF 2009): ash-throated flycatcher (*Myiarchus cinerascens*), black-tailed gnatcatcher (*Polioptila melanura*), black-throated sparrow (*Amphispiza bilineata*), burrowing owl (*Athene cunicularia*), common raven (*Corvus corax*), Costa's hummingbird (*Calypte costae*), crissal thrasher (*Toxostoma crissale*), ladder-backed woodpecker (*Picoides scalaris*), Le Conte's thrasher (*Toxostoma lecontei*), phainopepla (*Phainopepla nitens*), and verdin (*Auriparus flaviceps*). Habitats for most of these species are described in Table 9.4.11.2-1. The ash-throated flycatcher would be a summer resident within the SEZ, while the other desert focal bird species could occur year-round (CalPIF 2009).

> **Desert Focal Bird Species**
>
> Bird species whose requirements define spatial attributes, habitat characteristics, and management regimes representative of a healthy desert system (Chase and Geupel 2005).

Waterfowl, Wading Birds, and Shorebirds

As discussed in Section 4.10.2.2.2, waterfowl (ducks, geese, and swans), wading birds (herons and cranes), and shorebirds (avocets, gulls, plovers, rails, sandpipers, stilts, and terns) are among the most abundant groups of birds in the six-state study area. About 20 species of waterfowl, wading birds, and shorebirds occur within the SEZ region for the proposed Riverside

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TABLE 9.4.11.2-1 Representative Bird Species That Could Occur on or in the Affected Area of the Proposed Riverside East SEZ and Potential Impacts

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]		Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
		Within SEZ (Direct Effects)[b]	Outside SEZ (Indirect Effects)[c]	
Shorebirds				
Killdeer (*Charadrius vociferus*)	Widespread throughout California. Open areas such as fields, meadows, lawns, mudflats, and shores. Nests on ground in open dry or gravelly locations. About 231,000 acres[f] of potentially suitable habitat occurs in the SEZ region. Year-round.	2,535 acres of potentially suitable habitat lost (1.1% of available potentially suitable habitat)	10,821 acres of potentially suitable habitat (4.7% of available potentially suitable habitat)	Moderate. Avoid development in Ford Dry Lake and Palen Lake. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Least sandpiper (*Calidris minutilla*)	Wet meadows, mudflats, flooded fields, lake shores, edge of salt marshes, and river sandbars. About 64,700 acres of potentially suitable habitat occurs in the SEZ region. Common to abundant in winter.	223 acres of potentially suitable habitat lost (0.3% of available potentially suitable habitat)	435 acres of potentially suitable habitat (0.7% of available potentially suitable habitat)	Small. Avoid development in Ford Dry Lake and Palen Lake. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants				
Ash-throated flycatcher (*Myiarchus cinerascens*)	Common in scrub and woodland habitats including desert riparian and desert washes. Requires hole/cavity for nesting. Uses shrubs or small trees for foraging perches. About 3,196,900 acres of potentially suitable habitat occurs in the SEZ region. Summer.	136,695 acres of potentially suitable habitat lost (4.3% of available potentially suitable habitat)	315,008 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Black-tailed gnatcatcher (*Polioptila melanura*)	Nests in bushes mainly in wooded desert washes with dense mesquite, palo verde, ironwood, and acacia. Also occurs in desert scrub habitat. About 3,199,000 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	161,930 acres of potentially suitable habitat lost (5.1% of available potentially suitable habitat)	325,318 acres of potentially suitable habitat (10.2% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Black-throated sparrow (*Amphispiza bilineata*)	Chaparral and desert scrub habitats with sparse to open stands of shrubs. Often in areas with scattered Joshua trees. Nests in thorny shrubs or cactus. About 2,960,000 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	162,473 acres of potentially suitable habitat lost (5.5% of available potentially suitable habitat)	394,738 acres of potentially suitable habitat (13.3% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is wide-spread in the area of direct effects. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Brewer's sparrow (*Spizella breweri*)	Common in Mojave and Colorado Deserts during winter. Occupies open desert scrub and cropland habitats. About 2,305,900 acres of potentially suitable habitat occurs in the SEZ region.	111,544 acres of potentially suitable habitat lost (4.8% of available potentially suitable habitat)	243,705 acres of potentially suitable habitat (10.6% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Cactus wren (*Campylorhynchus brunneicapillus*)	Desert (especially areas with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and trees in towns in arid regions. Nests in *Opuntia* spp.; twiggy, thorny trees and shrubs; and sometimes in buildings. Nests may be used as winter roost. Locally common in the Mojave and Colorado Deserts. About 1,865,100 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	30,616 acres of potentially suitable habitat lost (1.6% of available potentially suitable habitat)	195,594 acres of potentially suitable habitat (10.5% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Common poorwill (*Phalaenoptilus nuttallii*)	Scrubby and brushy areas, prairie, desert, rocky canyons, open woodlands, and broken forests. Mostly in arid and semiarid habitats. Nests in open areas on a bare site. About 4,125,500 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	142,112 acres of potentially suitable habitat lost (3.4% of available potentially suitable habitat)	430,448 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Common raven (*Corvus corax*)	Occurs in most habitats. Trees and cliffs provide cover. Roosts primarily in trees. Nests on cliffs, bluffs, tall trees, or human-made structures. Forages in sparse, open terrain. About 2,692,700 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	112,684 acres of potentially suitable habitat lost (4.2% of available potentially suitable habitat)	245,576 acres of potentially suitable habitat (9.1% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Costa's hummingbird (*Calypte costae*)	Desert and semidesert areas, arid brushy foothills, and chaparral. Main habitats are desert washes, edges of desert riparian and valley foothill riparian areas, coastal shrub, desert scrub, desert succulent shrub, low-elevation chaparral, and palm oasis. Also in mountains, meadows, and gardens during migration and winter. Most common in canyons and washes when nesting. Nests are located in trees, shrubs, vines, or cacti. About 3,196,700 acres of potentially suitable habitat occurs in the SEZ region. Common in summer and uncommon in winter in California.	136,473 acres of potentially suitable habitat lost (4.3% of available potentially suitable habitat)	315,008 acres of potentially suitable habitat (9.8% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Greater roadrunner (*Geococcyx californianus*)	Desert scrub, chaparral, edges of cultivated lands, and arid open areas with scattered brush. Requires thickets, large bushes, or small trees for shade, refuge, and roosting. Usually nests low in trees, shrubs, or clumps of cactus. Rarely nests on ground. About 4,413,300 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	162,473 acres of potentially suitable habitat lost (3.7% of available potentially suitable habitat)	459,771 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Horned lark (*Eremophila alpestris*)	Common to abundant resident in a variety of open habitats. Breeds in grasslands, sagebrush, semidesert shrublands, and alpine tundra. During migration and winter, inhabits the same habitats other than tundra, and also occurs in agricultural areas. Usually occurs where plant density is low and there are exposed soils. About 2,378,200 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	111,496 acres of potentially suitable habitat lost (4.7% of available potentially suitable habitat)	235,350 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
House finch (*Carpodacus mexicanus*)	Variety of areas including arid scrub and brush, desert riparian areas, open woodlands, cultivated lands, and savannas. Usually forages in areas with elevated escape perches (e.g., trees, tall shrubs, transmission lines, and buildings). Roosts and nests in sheltered sites in trees; tall, dense shrubs; man-made structures; cliff crevices; or earthen banks. About 142,900 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	1,188 acres of potentially suitable habitat lost (0.8% of available potentially suitable habitat)	9,900 acres of potentially suitable habitat (6.9% of available potentially suitable habitat)	Small. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Ladder-backed woodpecker (*Picoides scalaris*)	Fairly common in Mojave and Colorado Deserts. Variety of habitats including deserts, arid scrub, riparian woodlands, mesquite, scrub oak, pinyon-juniper woodlands. Digs nest hole in rotted stub or dead or dying branches of various trees. Also nests in saguaro, agave, yucca, fence posts, and utility poles. Nests on ledges; branches of trees, shrubs, and cactus; and holes in trees or walls. About 3,196,800 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	136,695 acres of potentially suitable habitat lost (4.3% of available potentially suitable habitat)	315,008 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Le Conte's thrasher (*Toxostoma leconteii*)	Open desert wash, alkali desert scrub, and desert succulent shrub habitats. Prefers to nest and forage in arroyos and washes lined with dense stands of creosotebush and salt bush. About 3,197,700 acres of potentially suitable habitat occurs in the SEZ region. Year-round, but uncommon to rare.	161,930 acres of potentially suitable habitat lost (5.1% of available potentially suitable habitat)	325,566 acres of potentially suitable habitat (10.2% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Lesser nighthawk (*Chordeiles acutipennis*)	Open country, desert regions, scrub, savanna, and cultivated areas. Usually near water including open marshes, salt ponds, large rivers, rice paddies, and beaches. Roosts on low perches or the ground. Nests in the open on bare sites. About 4,603,400 acres of potentially suitable habitat occurs in the SEZ region. Uncommon summer resident.	162,473 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	594,861 acres of potentially suitable habitat (12.9% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Loggerhead shrike (*Lanius ludovicianus*)	Open country with scattered trees and shrubs, savanna, desert scrub, desert riparian, Joshua tree, and occasionally, open woodland habitats. Perches on poles, wires, or fence posts (suitable hunting perches are important aspect of habitat). Nests in shrubs and small trees. About 3,336,200 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	137,593 acres of potentially suitable habitat lost (4.1% of available potentially suitable habitat)	324,251 acres of potentially suitable habitat (9.7% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a] Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a] Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
Phainopepla (*Phainopepla nitens*)	Common in Mojave and Colorado Deserts. Desert scrub, mesquite, juniper and oak woodlands, tall brush, washes, riparian woodlands, and orchards. Nests in dense foliage of large shrubs or trees, sometimes in a clump of mistletoe. About 1,113,000 acres of potentially suitable habitat occurs in the SEZ region. Year-round, but many move to more western and northern portions of California during summer.	51,997 acres of potentially suitable habitat lost (4.7% of available potentially suitable habitat)	95,893 acres of potentially suitable habitat (8.6% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Say's phoebe (*Sayornis saya*)	Arid open country, deserts, sagebrush plains, dry barren foothills, canyons, cliffs, ranches, and rural homes. Nests in cliff crevices, holes in banks, sheltered ledges, tree cavities, under bridges and roofs, and in mines. About 3,359,000 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	118,034 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	360,289 acres of potentially suitable habitat (10.7% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Verdin (*Auriparus flaviceps*)	Common to abundant in Colorado Desert, less common in Mojave Desert. Desert riparian, desert wash, desert scrub, and alkali desert scrub areas with large shrubs and small trees. Nests in shrubs, small trees, or cactus. About 3,232,000 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	135,132 acres of potentially suitable habitat lost (4.2% of available potentially suitable habitat)	309,905 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Neotropical Migrants (Cont.)				
White-throated swift (*Aeronautes saxatalis*)	Mountainous country near cliffs and canyons where breeding occurs. Forages over forest and open situations. Nests in rock crevices and canyons, sometimes in buildings. Ranges widely over most terrain and habitats, usually high in the air. About 1,027,900 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	6,828 acres of potentially suitable habitat lost (0.7% of available potentially suitable habitat)	125,922 acres of potentially suitable habitat (12.3% of available potentially suitable habitat)	Small. Some measure of mitigation provided by the requirements of the Migratory Bird Treaty Act.
Birds of Prey				
American kestrel (*Falco sparverius*)	Occurs in most open habitats, in various shrub and early successional forest habitats, forest openings, and various ecotones. Perches on trees, snags, rocks, utility poles and wires, and fence posts. Uses cavities in trees, snags, rock areas, banks, and buildings for nesting and cover. About 1,774,600 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	37,970 acres of potentially suitable habitat lost (2.1% of available potentially suitable habitat)	266,637 acres of potentially suitable habitat (15.0% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Birds of Prey (cont.)				
Golden eagle (*Aquila chrysaetos*)	Grasslands, shrublands, pinyon-juniper woodlands, and ponderosa pine forests. Occasionally in most other habitats, especially during migration and winter. Nests on cliffs and sometimes trees in rugged areas, with breeding birds ranging widely over surrounding areas. About 4,645,700 acres of potentially suitable habitat occurs in the SEZ region. Winter.	162,473 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	566,888 acres of potentially suitable habitat (12.2% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects. Some measure of mitigation provided by the requirements of the Bald and Golden Eagle Protection Act.
Prairie falcon (*Falco mexicanus*)	Associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Nests in potholes or well-sheltered ledges on rocky cliffs or steep earth embankments. May also nest in man-made excavations on otherwise unsuitable cliffs and old nests of ravens, hawks, and eagles. Forages in large patch areas with low vegetation. May forage over irrigated croplands in winter. About 4,161,000 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	140,549 acres of potentially suitable habitat lost (3.4% of available potentially suitable habitat)	425,345 acres of potentially suitable habitat (10.2% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Birds of Prey (Cont.)				
Red-tailed hawk (*Buteo jamaicensis*)	Wide variety of habitats from deserts, mountains, and populated valleys. Open areas with scattered, elevated perch sites such as scrub desert, plains and montane grassland, agricultural fields, pastures, urban parklands, broken coniferous forests, and deciduous woodland. Nests on cliff ledges or in tall trees. About 433,400 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	2,461 acres of potentially suitable habitat lost (0.6% of available potentially suitable habitat)	14,594 acres of potentially suitable habitat (3.4% of available potentially suitable habitat)	Small
Turkey vulture (*Cathartes aura*)	Occurs in open stages of most habitats that provide adequate cliffs or large trees for nesting, roosting, and resting. Migrates and forages over most open habitats. Will roost communally in trees, exposed boulders, and occasionally transmission line support towers. About 3,372,500 acres of potentially suitable habitat occurs in the SEZ region. Summer.	117,359 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	351,380 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate
Upland Game Birds				
Gambel's quail (*Callipepla gambelii*)	Deserts, especially in areas with brushy or thorny growth, and adjacent cultivated areas. Usually occurs near water. Nests on the ground under cover of small trees, shrubs, and grass tufts. About 4,158,700 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	142,335 acres of potentially suitable habitat lost (3.4% of available potentially suitable habitat)	430,704 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.2-1 (Cont.)

Common Name (Scientific Name)	Habitat and Seasonal Occurrence	Maximum Area of Potential Habitat Affected[a]		Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
		Within SEZ (Direct Effects)[b]	Outside SEZ (Indirect Effects)[c]	
Upland Game Birds (Cont.)				
Mourning dove (*Zenaida macroura*)	Habitat generalist, occurring in grasslands, shrublands, croplands, lowland and foothill riparian forests, ponderosa pine forests, deserts, and urban and suburban areas. Rarely in aspen and other forests, coniferous woodlands, and alpine tundra. Nests on ground or in trees. Winters mostly in lowland riparian forests adjacent to cropland. About 3,426,600 acres of potentially suitable habitat occurs in the SEZ region. Year-round.	139,253 acres of potentially suitable habitat lost (4.1% of available potentially suitable habitat)	329,063 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate
White-winged dove (*Zenaida asiatica*)	Desert riparian, wash, succulent shrub, scrub, and Joshua tree habitats; orchards and vineyards, croplands, and pastures. About 3,266,300 acres of potentially suitable habitat occurs in the SEZ region. Summer.	162,473 acres of potentially suitable habitat lost (5.0% of available potentially suitable habitat)	330,669 acres of potentially suitable habitat (10.1% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effects.

[a] Maximum area of potentially suitable habitat affected relative to total available potentially suitable habitat within the SEZ region (i.e., a 50-mi [80-km] radius from the center of the SEZ). Habitat availability was determined from potentially suitable land cover for each species (USGS 2004, 2005, 2007).

[b] Direct effects within the SEZ consist of ground-disturbing activities associated with construction and the maintenance of an altered environment associated with operations. A maximum of 162,473 acres would be developed in the SEZ.

Footnotes continued on next page.

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TABLE 9.4.11.2-1 (Cont.)

[c] The area of indirect effects was assumed to be the area adjacent to the SEZ within 5 mi (8 km) of the SEZ boundary. Indirect effects include effects from surface runoff, dust, noise, lighting, etc. from the SEZ, but do not include ground-disturbing activities. The potential degree of indirect effects would decrease with increasing distance from the SEZ boundary.

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

[e] Species-specific mitigation is presented for those species that have particular habitat features that could be readily avoided. For species or individuals occurring outside the SEZ (in the area of indirect effects), no mitigation measures beyond required programmatic design features have been identified.

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

Sources: CDFG (2008); NatureServe (2010); USGS (2004, 2005, 2007).

East SEZ. Within the SEZ, waterfowl, wading birds, and shorebirds are uncommon because of the lack of aquatic habitat, but occur within the area of the CRA just northwest of the SEZ. The killdeer (*Charadrius vociferus*) and least sandpiper (*Calidris minutilla*) (shorebird species) would be expected to occur on the SEZ, especially when Ford Dry Lake and Palen Lake contain standing water. The Colorado River, located more than 5 mi (8 km) east of the SEZ, and the Salton Sea, located more than 31 mi (50 km) southwest of the SEZ, would provide more productive habitat for this group of birds.

Neotropical Migrants

As discussed in Section 4.10.2.2.3, neotropical migrants represent the most diverse category of birds within the six-state study area. Neotropical migrants expected to occur on or in the affected area of the proposed Riverside East SEZ throughout the year include the black-tailed gnatcatcher, black-throated sparrow, cactus wren (*Campylorhynchus brunneicapillus*), common poorwill (*Phalaenoptilus nuttallii*), common raven, Costa's hummingbird, crissal thrasher, greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), house finch (*Carpodacus mexicanus*), ladder-backed woodpecker, Le Conte's thrasher, loggerhead shrike (*Lanius ludovicianus*), phainopepla, Say's phoebe (*Sayornis saya*), verdin, and white-throated swift (*Aeronautes saxatalis*). The winter range for the Brewer's sparrow (*Spizella breweri*), green-tailed towhee (*Pipilo chlorurus*), and sage sparrow (*Amphispiza belli*) encompasses the SEZ, while the summer range for the ash-throated flycatcher (*Myiarchus cinerascens*) and lesser nighthawk (*Chordeiles acutipennis*) encompasses the SEZ (CDFG 2008).

Birds of Prey

Section 4.10.2.2.4 provides an overview of the birds of prey (raptors, owls, and vultures) within the six-state study area. Seventeen bird of prey species have ranges that encompass the proposed Riverside East SEZ (CDFG 2008). Raptor species expected to occur within the SEZ include the American kestrel (*Falco sparverius*, year-round), burrowing owl (year-round), ferruginous hawk (*Buteo regalis*, winter), golden eagle (*Aquila chrysaetos*, winter), prairie falcon (*Falco mexicanus*, year-round), red-tailed hawk (*Buteo jamaicensis*, year-round), and turkey vulture (*Cathartes aura*, summer) (CDFG 2008). However, the American kestrel, golden eagle, prairie falcon, and red-tailed hawk make only infrequent use of the desert regions within which the Riverside East SEZ occurs. The golden eagle is a Fully Protected species by the State of California (CDFG 2010b).

Upland Game Birds

Section 4.10.2.2.5 provides an overview of the upland game birds (primarily pheasants, grouse, quail, and doves) that occur within the six-state study area. Upland game species that could occur year-round within the proposed Riverside East SEZ are Gambel's quail (*Callipepla gambelii*) and mourning dove (*Zenaida macroura*), while the white-winged dove (*Zenaida asiatica*) would occur during the summer (CDFG 2008). Gambel's quail is common within the

Colorado and Mojave Desert areas of California. It prefers riparian areas and also occurs near streams, springs, and water holes. While it feeds in open habitats, trees or tall shrubs are required for escape cover. It also requires a nearby source of water, particularly during hot summer months (CDFG 2008). Up to 400,000 Gambel's quail are harvested annually in California (CDFG 2008). The mourning dove is common throughout California and can be found in a wide variety of habitats. Regardless of habitat occupied, it requires a nearby water source (CDFG 2008). The white-winged dove occurs in the southeastern corner of California. It inhabits desert riparian, wash, succulent shrub, scrub, alkali scrub, and Joshua tree habitats. It also occurs in orchards, vineyards, cropland, and pastures (CDFG 2008).

Table 9.4.11.2-1 provides habitat information for the representative bird species that could occur on the affected area of the proposed Riverside East SEZ. Because of their special status standing, the burrowing owl, crissal thrasher, ferruginous hawk, and short-eared owl are discussed in Section 9.4.12.1.

9.4.11.2.2 Impacts

The types of impacts that birds could incur from construction, operation, and decommissioning of utility-scale solar energy facilities are discussed in Section 5.10.2.2. Any such impacts would be minimized through the implementation of required programmatic design features described in Appendix A, Section A.2.2, and through any additional mitigation applied. Section 9.4.11.2.3, below, identifies design features of particular relevance to the proposed Riverside East SEZ.

The assessment of impacts on bird species is based on available information on the presence of species in the affected area as presented in Section 9.4.11.2.1, following the analysis approach described in Appendix M. Additional NEPA assessments and coordination with state natural resource agencies may be needed to address project-specific impacts more thoroughly. These assessments and consultations could result in additional required actions to avoid or mitigate impacts on birds (see Section 9.4.11.2.3).

In general, impacts on birds would result from habitat disturbance (i.e., habitat reduction, fragmentation, and alteration) and from disturbance, injury, or mortality to individual birds. Table 9.4.11.2-1 summarizes the potential impacts on representative bird species resulting from solar energy development that could occur on or in the affected area in the proposed Riverside East SEZ. Direct impacts on representative bird species would be small for the least sandpiper, house finch, white-throated sparrow, and red-tailed hawk, because 0.3 to 0.8% of habitats potentially suitable for the species would be lost (Table 9.4.11.2-1). Moderate direct impacts on the other representative bird species would occur, with loss of potentially suitable habitats ranging from 1.1 to 5.5% (Table 9.4.11.2-1). Larger areas of potentially suitable habitat for the birds occur within the area of potential indirect effects (e.g., up to 15.0% of potentially suitable habitat for the American kestrel). Other impacts on birds could result from collision with vehicles and structures, surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, noise, lighting, spread of invasive species, accidental spills, and harassment. Indirect impacts on areas outside the SEZ (e.g., impacts caused by dust generation, erosion, and sedimentation) are expected to be negligible with implementation of programmatic design features.

Decommissioning of facilities and reclamation of disturbed areas after operations cease could result in short-term negative impacts on individuals and habitats adjacent to project areas, but long-term benefits would accrue if suitable habitats in previously disturbed areas were restored. Section 5.10.2.1.4 provides an overview of the impacts of decommissioning and reclamation on wildlife. Of particular importance for reptile species would be the restoration of original ground surface contours, soils, and native plant communities associated with semiarid shrublands.

9.4.11.2.3 SEZ-Specific Design Features and Design Feature Effectiveness

The successful implementation of programmatic design features presented in Appendix A, Section A.2.2, would reduce the potential for effects on birds, especially for those species that depend on habitat types that can be avoided (e.g., ephemeral drainages, Ford Dry Lake and Palen Lake, wetlands, and the CRA). Indirect impacts could be reduced to negligible levels by implementing programmatic design features, especially those engineering controls that would reduce runoff, sedimentation, spills, and fugitive dust. While SEZ-specific design features important to reducing impacts on birds are best established when project details are considered, some design features can be identified at this time, as follows:

- Pre-disturbance surveys should be conducted within the SEZ for bird species listed under the Migratory Bird Treaty Act, including those species considered to be desert bird focal species. Nesting habitat for bird species listed under the Migratory Bird Treaty Act should be avoided during the nesting season.

- Plant species that positively influence the presence and abundance of the desert bird focal species should be avoided to the extent practicable. These species include Goodding's willow, yucca, Joshua tree, mesquite, honey mesquite, screwbean, desert mistletoe, big saltbush, smoketree, and catclaw acacia (CalPIF 2009).

- Take of golden eagles and other raptors should be avoided. Mitigation regarding the golden eagle should be developed in consultation with the USFWS and CDFG. A permit may be required under the Bald and Golden Eagle Protection Act.

- To the extent practicable, avoid ephemeral drainages, Ford Dry Lake and Palen Lake, wetlands, and the CRA.

If these SEZ-specific design features are implemented in addition to programmatic project design features, impacts on bird species could be reduced. Any residual impacts on birds are anticipated to be small given the relative abundance of suitable habitats in the SEZ region. However, as potentially suitable habitats for a number of the bird species occur throughout much of the SEZ, additional species-specific mitigation of direct effects for those species would be difficult or infeasible. The potential for indirect impacts on several bird species (particularly waterfowl, wading birds, and shorebirds) could be reduced by maximizing the distance between solar energy facilities and the CRA.

9.4.11.3 Mammals

9.4.11.3.1 Affected Environment

This section addresses mammal species that are known to occur, or for which suitable habitat occurs, on or within the potentially affected area of the Riverside East SEZ. The list of mammal species potentially present in the project area was determined from range maps and habitat information available from the California Wildlife Habitat Relationships System (CDFG 2008). Land cover types suitable for each species were determined from SWReGAP (USGS 2004, 2005, 2007). See Appendix M for additional information on the approach used. Based on species distributions and habitat preferences, more than 40 mammal species could occur within the SEZ (CDFG 2008). The following discussion emphasizes big game and other mammal species that (1) have key habitats within or near the Riverside East SEZ, (2) are important to humans (e.g., big game, small game, and furbearer species), and/or (3) are representative of other species that share similar habitats.

Big Game

The cougar (*Puma concolor*)[4], desert bighorn sheep (*Ovis canadensis nelsoni*), and mule deer (*Odocoileus hemionus*) are the big game species whose ranges encompass the area of the proposed Riverside East SEZ. The cougar inhabits cliffs, forests, woodlands, shrublands, chaparral, and deserts. It generally occurs in mountainous or remote undisturbed areas. However, it also occurs in a variety of other habitats, including swamps, riparian woodlands, and broken country with brush or woodland cover. Habitat areas of more than 500,000 acres (2,000 km^2) are needed for long-term population survival, and protection of immigration corridors is also desirable (NatureServe 2010). The cougar is generally absent from desert areas that do not support mule deer. Its seasonal movements are generally in response to following migrating deer herds. There are possibly more than 5,000 cougar in California with the numbers apparently increasing (CDFG 2008).

[4] Although cougar hunting does not occur in California, it is included with big game for the sake of continuity with the SEZ wildlife sections for the other five states.

Because it is a BLM sensitive species, the desert bighorn sheep is discussed in Section 9.4.12.

The mule deer is common to abundant throughout California, except in deserts and intensely farmed areas (CDFG 2008). It prefers a mosaic of vegetation that has herbaceous openings, dense brush or tree thickets, riparian areas, and abundant edges. Mule deer are browsers and grazers, feeding on shrubs, forbs, and a few grasses. Brush is important for escape cover and for thermal regulation in winter and summer (CDFG 2008). The burro deer (*Odocoileus hemionus eremicus*), a subspecies of mule deer, occurs in the Colorado Desert. It occurs primarily along the Colorado River, especially during hot summers, and in desert wash woodland communities when away from the river (generally when late summer thunderstorms and cooler temperatures allow the deer to move up the larger washes into the mountains or wash complexes in the foothills) (BLM and CDFG 2002). Burro deer consume foliage from riparian and woodland trees (e.g., willow, palo verde, and ironwood) and various shrubs. Major threats to the burro deer include habitat loss from agricultural development and urbanization and infestation of tamarisk along the Colorado River (BLM and CDFG 2002).

Other Mammals

A number of small game and furbearer species occur within the area of the proposed Riverside East SEZ: the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), round-tailed ground squirrel (*Spermophilus tereticaudus*), and white-tailed antelope squirrel (*Ammospermophilus leucurus*) (CDFG 2008).

Nongame (small) mammal species, such as bats, mice, kangaroo rats, and shrews, also occur within the area of the Riverside East SEZ: the cactus mouse (*Peromyscus eremicus*), canyon deermouse (*P. crinitus*), desert kangaroo rat (*Dipodomys deserti*), desert shrew (*Notiosorex crawfordi*), desert woodrat (*Neotoma lepida*), little pocket mouse (*Perognathus longimembris*), long-tailed pocket mouse (*Chaetodipus formosus*), Merriam's kangaroo rat (*Dipodomys merriami*), and southern grasshopper mouse (*Onychomys torridus*) (CDFG 2008). The ranges of nine bat species encompass the SEZ: big brown bat (*Eptesicus fuscus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Californian leaf-nosed bat (*Macrotus californicus*), California mastiff bat (*Eumops perotis californicus*), California myotis (*Myotis californicus*), pallid bat (*Antrozous pallidus*), spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western pipistrelle (*Parastrellus hesperus*). Most bat species would utilize the SEZ only during foraging. Roost sites for the species (e.g., caves, hollow trees, rock crevices, or buildings) are absent to scarce on or in the affected area of the SEZ.

Table 9.4.11.3-1 provides habitat information for the representative mammal species that could occur on or in the affected area of the Riverside East SEZ. Because of their special status standing, the California mastiff bat, Californian leaf-nose bat, pallid bat, and Townsend's big-eared bat are discussed in Section 9.4.12.

9.4.11.3.2 Impacts

The types of impacts that mammals could incur from construction, operation, and decommissioning of utility-scale solar energy facilities are discussed in Section 5.10.2.3. Any such impacts would be minimized through the implementation of required programmatic design features described in Appendix A, Section A.2.2, and through any additional mitigation applied. Section 9.4.11.3.3, below, identifies design features of particular relevance to the proposed Riverside East SEZ.

The assessment of impacts on mammal species is based on available information on the presence of species in the affected area as presented in Section 9.4.11.3.1, following the analysis approach described in Appendix M. Additional NEPA assessments and coordination with state natural resource agencies may be needed to address project-specific impacts more thoroughly. These assessments and consultations could result in additional required actions to avoid or mitigate impacts on mammals (see Section 9.4.11.3.3).

Table 9.4.11.3-1 summarizes the potential impacts on representative mammal species resulting from solar energy development (with the implementation of required programmatic design features) in the proposed Riverside East SEZ.

Although the Riverside East SEZ falls within the overall range of the cougar, desert habitat is not the preferred habitat for the species. It is unlikely that impacts from solar energy development within the SEZ would represent an actual loss of occupied habitat, although direct impacts could occur to 117,359 acres (474.9 km^2), about 3.3%, of potentially suitable habitat within the SEZ region (Table 9.4.11.3-1).

Mule deer would occur near the Colorado River most of the year, particularly during the hot summer months. However, the species could occur within the desert scrub and desert wash habitats of the SEZ for portions of the year, particularly when standing water occurs in Ford Dry Lake and Palen Lake. Almost 162,500 acres (658 km^2) of potentially suitable mule deer habitat could be directly affected by solar energy development on the proposed Riverside East SEZ (Table 9.4.11.3-1). Fencing around a large solar development within the SEZ could affect movement of mule deer between the Colorado River and mountains or foothills.

TABLE 9.4.11.3-1 Representative Mammal Species That Could Occur on or in the Affected Area of the Proposed Riverside East SEZ and Potential Impacts

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Big Game				
Cougar (*Puma concolor*)	Widespread, uncommon permanent resident in California. Most common in rough, broken foothills and canyon country, often in association with montane forests, shrublands/chaparral, and pinyon-juniper woodlands. Also occurs in deserts, swamps, and riparian area. Seeks cover in caves, other natural cavities, and thickets in brush and timber. About 3,508,100 acres[f] of potentially suitable habitat occurs in the SEZ region.	117,359 acres of potentially suitable habitat lost (3.3% of available potentially suitable habitat)	351,380 acres of potentially suitable habitat (10.0% of available potentially suitable habitat)	Moderate
Mule deer (*Odocoileus hemionus*)	Occurs in early to intermediate successional stages of most forest, woodland, and brush habitats. About 3,433,200 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (4.7% of available potentially suitable habitat)	335,963 acres of potentially suitable habitat (9.8% of available potentially suitable habitat)	Moderate. Ensure that fencing does not block the free passage of mule deer between the Colorado River and mountains or foothills.
Small Game and Furbearers				
American badger (*Taxidea taxus*)	Open grasslands and deserts, meadows in subalpine and montane forests, alpine tundra. Dig burrows in friable soils. Most common in areas with abundant populations of ground squirrels, prairie dogs, and pocket gophers. Relatively uncommon throughout California. About 2,502,700 acres of potentially suitable habitat occurs in the SEZ region.	110,156 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	230,581 acres of potentially suitable habitat (9.2% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Small Game and Furbearers (Cont.)				
Black-tailed jackrabbit (*Lepus californicus*)	Open plains, fields, and deserts with scattered thickets or patches of shrubs. Also open, early stages of forests and chaparral habitats. Rests during the day in shallow depressions, and uses shrubs for cover. About 4,065,600 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (4.0% of available potentially suitable habitat)	450,831 acres of potentially suitable habitat (11.1% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.
Bobcat (*Lynx rufus*)	Occurs in nearly all habitats and successional stages. Optimal habitats include mixed woodlands and forest edges, hardwood forests, swamps, forested river bottoms, brushlands, deserts, mountains, and other area with thick undergrowth. Availability of water may limit its distribution in xeric regions. Uses rocky clefts, caves, hollow logs, spaces under fallen trees, and so forth when inactive; usually changes shelter areas daily. About 2,951,800 acres of potentially suitable habitat occurs in the SEZ region.	136,053 acres of potentially suitable habitat lost (4.6% of available potentially suitable habitat)	322,483 acres of potentially suitable habitat (10.9% of available potentially suitable habitat)	Moderate
Coyote (*Canis latrans*)	Suitable habitat characterized by interspersions of brush and open areas with free water. Least common in dense coniferous forest. Where human control efforts occur, it is restricted to broken, rough country with abundant shrub cover and a good supply of rabbits or rodents. About 4,822,200 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (3.4% of available potentially suitable habitat)	605,581 acres of potentially suitable habitat (12.6% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Small Game and Furbearers (Cont.)				
Desert cottontail (*Sylvilagus audubonii*)	Abundant to common in grasslands, open forests, and desert shrub habitats. Can occur in areas with minimal vegetation as long as adequate cover (e.g., rock piles, fallen logs, fence rows) is present. Thickets and patches of shrubs, vines, and brush also used as cover. About 3,233,000 acres of potentially suitable habitat occurs in the SEZ region.	136,030 acres of potentially suitable habitat lost (4.2% of available potentially suitable habitat)	318,574 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate
Round-tailed ground squirrel (*Spermophilus tereticaudus*)	Optimum habitat includes desert succulent shrub, desert wash, desert scrub, alkali desert scrub, and levees in cropland habitat. Also occurs in urban habitats. Burrows usually at base of shrubs. About 2,558,600 acres of potentially suitable habitat occurs in the SEZ region.	111,719 acres of potentially suitable habitat lost (4.4% of available potentially suitable habitat)	235,684 acres of potentially suitable habitat (9.2% of available potentially suitable habitat)	Moderate
White-tailed antelope squirrel (*Ammospermophilus leucurus*)	Common to abundant in California deserts. Optimal habitats are desert scrub, sagebrush, alkali desert scrub, Joshua tree, bitterbrush, and pinyon-juniper. Fairly common in desert riparian, desert succulent shrub, and desert wash habitats. Also occurs in mixed chaparral and annual grassland habitats. Requires friable soil for burrowing. Burrows may be under shrubs or in open, often uses abandoned kangaroo rat burrows. About 4,053,800 acres of potentially suitable habitat occurs in the SEZ region.	140,549 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	425,267 acres of potentially suitable habitat (10.5% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Nongame (Small) Mammals				
Big brown bat (*Eptesicus fuscus*)	Deserts, forests and woodlands, old fields, shrublands, and urban/suburban areas. Uncommon in hot desert habitats. Summer roosts are in buildings, hollow trees, rock crevices, tunnels, and cliff swallow nests. Maternity colonies occur in attics, barns, tree cavities, rock crevices, and caves. Caves, mines, and man-made structures used for hibernation sites. About 3,578,200 acres of potentially suitable habitat occurs in the SEZ region.	116,538 acres of potentially suitable habitat lost (3.3% of available potentially suitable habitat)	355,936 acres of potentially suitable habitat (9.4% of available potentially suitable habitat)	Moderate
Brazilian free-tailed bat (*Tadarida brasiliensis*)	Cliffs, deserts, grasslands, old fields, savannas, shrublands, woodlands, and suburban/urban areas. Roosts in buildings, caves, and hollow trees. May roost in rock crevices, bridges, signs, or cliff swallow nests during migration. Large maternity colonies inhabit caves, buildings, culverts, and bridges. About 4,291,600 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (3.8% of available potentially suitable habitat)	451,224 acres of potentially suitable habitat (10.5% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.
Cactus mouse (*Peromyscus eremicus*)	Deserts, shrublands, chaparral, and coniferous woodlands. Occurs on rocky areas and areas with sandy substrates and loamy soils. Nests in rock heaps, stone walls, burrows, brush fences, and woodrat houses. About 3,209,200 acres of potentially suitable habitat occurs in the SEZ region.	136,695 acres of potentially suitable habitat lost (4.3% of available potentially suitable habitat)	315,008 acres of potentially suitable habitat (9.8% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a] Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a] Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Nongame (Small) Mammals (Cont.)				
Californian myotis (*Myotis californicus*)	Cliffs, deserts, forests, woodlands, grasslands, savannas, shrublands, and savannas. Often uses man-made structures for night roosts. Uses crevices for summer day roosts. May roost on small desert shrubs or on the ground. Hibernates in caves, mines, tunnels, or buildings. Maternity colonies in rock crevices, under bark, or under eaves of buildings. Common to abundant below 6,000 ft. About 4,078,900 acres of potentially suitable habitat occurs in the SEZ region.	140,772 acres of potentially suitable habitat lost (3.5% of available potentially suitable habitat)	425,353 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate
Canyon deermouse (*Peromyscus crinitus*)	Found in most desert and chaparral habitats. Gravelly desert pavement, talus, boulders, cliffs, and slickrock—rocky areas with virtually any type of plant cover. About 2,898,300 acres of potentially suitable habitat occurs in the SEZ region.	141,075 acres of potentially suitable habitat lost (4.9% of available potentially suitable habitat)	371,040 acres of potentially suitable habitat (12.8% of available potentially suitable habitat)	Moderate
Desert kangaroo rat (*Dipodomys deserti*)	Low deserts, deep wind-drifted sandy soil with sparse vegetation, alkali sinks, and shadscale or creosote bush scrub. Nests in burrows dug in mounds, usually under vegetation. About 722,200 acres of potentially suitable habitat occurs in the SEZ region.	51,774 acres of potentially suitable habitat lost (7.2% of available potentially suitable habitat)	95,311 acres of potentially suitable habitat (13.2% of available potentially suitable habitat)	Moderate

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Nongame (Small) Mammals (Cont.)				
Desert shrew (*Notiosorex crawfordi*)	Generally found in arid areas with adequate cover for nesting and resting. Deserts, semiarid grasslands with scattered cactus and yucca, chaparral slopes, alluvial fans, sagebrush, gullies, juniper woodlands, riparian areas, and dumps. About 4,334,000 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (3.7% of available potentially suitable habitat)	446,691 acres of potentially suitable habitat (10.3% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.
Desert woodrat (*Neotoma lepida*)	Sagebrush scrub; chaparral; deserts and rocky slopes with scattered cactus, yucca, pine-juniper, or other low vegetation; creosotebush desert; Joshua tree woodlands; scrub oak woodlands, pinyon-juniper woodlands; and riparian zones. Most abundant in rocky areas with Joshua trees. Dens built of debris on ground, among cacti or yucca, along cliffs, among rocks, or occasionally in trees. About 4,546,200 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (3.6% of available potentially suitable habitat)	579,200 acres of potentially suitable habitat (12.7% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]		Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
		Within SEZ (Direct Effects)[b]	Outside SEZ (Indirect Effects)[c]	
Nongame (Small) Mammals (Cont.)				
Little pocket mouse (*Perognathus longimembris*)	Common to abundant in southern California deserts. Preferred habitat includes desert riparian, desert scrub, desert wash, and sagebrush. Nests in an underground burrow. Sandy soil preferred for burrowing, but also commonly burrows on gravel washes and on stony soils. About 3,244,600 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (5.0% of available potentially suitable habitat)	330,661 acres of potentially suitable habitat (10.2% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.
Merriam's kangaroo rat (*Dipodomys merriami*)	Most widespread kangaroo rat in California. In southern California, it occurs in desert scrub and alkali desert scrub, sagebrush, Joshua tree, and pinyon-juniper habitats. Uses desert flats or slopes with sparse to moderate canopy coverage and sandy to gravelly subsrates. Uses underground burrows that are often located at the base of a shrub. About 3,290,800 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (4.9% of available potentially suitable habitat)	340,466 acres of potentially suitable habitat (10.3% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.
Southern grasshopper mouse (*Onychomys torridus*)	Hot, arid valleys and scrub deserts with sparse and scattered vegetation such as mesquite, creosotebush, cholla, yucca, and short grasses. Frequents scrub habitats with friable soils for digging. Also uses abandoned underground burrows. About 3,284,300 acres of potentially suitable habitat occurs in the SEZ region.	162,473 acres of potentially suitable habitat lost (4.9% of available potentially suitable habitat)	330,987 acres of potentially suitable habitat (10.1% of available potentially suitable habitat)	Moderate. No species-specific mitigation of direct effects is feasible because suitable habitat is widespread in the area of direct effect.

TABLE 9.4.11.3-1 (Cont.)

Common Name (Scientific Name)	Habitat	Maximum Area of Potential Habitat Affected[a]: Within SEZ (Direct Effects)[b]	Maximum Area of Potential Habitat Affected[a]: Outside SEZ (Indirect Effects)[c]	Overall Impact Magnitude[d] and Species-Specific Mitigation[e]
Nongame (Small) Mammals (Cont.)				
Spotted bat (*Euderma maculatum*)	Mostly found in the foothills, mountains, and desert regions of southern California. Roosts in caves and cracks or crevices in cliffs and canyons. About 3,863,400 acres of potentially suitable habitat occurs in the SEZ region.	140,772 acres of potentially suitable habitat lost (3.6% of available potentially suitable habitat)	425,601 acres of potentially suitable habitat (11.0% of available potentially suitable habitat)	Moderate
Western pipistrelle (*Parastrellus hesperus*)	Deserts and lowlands, desert mountain ranges, desert scrub flats, and rocky canyons. Roosts mostly in rock crevices, sometimes mines and caves, and rarely in buildings. Suitable roosts occur in rocky canyons and cliffs. Most abundant bat in desert regions. About 3,450,700 acres of potentially suitable habitat occurs in the SEZ region.	116,538acres of potentially suitable habitat lost (3.4% of available potentially suitable habitat)	355,587 acres of potentially suitable habitat (10.3% of available potentially suitable habitat)	Moderate

[a] Maximum area of potentially suitable habitat affected relative to total available potentially suitable habitat within the SEZ region (i.e., a 50-mi [80-km] radius from the center of the SEZ). Habitat availability was determined from potentially suitable land cover for each species (USGS 2004, 2005, 2007).

[b] Direct effects within the SEZ consist of ground-disturbing activities associated with construction and the maintenance of an altered environment associated with operations. A maximum of 162,473 acres would be developed in the SEZ.

[c] The area of indirect effects was assumed to be the area adjacent to the SEZ within 5 mi (8 km) of the SEZ boundary. Indirect effects include effects from surface runoff, dust, noise, lighting, etc., from the SEZ, but do not include ground-disturbing activities. The potential degree of indirect effects would decrease with increasing distance from the SEZ boundary.

Footnotes continued on next page.

TABLE 9.4.11.3-1 (Cont.)

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

[e] Species-specific mitigation is presented for those species that have particular habitat features that could be readily avoided. For species or individuals occurring outside the SEZ (in the area of indirect effects), no mitigation measures beyond required programmatic design features have been identified.

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

Sources: CDFG (2008); NatureServe (2010); USGS (2004, 2005, 2007).

Direct impacts on small game, furbearers, and nongame (small) mammal species would be moderate, ranging from 3.3 to 7.2% of potentially suitable habitats lost for the representative species listed in Table 9.4.11.3-1. Larger areas of suitable habitat for mammal species occur within the area of potential indirect effects (e.g., ranging from 9.2% for the American badger and round-tailed ground squirrel to 19.3% for the desert bighorn sheep). Other impacts on mammals could result from collision with fences and vehicles, surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, noise, lighting, spread of invasive species, accidental spills, and harassment. These indirect impacts are expected to be negligible with implementation of programmatic design features.

Decommissioning of facilities and reclamation of disturbed areas after operations cease could result in short-term negative impacts on individuals and habitats adjacent to project areas, but long-term benefits would accrue if suitable habitats were restored in previously disturbed areas. Section 5.10.2.1.4 provides an overview of the impacts of decommissioning and reclamation on wildlife. Of particular importance for mammal species would be the restoration of original ground surface contours, soils, and native plant communities associated with semiarid shrublands.

9.4.11.3.3 SEZ-Specific Design Features and Design Feature Effectiveness

The implementation of required programmatic design features described in Appendix A, Section A.2.2, would reduce the potential for effects on mammals. While some SEZ-specific design features are best established when project details are considered, design feature that can be identified at this time include the following:

- The fencing around the solar energy development should not block the free passage of mule deer between the Colorado River and mountains or foothills.

- To the extent practicable, ephemeral drainages, Ford Dry Lake and Palen Lake, wetlands, and the CRA should be avoided.

If these SEZ-specific design features are implemented in addition to programmatic design features, impacts on mammal species could be reduced. However, because potentially suitable habitats for a number of the mammal species occur throughout much of the SEZ, additional species-specific mitigation of direct effects for those species would be difficult or infeasible.

9.4.11.4 Aquatic Biota

9.4.11.4.1 Affected Environment

This section addresses aquatic habitats and biota known to occur on the proposed Riverside East SEZ itself or within an area that could be affected, either directly or indirectly, by activities associated with solar energy development within the SEZ. There are no perennial streams within the proposed Riverside East SEZ, but the intermittent McCoy Wash is present. McCoy Wash carries substantial flow, but there is little information on aquatic communities, if present. Palen Lake and Ford Dry Lake are the only water bodies within the SEZ, with approximately 745 acres (3 km^2) of Palen Lake located on the western side of the SEZ, and 3,945 acres (16 km^2) of Ford Dry Lake located in the center of the SEZ. Both Palen Lake and Ford Dry Lake are intermittent and rarely have standing water, but temporary ponding may occur especially in Palen Lake, which has groundwater located near the surface. As described in Section 9.4.9.1.1, there are also 3,807 acres (15 km^2) of wetland within the SEZ. However, wetlands near dry lakes rarely have water (USFS 1998), and the NWI classifies these wetlands as intermittently flooded, indicating that surface water is usually absent but may be present for variable periods. Although site-specific data are s not available, Palen Lake, Ford Dry Lake, and wetlands may contain aquatic biota adapted to desiccating conditions (Graham 2001). On the basis of information from ephemeral pools in the American Southwest, ostracods (seed shrimp) and small planktonic crustaceans (e.g., copepods or cladocerans) are expected to be present, and larger branchiopod crustaceans such as fairy shrimp could occur (Graham 2001). Various types of insects that have aquatic larval stages, such as dragonflies and a variety of midges and other fly larvae, may also occur depending on pool longevity, distance to permanent water features, and the abundance of other invertebrates for prey (Graham 2001). However, more site-specific data are needed to fully evaluate the extent to which aquatic biota are present.

There are no natural perennial stream features within the area of indirect effects. However, 31 mi (50 km) of the CRA is present, primarily along the western edge of the SEZ. The aqueduct diverts water west from the Colorado River at Lake Havasu, located approximately 44 mi (71 km) from the Riverside East SEZ. The aqueduct may support populations of non-native fish common to the lower Colorado River, including striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), carp (*Cyprinus carpio*), flathead catfish (*Pylodictis olivaris*), channel catfish (*Ictalurus punctatus*), sunfish (*Lepomis* spp.), and tilapia (*Tilapia* spp.; Mueller and Marsh 2002). Native fish are relatively rare in the lower Colorado River because of overfishing, predation by non-native species, and human alteration of streams and rivers (Mueller and Marsh 2002), and endangered species native to the Colorado River are not expected to occur (see Section 9.4.12). Although aquatic organisms may be present in the CRA, periodic chlorination and draining used to control the population of the invasive quagga mussel (*Dreissena rostriformis bugensis*) (USGS 2008a) makes the aqueduct unsuitable for aquatic organisms. Palen Lake and Ford Dry Lake are the only water bodies present in the area of indirect effects. A total of approximately 3,516 acres (14 km^2) and 460 acres (2 km^2) of Palen Lake and Ford Dry Lake, respectively, are located within the area of potential indirect effects. Approximately 7,757 acres (31 km^2) of wetlands is also located in the area of potential indirect effects. As described above, Ford Dry Lake, Palen Lake, and associated wetlands are typically dry but may support aquatic communities when water is present.

Outside of the potential indirect effects area, but within 50 mi (80 km) of the SEZ, there are several lake and reservoir habitats totaling approximately 62,143 acres (251 km^2). Of this total, 15,998 acres (65 km^2) is permanent lake (Salton Sea), 10,160 acres (41 km^2) is intermittent lake, and 35,984 (146 km^2) is dry lake. Dammed portions of the Colorado River are also present and total 51,004 acres (206 km^2). There are also several stream features including 124 mi (200 km) of the CRA, 74 mi (119 km) of canals, and 168 mi (270 km) of intermittent streams.

Within the SEZ and the area of potential indirect effects, intermittent lakes are the only surface water features present, representing approximately 46% of the amount of intermittent lake available within the overall analysis area.

9.4.11.4.2 Impacts

The types of impacts that could occur on aquatic habitats and biota from development of utility-scale solar energy facilities are discussed in Section 5.10.2.4. Effects particularly relevant to aquatic habitats and communities are water withdrawal and changes in water, sediment, and contaminant inputs associated with runoff.

No permanent water bodies or streams are present within the boundaries of the Riverside East SEZ. Therefore, no direct impacts on these features are expected. The intermittent streams, wetlands, and dry lakes present within the SEZ could be affected by ground disturbance and runoff of water and sediment from the SEZ, especially if ground disturbance occurred near Palen Lake and Ford Dry Lake (see Section 9.4.9). The intermittent streams, dry lakes, and associated wetlands present in the SEZ are typically dry but may support aquatic communities on a seasonal basis. More detailed site surveys of ephemeral and intermittent surface waters would be needed to determine whether solar energy development activities would result in direct or indirect impacts on aquatic biota. See Section 5.10.3 for a detailed description of potential impacts to aquatic biota resulting from solar energy development activities. Avoiding intermittent surface water features within the SEZ as well as the implementation of commonly used engineering practices to control water runoff and sediment deposition into surface water features would minimize the potential for impacts on aquatic organisms.

The man-made CRA is within 5 mi (8 km) of the SEZ and could be indirectly affected by development and operation of solar energy facilities. Aquatic organisms present in these habitat features could be affected by airborne particulate deposition originating from the SEZ, especially if ground disturbance occurred along the SEZ's western boundary (Section 5.10.2.4). Runoff from the SEZ into the CRA would not occur, because the aqueduct is leveed, and natural drainage patterns would carry surface water away from the aqueduct.

As identified in Section 5.9, water quality in aquatic habitats could be affected by the introduction of contaminants such as fuels, lubricants, or pesticides/herbicides during site characterization, construction, operation, or decommissioning for a solar energy facility. There is the potential for contaminants from solar energy development activities within the SEZ to enter McCoy Wash, Palen Lake, Ford Dry Lake, and wetlands within the SEZ, especially if heavy machinery is used in or near these features. The aqueduct runs along the western border of the Riverside East SEZ, but contamination from solar development activities in the SEZ would not occur, because it is leveed and natural drainage patterns would carry runoff away from the CRA.

In arid environments, reductions in the quantity of water in aquatic habitats are of particular concern. Water quantity in aquatic habitats could also be affected if significant amounts of surface water or groundwater were utilized for power plant cooling water, for washing mirrors, or for other needs. The greatest need for water would occur if technologies employing wet cooling, such as parabolic trough or power tower, were developed at the site; the associated impacts would ultimately depend on the water source used (including groundwater from aquifers at various depths). As identified in Section 9.4.9.1.3, it seems unlikely that approval could be obtained to withdraw water from the CRA. Nevertheless, the aqueduct itself is poor habitat and supports no important aquatic species. Obtaining cooling water from other perennial surface water features in the region could affect water levels and, as a consequence, aquatic organisms in those water bodies. Additional details regarding the volume of water required and the types of organisms present in potentially affected water bodies would be required in order to further evaluate the potential for impacts from water withdrawals.

9.4.11.4.3 SEZ-Specific Design Features and Design Feature Effectiveness

The implementation of required programmatic design features described in Appendix A, Section A.2.2, could greatly reduce or eliminate the potential for effects on aquatic biota and aquatic habitats from development and operation of solar energy facilities. While some SEZ-specific design features are best established when project details are being considered, a design feature that can be identified at this time is as follows:

- Ground disturbance near McCoy Wash, Palen Lake, Ford Dry Lake and wetlands should be avoided or minimized to the extent practicable.

If this design feature is implemented in addition to programmatic project design features 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 and habitats from solar energy development at the Riverside East SEZ would be negligible.

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9.4.12 Special Status Species (Threatened, Endangered, Sensitive, and Rare Species)

This section addresses special status species that are known to occur, or for which suitable habitat occurs, on or within the potentially affected area of the proposed Riverside East SEZ. Special status species include the following types of species:[5]

- Species listed as threatened or endangered under the ESA;
- Species that are proposed for listing, under review, or are candidates for listing under the ESA;
- Species that are listed as threatened or endangered by the State of California under the CESA, or that are identified as fully protected by the state[6];
- Species that are listed by the BLM as sensitive; and
- Species that have been ranked by the states of California or Arizona as S1 or S2, or species of concern by the State of California or the USFWS; hereafter referred to as "rare" species. Arizona does not maintain a separate list of species of concern.

Special status species known to occur within 50 mi (80 km) of the Riverside East SEZ center (i.e., the SEZ region) were determined from natural heritage records available through NatureServe Explorer (NatureServe 2010), information provided by the CDFG (2010c), CNDDB (CDFG 2010b), CAReGAP (Davis et al. 1998, USGS 2010d), and SWReGAP (USGS 2004, 2005, 2007). Information reviewed consisted of county-level occurrences as determined from NatureServe, point and polygon element occurrences as determined from CNDDB, and modeled land cover types and predicted suitable habitats for the species within the 50-mi (80-km) region as determined from CAReGAP and SWReGAP. The 50-mi (80-km) SEZ region intersects Imperial, Riverside, and San Bernardino Counties, California, and La Paz and Yuma Counties, Arizona. However, the SEZ and affected area occur only in eastern Riverside County, California. See Appendix M for additional information on the approach used to identify species that could be affected by development within the SEZ.

9.4.12.1 Affected Environment

The affected area considered in this assessment included the areas of direct and indirect effects. The area of direct effects was defined as the area that would be physically modified during project development (i.e., where ground-disturbing activities would occur). For the

[5] See Section 4.6.4 for definitions of these species categories. Note that some of the categories of species included here do not fit BLM's definition of special status species as defined in BLM Manual 6840 (BLM 2008c). These species are included here to ensure broad consideration of species that may be most vulnerable to impacts.

[6] State-listed species are those listed as threatened or endangered under the CESA; California fully protected species are species that receive the strictest take provisions as identified by the CDFG.

Riverside East SEZ, the area of direct effect was limited to the SEZ itself. Because of the proximity of existing infrastructure, the impacts of construction and operation of transmission lines outside the SEZ are not assessed, assuming that the existing transmission infrastructure might be used to connect some new solar facilities to load centers, and that additional project-specific analysis would be conducted for new transmission construction or line upgrades. Similarly, the impacts of construction of or upgrades to access roads were not assessed for this SEZ because of the proximity of State Route 62 (see Section 9.4.1.2 for a discussion of development assumptions for this SEZ). The area of indirect effects was defined as the area within 5 mi (8 km) of the SEZ boundary where ground-disturbing activities would not occur but that could be indirectly affected by activities in the area of direct effect. Indirect effects considered in the assessment included effects from surface runoff, dust, noise, lighting, and accidental spills from the SEZ, but do not include ground-disturbing activities. The potential magnitude of indirect effects would decrease with increasing distance away from the SEZ. This area of indirect effect was identified on the basis of professional judgment and was considered sufficiently large to bound the area that would potentially be subject to indirect effects. The affected area includes both the direct and indirect effects areas.

The primary habitat type within the affected area is Sonora-Mojave creosotebush-white bursage desert scrub (see Section 9.4.10). Potentially unique habitats in the affected area in which special status species may reside include desert dunes, cliffs and rock outcrops, desert washes, playa habitats, and other aquatic habitats such as the CRA. Dry lake playas in the affected area include Ford Dry Lake and Palen Lake. Palen Lake is located in the western portion of the SEZ; Ford Lake is in the center of the SEZ. The CRA is located along the western border of the SEZ (Figure 9.4.12.1-1). There are a number of desert washes on the SEZ that may provide habitat for unique plant assemblages as identified in the Northern and Eastern Colorado (NECO) Management Plan (BLM and CDFG 2002).

All special status species that are known to occur within the Riverside East SEZ region (i.e., within 50 mi [80 km] of the center of the SEZ) are listed, with their status, nearest recorded occurrence, and habitats, in Appendix J. Of these species, there are 69 that could be affected by solar energy development within the SEZ, based on recorded occurrences or the presence of potentially suitable habitat in the area. These species, their status, and their habitats are presented in Table 9.4.12.1-1. For many of the species listed in the table, their predicted potential occurrence in the affected area is based only on a general correspondence between mapped CAReGAP land cover types and descriptions of species habitat preferences. This overall approach to identifying species in the affected area probably overestimates the number of species that actually occur in the affected area. For many of the species identified as having potentially suitable habitat in the affected area, the nearest known occurrence is over 20 mi (32 m) away from the SEZ.

Based on CNDDB records and information provided by the CDFG and USFWS, there are 29 special status species known to occur within the affected area of the Riverside East SEZ: Abrams’ spurge, bitter hymenoxys, California ditaxis, California satintail, desert spike-moss, dwarf germander, Emory’s crucifixion thorn, glandular ditaxis, Harwood’s milkvetch, jackass-clover, Orocopia sage, pink fairy-duster, spear-leaf matelea, Wiggins’ cholla, California McCoy snail, Bradley’s cuckoo wasp, Riverside cuckoo wasp, desert tortoise, Bendire’s thrasher, crissal thrasher, western burrowing owl, Arizona myotis, California leaf-nosed bat, cave myotis, Colorado Valley woodrat, Nelson's bighorn sheep, pallid bat, Townsend's big-eared bat, and western mastiff bat. Of these species, the desert tortoise is listed as threatened under the ESA. Nine of these species are listed as BLM-designated sensitive; the remaining 19 species are considered rare. Designated critical habitat for the desert tortoise occurs within the affected area in the Chuckwalla DWMA adjacent to the southern boundary of the SEZ. There are no groundwater-dependent species in the vicinity of the SEZ based upon CNDDB records, comments provided by the USFWS (Stout 2009), and the evaluation of groundwater resources in the Riverside East SEZ region (Section 9.4.9).

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

There is one species listed under the ESA that may occur in the affected area of the Riverside East SEZ: the desert tortoise. The Mojave population of the desert tortoise, which includes all populations in California, is listed as a threatened species under the ESA. The desert tortoise is also listed as a threatened species under the CESA. This species is discussed below; additional basic information on life history, habitat needs, and threats to populations of this species is provided in Appendix J. CNDDB records indicate disjunct occurrences of the Coachella Valley milkvetch in the Chuckwalla Valley within the affected area of the SEZ. The Coachella Valley milkvetch is listed as endangered under the ESA. However, the USFWS has confirmed that those occurrences do not belong to the Coachella Valley milkvetch; the nearest known occurrences of this species are from the Coachella Valley, approximately 45 mi (72 km) west of the SEZ. It is unlikely for the Coachella Valley milkvetch to occur in the affected area of the Riverside East SEZ.

In scoping comments on the Riverside East SEZ, the USFWS expressed concern for impacts of solar facilities within the SEZ on the desert tortoise (Stout 2009). This species has the potential to occur within the SEZ based on observed occurrences on and near the SEZ, the presence of designated critical habitat within the area of indirect effects, and the presence of potentially suitable habitat in the SEZ (Figure 9.4.12.1-1; Table 9.4.12.1-1).

The desert tortoise occurs in Joshua Tree NP and the Chuckwalla DWMA, which are adjacent to the western and southern boundary of the proposed Riverside East SEZ. In 2007, surveys for desert tortoises conducted by the USFWS Desert Tortoise Recovery Office indicated a desert tortoise density of about 3.5 and 5.0 individuals/km^2 within Joshua Tree NP and the Chuckwalla DWMA, respectively (Stout 2009). Because the SEZ exists at lower elevations, desert tortoise densities within the SEZ are likely lower than those within the surrounding DWMAs. The SEZ also shares greater connectivity with the Pinto Basin near the Joshua Tree NP. For these reasons, the USFWS used the lower density estimate from the Joshua Tree NP (3.5 individuals/km^2) to estimate that the SEZ may support up to 2,865 desert tortoises.

CNDDB records desert tortoises located within the eastern and western portions of the SEZ (Figure 9.4.12.1-1). According to the CAReGAP habitat suitability model, potentially suitable habitat for the species occurs throughout the majority of the SEZ and the area of indirect

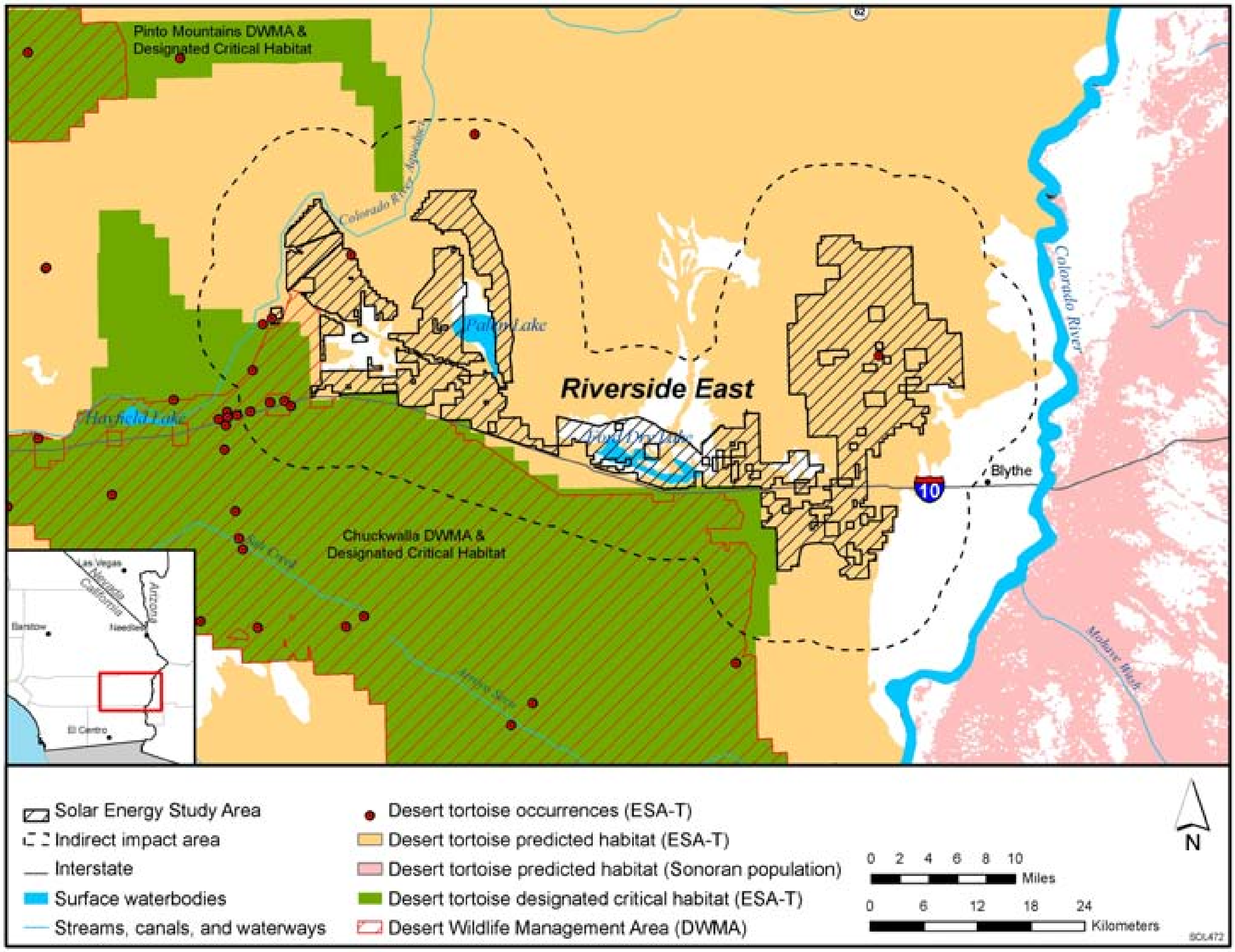

FIGURE 9.4.12.1-1 Known or Potential Occurrences of Species Listed as Endangered or Threatened under the ESA That May Occur in the Proposed Riverside East SEZ Affected Area (Sources: CDFG 2010b; Davis et al. 1998, 2007)

TABLE 9.4.12.1-1 Habitats, Potential Impacts, and Potential Mitigation for Special Status Species That Could Be Affected by Solar Energy Development on the Proposed Riverside East SEZ

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants						
Abrams' spurge	*Chamaesyce abramsiana*	CA-S1	Sandy substrates within creosotebush scrub communities in the Mojave and Sonoran Deserts at elevations below 3,000 ft.[h] Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla DWMA, about 1 mi south of the SEZ. About 2,215,155 acres[i] of potentially suitable habitat occurs within the SEZ region.	109,933 acres of potentially suitable habitat lost (5.0% of available suitable habitat)	229,999 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of occupied habitats on the SEZ; translocation of individuals from areas of direct effect; or compensatory mitigation of direct effects on occupied habitats could reduce impacts. Note that these potential mitigations apply to all special status plants.
Alkali mariposa-lily	*Calochortus striatus*	BLM-S; CA-S2; FWS-SC	Alkaline seeps, springs, and meadows at elevations between 2,600 and 4,600 ft. Nearest recorded occurrences are 40 mi west of the SEZ. About 68,658 acres of potentially suitable habitat occurs within the SEZ region.	1,570 acres of potentially suitable habitat lost (2.3% of available suitable habitat)	828 acres of potentially suitable habitat (1.2% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert playa habitat on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c] Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c] Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Bitter hymenoxys[j]	***Hymenoxys odorata***	CA-S2	Sandy substrates within riparian and Sonoran Desert scrub communities, also within open flats, mesquite flats, ditches and drainage areas, and along roads and streams. Elevation ranges between 150 and 500 ft. Known to occur in the affected area. Nearest recorded occurrences are 5 mi east of the SEZ. About 2,657,966 acres of potentially suitable habitat occurs within the SEZ region.	138,283 acres of potentially suitable habitat lost (5.2% of available suitable habitat)	324,557 acres of potentially suitable habitat (12.2% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
California ditaxis	***Ditaxis serrata* var. *californica***	CA-S2	Sonoran Desert scrub and creosotebush scrub communities at elevations between 100 and 3,300 ft. Known to occur in the affected area. Nearest recorded occurrence is near the CRA, approximately 2 mi west of the SEZ. About 2,514,766 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,102 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
California satintail	***Imperata brevifolia***	CA-S2	Chaparral, coastal sage scrub, creosotebush, desert scrub, mesic riparian scrub, and alkaline meadow and seep communities. Elevation ranges between 0 and 1,650 ft. Known to occur in the affected area. Nearest recorded occurrences are 5 mi east of the SEZ. About 2,526,349 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
California saw-grass	*Cladium californicum*	CA-S2	Alkaline, freshwater, and riparian habitats including meadows, marshes, swamps, and seeps. Elevation ranges between 200 and 2,000 ft. Nearest recorded occurrence is from the vicinity of the Salton Sea, approximately 30 mi southwest of the SEZ. About 117,240 acres of potentially suitable habitat occurs within the SEZ region.	1,793 acres of potentially suitable habitat lost (1.5% of available suitable habitat)	1,162 acres of potentially suitable habitat (1.0% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert playa and wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	BLM-S; CA-S2	Endemic to southern California. Inhabits chaparral desert sand dunes at elevations between 350 and 5,250 ft. Historically occurred on and in the vicinity of the SEZ; the species has not been recorded in the project area since 1964. Most recent recorded occurrences are 23 mi from the SEZ. About 84,357 acres of potentially suitable habitat occurs within the SEZ region.	26,798 acres of potentially suitable habitat lost (31.8% of available suitable habitat)	15,987 acres of potentially suitable habitat (19.0% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to desert dunes and sand transport systems on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Coves' cassia	*Senna covesii*	CA-S2	Sonoran Desert dry washes and slopes with sandy substrates within desert scrub and creosotebush scrub communities. Elevation ranges between 1,000 and 3,500 ft. Nearest recorded occurrence is 15 mi from the SEZ. About 3,164,051 acres of potentially suitable habitat occurs within the SEZ region.	136,472 acres of potentially suitable habitat lost (4.3% of available suitable habitat)	314,674 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Creamy blazing star	*Mentzelia tridentata*	BLM-S; CA-S2	Mojave desert creosotebush scrub communities on rocky and sandy substrates at elevations below 3,900 ft. Nearest recorded occurrences are 45 mi west of the SEZ. About 2,215,155 acres of potentially suitable habitat occurs within the SEZ region.	109,933 acres of potentially suitable habitat lost (5.0% of available suitable habitat)	229,999 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Desert pincushion	*Coryphantha chlorantha*	CA-S1	Gravelly bajadas, limestone, or dolomite rocky slopes associated with desert scrub communities within pinyon-juniper woodlands and Joshua tree woodlands. Elevation ranges between 148 and 7,875 ft. Nearest recorded occurrence is 30 mi from the SEZ. About 2,526,161 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Desert spike-moss	***Selaginella eremophila***	CA-S2	Gravelly or rocky slopes within creosotebush scrub and Sonoran desert scrub communities. Elevation ranges between 650 and 2,950 ft. Known to occur in the affected area. Nearest recorded occurrence is 5 mi south of the SEZ. About 2,514,766 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,102 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Dwarf germander	***Teucrium cubense* ssp. *depressum***	CA-S2	Desert dunes, playas, riparian, creosotebush scrub, and desert scrub communities. Elevation ranges between 150 and 1,300 ft. Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla DWMA, about 1 mi south of the SEZ. About 2,727,570 acres of potentially suitable habitat occurs within the SEZ region.	140,087 acres of potentially suitable habitat lost (5.1% of available suitable habitat)	252,499 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to playas and desert dunes and sand transport systems could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Emory's crucifixion-thorn	***Castela emoryi***	CA-S2	Slightly wet alluvial bottomlands associated with basalt flows within Mojave Desert scrub, non-saline playas, creosotebush scrub, and Sonoran Desert scrub communities. Elevation ranges between 295 and 2,200 ft. Known to occur in the affected area. Nearest recorded occurrence is about 1 mi from the western portion of the SEZ. About 2,594,668 acres of potentially suitable habitat occurs within the SEZ region.	113,066 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	236,178 acres of potentially suitable habitat (9.1% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to playas could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Giant spanish-needle	*Palafoxia arida* var. *gigantea*	BLM-S; CA-S1	Desert sand dune habitats at elevations below 330 ft. Nearest recorded occurrences are 40 mi south of the SEZ. Suitable habitat may exist on the site. About 84,168 acres of potentially suitable habitat occurs within the SEZ region.	26,798 acres of potentially suitable habitat lost (31.8% of available suitable habitat)	15,987 acres of potentially suitable habitat (19.0% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to desert dunes and sand transport systems on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Glandular ditaxis	***Ditaxis claryana***	CA-S1	Sandy substrates within desert scrub communities at elevations below 1,525 ft. Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla DWMA, approximately 2 mi south of the SEZ. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Harwood's eriastrum	*Eriastrum harwoodii*	BLM-S; CA-S2	Known from fewer than 20 occurrences in southern California on desert dunes and other sandy habitats at elevations between 650 and 3,000 ft. Nearest recorded occurrence is 15 mi northwest of the SEZ in the Pinto Mountains DWMA. About 84,168 acres of potentially suitable habitat occurs within the SEZ region.	26,798 acres of potentially suitable habitat lost (31.8% of available suitable habitat)	15,987 acres of potentially suitable habitat (19.0% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to dunes and sand transport systems could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Harwood's milkvetch	***Astragalus insularis* var. *harwoodii***	CA-S2	Sonoran Desert of Arizona and California on sandy or gravelly substrates of desert dunes within desert scrub communities. Elevation ranges between 0 and 2,325 ft. Known to occur on the SEZ and in other portions of the affected area. About 2,610,178 acres of potentially suitable habitat occurs within the SEZ region.	138,294 acres of potentially suitable habitat lost (5.3% of available suitable habitat)	251,337 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Jackass-clover	***Wislizenia refracta* ssp. *refracta***	CA-S1	Mojave and northern Sonoran Deserts in dunes, sandy washes, roadsides, and playas within creosotebush scrub, alkali sink, or desert scrub communities. Elevation ranges between 2,000 and 2,600 ft. Known to occur in wash habitats in the western portion of the SEZ near Palen Lake. About 813,288 acres of potentially suitable habitat occurs within the SEZ region.	53,991 acres of potentially suitable habitat lost (6.6% of available suitable habitat)	99,483 acres of potentially suitable habitat (12.2% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to dunes and sand transport systems, playas, or washes could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Latimer's woodland-gilia	*Saltugilia latimeri*	BLM-S; CA-S2	Mojave Desert scrub communities, pinyon-juniper woodlands, and washes on rocky or sandy substrates at elevations between 1,300 and 6,500 ft. Nearest recorded occurrence is 30 mi west of the SEZ. About 2,920,277 acres of potentially suitable habitat occurs within the SEZ region.	136,472 acres of potentially suitable habitat lost (4.7% of available suitable habitat)	314,674 acres of potentially suitable habitat (10.8% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	BLM-S; CA-S1	Known from fewer than 20 occurrences in southern California near Joshua Tree National Park in desert dunes and sandy flats with creosotebush scrub and Joshua tree woodland communities at elevations less than 6,900 ft. Nearest recorded occurrences are 30 mi west of the SEZ. About 84,168 acres of potentially suitable habitat occurs within the SEZ region.	26,798 acres of potentially suitable habitat lost (31.8% of available suitable habitat)	15,987 acres of potentially suitable habitat (19.0% of available potentially suitable habitat)	Large overall impact. Avoiding or minimizing disturbance to dunes and sand transport systems on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Lobed ground-cherry	*Physalis lobata*	CA-S1	Known from the northeastern Sonoran and southeastern Mojave Deserts in decomposed granitic substrates within creosotebush scrub, alkali sink, desert scrub, and playas communities. Elevation ranges between 1,650 and 2,600 ft. Nearest recorded occurrences are 20 mi northwest of the SEZ. About 2,594,668 acres of potentially suitable habitat occurs within the SEZ region.	113,066 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	236,178 acres of potentially suitable habitat (9.1% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Munz's cholla	*Opuntia munzii*	BLM-S; CA-S1	Gravelly or sandy to rocky soils, often on lower bajadas, washes, flats, hills and canyon sides in Sonoran Desert creosotebush shrub communities at elevations below 3,280 ft. Nearest recorded occurrences are from the Chuckwalla DWMA, approximately 20 mi south of the SEZ. About 4,187,934 acres of potentially suitable habitat occurs within the SEZ region.	171,716 acres of potentially suitable habitat lost (4.1% of available suitable habitat)	570,180 acres of potentially suitable habitat (13.6% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Narrow-leaved psorothamnus	*Psorothamnus fremontii* var. *attenuatus*	CA-S2	Volcanic substrates of slopes, flats, and canyons within Sonoran Desert scrub communities at elevations between 1,100 and 3,000 ft. Nearest recorded occurrences are from the vicinity of the Whipple Mountains, approximately 32 mi northeast of the SEZ. About 2,863,434 acres of potentially suitable habitat occurs within the SEZ region.	141,075 acres of potentially suitable habitat lost (4.9% of available suitable habitat)	370,466 acres of potentially suitable habitat (12.9% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Orocopia sage	***Salvia greatae***	BLM-S; CA-S2	Creosotebush scrub communities and dry washes at elevations less than 2,600 ft. Known to occur in the affected area. Nearest occurrences are from the Chuckwalla DWMA about 2 mi south of the SEZ. About 2,853,196 acres of potentially suitable habitat occurs within the SEZ region.	134,909 acres of potentially suitable habitat lost (4.7% of available suitable habitat)	309,323 acres of potentially suitable habitat (10.8% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Parish's club-cholla	*Grusonia parishii*	CA-S2	Silty, sandy, or gravelly flats, dunelets, and hills within Joshua tree woodlands, creosotebush scrub, and desert scrub communities. Elevation ranges between 100 and 5,000 ft. Nearest recorded occurrences are 10 mi west of the SEZ. About 2,995,669 acres of potentially suitable habitat occurs within the SEZ region.	169,461 acres of potentially suitable habitat lost (5.7% of available suitable habitat)	396,498 acres of potentially suitable habitat (13.2% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Pink fairy-duster	***Calliandra eriophylla***	CA-S2	Sandy or rocky substrates in creosote and desert scrub communities. Elevation ranges between 390 and 4,900 ft. Known to occur in the affected area. The species is known to occur in habitats along I-10 about 0.5 mi south of the SEZ. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Purple-nerve cymopterus	*Cymopterus multinervatus*	CA-S2	Sandy or gravelly slopes within desert scrub, Joshua tree woodland, and pinyon-juniper woodland communities. Elevation ranges between 2,600 and 5,900 ft. Nearest recorded occurrences are from San Bernardino County, California, approximately 40 mi northwest of the SEZ. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Saguaro cactus	*Carnegiea gigantea*	CA-S1	Endemic to the Sonoran Desert along the Colorado River from the Whipple Mountains to Laguna Dam. Rocky substrates within Sonoran desert scrub and creosotescrub communities at elevations between 160 and 4,900 ft. Nearest recorded occurrence is from the Palo Verde Mountains WA, approximately 10 mi south of the SEZ. About 2,863,434 acres of potentially suitable habitat occurs within the SEZ region.	141,075 acres of potentially suitable habitat lost (4.9% of available suitable habitat)	370,466 acres of potentially suitable habitat (12.9% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Salt Spring checkerbloom	*Sidalcea neomexicana*	CA-S2	Alkaline or mesic substrates within riparian wetlands, marshes, springs, chaparral, coastal scrub, coniferous forest, desert scrub, and playas habitats. Elevation ranges between 50 and 5,000 ft. Nearest recorded occurrences are approximately 40 mi northwest of the SEZ. About 2,643,589 acres of potentially suitable habitat occurs within the SEZ region.	113,289 acres of potentially suitable habitat lost (4.3% of available suitable habitat)	236,512 acres of potentially suitable habitat (8.9% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert playa and wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Sand evening-primrose	*Camissonia arenaria*	CA-S2	Sandy washes and rocky slopes within Sonoran desert scrub communities at elevations below 3,000 ft. Nearest recorded occurrence is 13 mi south of the SEZ in the Chuckwalla DWMA. About 3,501,475 acres of potentially suitable habitat occurs within the SEZ region.	166,051 acres of potentially suitable habitat lost (4.7% of available suitable habitat)	449,790 acres of potentially suitable habitat (12.8% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance to desert wash habitats on the SEZ could reduce impacts. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Slender cottonheads	*Nemacaulis denudata* var. *gracilis*	CA-S2	Southern California within the Mojave and Sonoran Deserts on sandy soils within coastal dunes, desert dunes, creosotebush scrub, and desert scrub communities at elevations below 1,300 ft. Nearest recorded occurrences are 40 mi west of the SEZ. About 1,786,349 acres of potentially suitable habitat occurs within the SEZ region.	138,294 acres of potentially suitable habitat lost (7.7% of available suitable habitat)	251,337 acres of potentially suitable habitat (14.1% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Small-flowered androstephium	*Androstephium breviflorum*	CA-S1	Dry sandy to rocky soil substrates in desert dunes within creosotebush scrub and Mojavean desert scrub at elevations between 720 and 2,100 ft. Nearest occurrences are approximately 10 mi north of the SEZ. About 2,715,222 acres of potentially suitable habitat occurs within the SEZ region.	167,873 acres of potentially suitable habitat lost (6.2% of available suitable habitat)	386,701 acres of potentially suitable habitat (14.2% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Spear-leaf matelea	***Matelea parvifolia***	CA-S2	Endemic to southeastern California on rocky substrates within creosotebush and desert scrub communities at elevations between 1,450 and 3,600 ft. Known to occur in the affected area. Nearest recorded occurrences are 5 mi south of the SEZ in the Chuckwalla DWMA. About 2,526,160 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Thorny milkwort	*Polygala acanthoclada*	CA-S2	Loose, sandy or gravelly slopes within shadscale scrub, chenopod scrub, Joshua tree woodland, and pinyon-juniper woodland communities at elevations between 2,500 and 7,500 ft. Nearest recorded occurrences are 25 mi west of the SEZ. About 2,526,161 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Three-awned grama	*Bouteloua trifida*	CA-S2	Eastern Mojave Desert mountains on dry, rocky, often calcareous slopes within desert scrub communities. Elevation ranges between 2,300 and 6,500 ft. Nearest recorded occurrence is 40 mi north of the SEZ. About 2,282,236 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.9% of available suitable habitat)	235,350 acres of potentially suitable habitat (10.3% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
White-margined beardtongue	*Penstemon albomarginatus*	BLM-S; CA-S1; FWS-SC	Desert sand dune habitats and Mojave Desert scrub communities at elevations below 3,600 ft. Nearest recorded occurrences are 50 mi north of the SEZ. About 2,366,404 acres of potentially suitable habitat occurs within the SEZ region.	138,294 acres of potentially suitable habitat lost (5.8% of available suitable habitat)	251,337 acres of potentially suitable habitat (10.6% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c] Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c] Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Plants (Cont.)						
Wiggins' cholla	***Opuntia wigginsii***	CA-S1	Sandy substrates of small washes and flats within creosotebush scrub and Sonoran Desert scrub communities. Elevation ranges between 100 and 2,900 ft. Known to occur in the affected area. Nearest recorded occurrences are approximately 5 mi south of the SEZ. About 2,909,226 acres of potentially suitable habitat occurs within the SEZ region.	136,472 acres of potentially suitable habitat lost (4.7% of available suitable habitat)	314,426 acres of potentially suitable habitat (10.8% of available potentially suitable habitat)	Moderate overall impact. See Abrams' spurge for a list of potential mitigations applicable to all special status plant species.
Mollusks						
California McCoy snail	***Eremarionta rowelli mccoiana***	CA-S1	Known only from Riverside County, California within an area less than 40 mi^2 near the southern Palen/McCoy Wilderness. Lives terrestrially among rocks on talus slopes. Known to occur in the affected area. Nearest occurrences are from the Palen/McCoy Mountains within 1 mi north of the SEZ. About 949,247 acres of potentially suitable habitat occurs within the SEZ region.	5,640 acres of potentially suitable habitat lost (0.6% of available suitable habitat)	115,696 acres of potentially suitable habitat (12.2% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Arthropods						
Bradley's cuckoo wasp	*Ceratochrysis bradleyi*	CA-S1	Endemic to California where it is known only from eastern Riverside County in Sonoran Desert scrub, creosote-scrub, yucca and cholla cactus, saltbush, and desert dune communities. Known to occur in the affected area. Nearest recorded occurrence is 2 mi east of the SEZ. About 2,610,178 acres of potentially suitable habitat occurs within the SEZ region.	138,294 acres of potentially suitable habitat lost (5.3% of available suitable habitat)	251,337 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Cheeseweed owlfly	*Oliarces clara*	CA-S1; FWS-SC	Colorado River drainage of southwestern Arizona and southern California within creosote-scrub communities on or near bajadas at elevations below 330 ft. Nearest recorded occurrence is 10 mi north of the SEZ. About 2,215,155 acres of potentially suitable habitat occurs within the SEZ region.	109,933 acres of potentially suitable habitat lost (5.0% of available suitable habitat)	229,999 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]		Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
				Within SEZ (Direct Effects)[d]	Outside SEZ (Indirect Effects)[e]	
Arthropods (Cont.)						
Riverside cuckoo wasp	***Hedychridium argenteum***	CA-S1	Endemic to California where it is known only from eastern Riverside County in Sonoran Desert scrub, creosotebush scrub, yucca and cholla cactus, saltbush, and desert dune communities. The only known CNDDB occurrence for this species is within the SEZ near the southern border of the SEZ. About 2,610,178 acres of potentially suitable habitat occurs within the SEZ region.	138,294 acres of potentially suitable habitat lost (5.3% of available suitable habitat)	251,337 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Roberts' rhopalolemma bee	*Rhopalolemma robertsi*	CA-S1	Endemic to southern California from desert wash habitats in southern San Bernardino County. Nearest recorded occurrences are 35 mi west of the SEZ. About 637,257 acres of potentially suitable habitat occurs within the SEZ region.	24,976 acres of potentially suitable habitat lost (3.9% of available suitable habitat)	79,324 acres of potentially suitable habitat (12.4% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Amphibians						
Couch's spadefoot	*Scaphiopus couchii*	CA-S2; CA-SC	Scattered populations east of the Algodones Mountains north along the Colorado River in wetland habitats that include temporary pools, ponds, and puddles. Often occurs in arid and semiarid shrublands, shortgrass plains, mesquite savanna, creosotebush, thorn forest, and cultivated areas. Elevation ranges between 690 and 1,120 ft. Nearest recorded occurrences are 6 mi southeast of the SEZ. About 424,690 acres of potentially suitable habitat occurs within the SEZ region.	20,880 acres of potentially suitable habitat lost (4.9% of available suitable habitat)	62,922 acres of potentially suitable habitat (14.8% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Reptiles						
Desert tortoise	***Gopherus agassizii***	ESA-T; CA-T; CA-S2;	Mojave and Sonoran Deserts in desert creosote bush communities on firm soils for digging burrows, along riverbanks, washes, canyon bottoms, creosote flats, and desert oases. Known to occur on the SEZ (western and northeastern portions) and in the affected area. About 4,205,025 acres of potentially suitable habitat occurs within the SEZ region.	185,274 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	542,622 acres of potentially suitable habitat (12.9% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ, translocation of individuals from areas of direct effect, or compensatory mitigation of direct effects on occupied habitats could reduce impacts. The potential for impact and need for mitigation should be determined in consultation with the USFWS and CDFG.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Reptiles (Cont.)						
Mojave fringe-toed lizard	*Uma scoparia*	BLM-S; CA-SC	Sandy habitats in the Mojave Desert from Death Valley south to the Colorado River near Blythe, California and extreme western Arizona. Sparsely-vegetated desert areas with fine wind-blown sand, including dunes, flats, and washes at elevations below 3,000 ft. Nearest recorded occurrences are 25 mi north of the SEZ. About 1,840,628 acres of potentially suitable habitat occurs within the SEZ region.	140,506 acres of potentially suitable habitat lost (7.6% of available suitable habitat)	380,038 acres of potentially suitable habitat (20.6% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance of desert dunes and sand transport systems or washes could reduce impacts. In addition, pre-disturbance surveys and avoiding or minimizing disturbance of occupied habitats on the SEZ or compensatory mitigation of direct effects could reduce impacts.
Rosy boa	*Charina trivirgata*	BLM-S; FWS-SC	Southeastern California and western Arizona in scrublands, rocky deserts, and canyons with permanent or intermittent streams. Nearest recorded occurrences are from Joshua Tree NP, approximately 25 mi west of the SEZ. About 4,171,153 acres of potentially suitable habitat occurs within the SEZ region.	185,274 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	544,126 acres of potentially suitable habitat (13.0% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats on the SEZ, translocation of individuals from areas of direct effect, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds						
Bendire's thrasher	***Toxostoma bendirei***	BLM-S; CA-SC	Summer resident in the SEZ region in a variety of desert habitats with fairly large shrubs or cacti and open ground, or open woodland with scattered shrubs and trees, between 0 and 550 m elevation. Nearest recorded occurrence is 2 mi south of the SEZ in the Chuckwalla DWMA. About 2,526,161 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	235,350 acres of potentially suitable habitat (9.3% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Crissal thrasher	***Toxostoma crissale***	CA-SC; FWS-SC	Year-round resident in SEZ region in dense thickets of scrubs or low trees in desert riparian and desert wash habitats, and in washes within pinyon-juniper habitats. Nearest recorded occurrence is approximately 1 mi south of the SEZ. About 295,943 acres of potentially suitable habitat occurs within the SEZ region.	635 acres of potentially suitable habitat lost (0.2% of available suitable habitat)	13,309 acres of potentially suitable habitat (4.5% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Ferruginous hawk	*Buteo regalis*	BLM-S; FWS-SC	Winter resident and migrant in the SEZ region at lower elevations in open grasslands, shrublands, sagebrush flats, desert scrub, desert valleys, and fringes of pinyon-juniper habitats. Occurs in Riverside County, California in the SEZ region. About 1,978,858 acres of potentially suitable habitat occurs within the SEZ region.	112,197 acres of potentially suitable foraging habitat lost (5.7% of available suitable habitat)	287,942 acres of potentially suitable habitat (14.6% of available potentially suitable habitat)	Moderate overall impact on foraging habitat only. Avoidance of direct impacts on all foraging habitat is not feasible because suitable foraging habitat is widespread in the area of direct effects.
Gila woodpecker	*Melanerpes uropygialis*	CA-E; CA-S1	Year-round resident in the SEZ region along the Colorado River in desert riparian and desert wash habitats, orchards, vineyards, and urban habitats. Nearest recorded occurrence is from the Colorado River, approximately 6 mi east of the SEZ. About 297,582 acres of potentially suitable habitat occurs within the SEZ region.	0 acres	300 acres of potentially suitable habitat (0.1% of available potentially suitable habitat)	Small overall impact; no direct impact. No species-specific mitigation is needed.
Hepatic tanager	*Piranga flava*	CA-S1	Summer resident in SEZ region in open coniferous forests, montane pine-oak forests, riparian woodlands, and pine savanna. Nests high in coniferous or deciduous trees. Nearest recorded occurrences are 17 mi from the SEZ. About 3,283 acres of potentially suitable habitat occurs within the SEZ region.	223 acres of potentially suitable habitat lost (6.8% of available suitable habitat)	8 acres of potentially suitable habitat (0.2% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Loggerhead shrike	*Lanius ludovicianus*	CA-SC; FWS-SC	Breeds in SEZ region in open woodlands with moderate grass cover interspersed with areas of bare ground. Nearest recorded occurrences are approximately 10 mi south of the SEZ. About 3,635,415 acres of potentially suitable habitat occurs within the SEZ region.	202,050 acres of potentially suitable habitat lost (5.6% of available suitable habitat)	574,386 acres of potentially suitable habitat (15.8% of available potentially suitable habitat)	Moderate overall impact. Avoiding or minimizing disturbance of all woodland habitat on the SEZ would reduce or eliminate impacts. Alternatively, pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Lucy's warbler	*Vermivora luciae*	CA-S2; CA-SC	Riparian, chaparral, and hardwood woodlands having standing snags or hollow trees. Nonbreeding habitat includes dry washes and riparian forests. Nearest recorded occurrences are from the Colorado River, approximately 20 mi southeast of the SEZ. About 376,331 acres of potentially suitable habitat occurs within the SEZ region.	636 acres of potentially suitable habitat lost (0.2% of available suitable habitat)	15,966 acres of potentially suitable habitat (4.2% of available potentially suitable habitat)	Small overall impact. Avoiding or minimizing disturbance of all woodland and riparian habitat on the SEZ would reduce or eliminate impacts. Alternatively, pre-disturbance surveys and avoiding or minimizing disturbance to occupied habitats, especially nesting habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Western burrowing owl	*Athene cunicularia hypugaea*	BLM-S; CA-S2; CA-SC; FWS-SC	Year-round resident in the SEZ region. Open areas with short, sparse vegetation, including grasslands, agricultural fields, and disturbed areas. Nests in burrows created by mammals or tortoises. Known to occur in the affected area. Nearest occurrences are within 1 mi east of the SEZ. About 4,653,092 acres of potentially suitable habitat occurs within the SEZ region.	202,844 acres of potentially suitable habitat lost (4.4% of available suitable habitat)	652,982 acres of potentially suitable habitat (14.0% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of occupied burrows and habitats in the area of direct effects or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Arizona myotis	*Myotis occultus*	CA-S2; CA-SC; FWS-SC	Ponderosa pine and oak-pine woodlands in close proximity to water, and riparian forests within along the Colorado River. Known to occur in the affected area. Nearest recorded occurrences are 4 mi east of the SEZ. About 802,324 acres of potentially suitable habitat occurs within the SEZ region.	25,199 acres of potentially suitable habitat lost (3.1% of available suitable habitat)	79,658 acres of potentially suitable habitat (9.9% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.
California leaf-nosed bat	*Macrotus californicus*	BLM-S; CA-S2; CA-SC; FWS-SC	Year-round resident in SEZ region in desert riparian, desert wash, desert scrub, and palm oasis habitats at elevations below 2,000 ft. Roosts in mines, caves, and buildings. Known to occur in the affected area. Nearest recorded occurrences are from the Palen/McCoy Wilderness within 2 mi of the SEZ. About 3,973,317 acres of potentially suitable habitat occurs within the SEZ region.	142,335 acres of potentially suitable habitat lost (3.6% of available suitable habitat)	430,378 acres of potentially suitable habitat (10.8% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.
Cave myotis	*Myotis velifer*	BLM-S; CA-S1; CA-SC; FWS-SC	Year-round resident in SEZ region in desert scrub, shrublands, washes, and riparian habitats. Roosts in colonies in caves. Known to occur in the affected area. Nearest recorded occurrence is from the Mule Mountains ACEC about 2 mi south of the SEZ. About 4,136,719 acres of potentially suitable habitat occurs within the SEZ region.	142,335 acres of potentially suitable habitat lost (3.4% of available suitable habitat)	430,704 acres of potentially suitable habitat (10.4% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Colorado Valley woodrat	*Neotoma albigula venusta*	CA-S1	Low-lying desert, creosote-mesquite, and pinyon-juniper habitats. Distribution is strongly influenced by the availability of den-building materials, including litter of cholla, prickly pear, mesquite, and catclaw, as well as its low tolerance for cold temperatures. Known to occur in the affected area. Nearest recorded occurrences are on BLM lands about 1 mi southeast of the SEZ. About 3,066,791 acres of potentially suitable habitat occurs within the SEZ region.	167,910 acres of potentially suitable habitat lost (5.5% of available suitable habitat)	425,558 acres of potentially suitable habitat (13.9% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	BLM-S; FWS-SC	Open, steep rocky terrain in mountainous habitats of the eastern Mojave and Sonoran Deserts in California. Rarely uses desert lowlands, except as corridors for travel between mountain ranges. Known to occur in the affected area. Nearest recorded occurrences are from the Joshua Tree Wilderness and the Chuckwalla DWMA, about 2 mi north, west, and south of the SEZ. About 1,896,141 acres of potentially suitable habitat occurs within the SEZ region.	42,020 acres of potentially suitable habitat lost (2.2% of available suitable habitat)	223,604 acres of potentially suitable habitat (11.8% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of occupied habitats within the SEZ other habitats that serve as movement corridors could further reduce impacts.
Pallid bat	*Antrozous pallidus*	BLM-S; CA-SC; FWS-SC	Year-round resident in SEZ region in low-elevation desert communities, including grasslands, shrublands, and woodlands. Roosts in caves, crevices, and mines. Known to occur in the affected area. Nearest recorded occurrence is from the Chuckwalla Mountains Wilderness approximately 5 mi south of the SEZ. About 3,668,119 acres of potentially suitable habitat occurs within the SEZ region.	117,359 acres of potentially suitable habitat lost (3.2% of available suitable habitat)	351,380 acres of potentially suitable habitat (9.6% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Palm Springs pocket mouse	*Perognathus longimembris bangsi*	BLM-S; CA-S2; CA-SC	Creosote scrub, desert scrub, and grasslands on loose or sandy soils. Nearest recorded occurrence is from the Chuckwalla DWMA, approximately 25 mi west of the SEZ. About 3,749,649 acres of potentially suitable habitat occurs within the SEZ region.	198,472 acres of potentially suitable habitat lost (5.3% of available suitable habitat)	512,782 acres of potentially suitable habitat (13.7% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of occupied habitats on the SEZ or compensatory mitigation of direct effects on occupied habitats could reduce impacts.
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	CA-S2; CA-SC; FWS-SC	Year-round resident in SEZ region lowland areas including creosotebush and chaparral habitats in association with very large boulders, high cliffs, rugged rock outcroppings, and rocky canyons. Nearest recorded occurrences are 37 mi south of the SEZ. About 1,964,239 acres of potentially suitable habitat occurs within the SEZ region.	111,496 acres of potentially suitable habitat lost (5.7% of available suitable habitat)	235,350 acres of potentially suitable habitat (12.0% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.
Spotted bat	*Euderma maculatum*	BLM-S; CA-S2	Year-round resident in SEZ region in deserts, grasslands, and mixed coniferous forests at elevations below 10,000 ft. Roosts in caves, rock crevices, and buildings. Nearest recorded occurrence is 40 mi west of the SEZ. Suitable habitat exists on the site. About 2,363,936 acres of potentially suitable habitat occurs within the SEZ region.	111,719 acres of potentially suitable habitat lost (4.7% of available suitable habitat)	235,684 acres of potentially suitable habitat (10.0% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM-S; CA-S2; CA-SC; FWS-SC	Year-round resident in SEZ region in all habitats but subalpine and alpine habitats, and at any season. Roosts in caves, mines, tunnels, buildings, or other human-made structures. Known to occur in the affected area. Nearest recorded occurrences are approximately 4 mi southeast of the SEZ. About 5,065,765 acres of potentially suitable habitat occurs within the SEZ region.	202,912 acres of potentially suitable habitat lost (4.0% of available suitable habitat)	655,256 acres of potentially suitable habitat (12.9% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.
Western mastiff bat	*Eumops perotis californicus*	BLM-S; CA-SC; FWS-SC	Year-round resident in SEZ region in open semiarid habitats, including conifer and deciduous woodlands, shrublands, grasslands, chaparral, and urban areas. Roosts in crevices in cliff faces, buildings, and tall trees. Known to occur in the affected area. Nearest recorded occurrence is 5 mi south of the SEZ. About 4,069,881 acres of potentially suitable habitat occurs within the SEZ region.	202,912 acres of potentially suitable habitat lost (5.0% of available suitable habitat)	655,256 acres of potentially suitable habitat (16.1% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.
Western small-footed myotis	*Myotis ciliolabrum*	BLM-S; CA-S2	Year-round resident in SEZ region in woodland and riparian habitats at elevations below 9,000 ft. Roosts in caves, buildings, mines, and crevices of cliff faces. Nearest recorded occurrence is from the Chocolate Mountains, approximately 30 mi south of the SEZ. About 661,873 acres of potentially suitable habitat occurs within the SEZ region.	25,199 acres of potentially suitable habitat lost (3.8% of available suitable habitat)	79,658 acres of potentially suitable habitat (12.0% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]: Within SEZ (Direct Effects)[d]	Maximum Area of Potential Habitat Affected[c]: Outside SEZ (Indirect Effects)[e]	Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
Birds (Cont.)						
Western yellow bat	*Lasiurus xanthinus*	BLM-S; AZ-WSC; AZ-S2; CA-SC	Year-round resident in SEZ region in desert riparian, desert wash, and palm oasis habitats at elevations below 2,000 ft. Roosts in trees. Nearest recorded occurrence is from Blythe, California, approximately 6 mi east of the SEZ. About 1,340,978 acres of potentially suitable habitat occurs within the SEZ region.	25,199 acres of potentially suitable habitat lost (1.9% of available suitable habitat)	79,658 acres of potentially suitable habitat (5.9% of available potentially suitable habitat)	Moderate overall impact on mostly foraging habitat. Pre-disturbance surveys and avoiding or minimizing disturbance of discovered roost areas on the SEZ could reduce impacts.
Yuma hispid cotton rat	*Sigmodon hispidus eremicus*	AZ-S2; CA-S2; CA-SC; FWS-SC	Dense stands of vegetation near wetlands, herbaceous grasslands, and hardwood woodland communities especially dense grassy areas such as fields, marshes, and roadside edges, brushy areas along streams or ponds, irrigated fields, and desert scrub. Nearest recorded occurrences are 50 mi south of the SEZ. About 176,434 acres of potentially suitable habitat occurs within the SEZ region.	76 acres of potentially suitable habitat lost (<0.1% of available suitable habitat)	53,096 acres of potentially suitable habitat (30.1% of available potentially suitable habitat)	Small overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of occupied habitats on the SEZ, or compensatory mitigation of direct effects on occupied habitats could reduce impacts.

TABLE 9.4.12.1-1 (Cont.)

Common Name	Scientific Name	Listing Status[a]	Habitat[b]	Maximum Area of Potential Habitat Affected[c]		Overall Potential Impact Magnitude[f] and Species-Specific Mitigation[g]
				Within SEZ (Direct Effects)[d]	Outside SEZ (Indirect Effects)[e]	
Birds (Cont.)						
Yuma mountain lion	*Puma concolor browni*	CA-S1; CA-SC	Riparian bottomlands, cottonwood-willow forests, mesquite bosques, adjacent desert foothills, low rocky mountains, and canyons within desert, chaparral shrubland, and mixed woodland communities especially sites with dense vegetation, caves or other natural cavities, rocky outcrops ranging, and tree/brush edges. Elevation ranges between 1,000 and 3,500 ft. Nearest recorded occurrences are 25 mi south of the SEZ. About 2,833,446 acres of potentially suitable habitat occurs within the SEZ region.	185,274 acres of potentially suitable habitat lost (6.5% of available suitable habitat)	542,622 acres of potentially suitable habitat (19.2% of available potentially suitable habitat)	Moderate overall impact. Pre-disturbance surveys and avoiding or minimizing disturbance of habitats within the SEZ that serve as movement corridors could further reduce impacts.

[a] BLM-S = listed as a sensitive species by the BLM; CA-E = listed as endangered by the State of California; CA-S1 = ranked as S1 in the State of California; CA-S2 = ranked as S2 in the State of California; CA-T = listed as threatened by the State of California; ESA-T = listed as threatened under the ESA; ESA-UR = under review for listing under the ESA; FWS-SC = USFWS species of concern. An asterisk denotes that the listing status applies to populations only within the State of Arizona.

[b] For plant and invertebrate species, potentially suitable habitat was determined using CAReGAP and SWReGAP land cover types. For reptile, bird, and mammal species, potentially suitable habitat was determined using CAReGAP and SWReGAP habitat suitability models as well as CAReGAP and SWReGAP land cover models. Area of potentially suitable habitat for each species is presented for the SEZ region, defined as the area within 50 mi (80 km) of the SEZ center.

[c] Maximum area of potentially suitable habitat that could be affected relative to availability within the SEZ region. Habitat availability for each species within the region was determined using CAReGAP or SWReGAP habitat suitability and land cover models. This approach probably overestimates the amount of suitable habitat in the project area. Impacts of access road and transmission line construction, upgrade, or operation are not assessed in this evaluation because of the proximity of existing infrastructure to the SEZ.

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

[e] Area of indirect effects was assumed to be the area adjacent to the SEZ within 5 mi (8 km) of the SEZ boundary. Indirect effects include effects from surface runoff, dust, noise, lighting, etc., from the SEZ, but do not include ground-disturbing activities. The potential degree of indirect effects would decrease with increasing distance away from the SEZ.

Footnotes continued on next page.

TABLE 9.4.12.1-1 (Cont.)

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

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

[h] Elevations in the areas of direct and indirect effect range from about 230 ft (70 m) to 3,800 ft (1,160 m).

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

[j] Species in bold text have been recorded or have designated critical habitat in the affected area.

effects (Figure 9.4.12.1-1; Table 9.4.12.1-1). The USGS desert tortoise model (Nussear et al. 2009) indicates that the majority of the SEZ is composed of less suitable habitat than the surrounding landscape (modeled suitability value ≤0.5 out of 1.0).

Designated critical habitat for this species does not occur on the SEZ, but adjacent critical habitat occurs south of the SEZ in the area of indirect effects within the Chuckwalla DWMA. Designated critical habitat for the desert tortoise also occurs within the area of indirect effects northwest of the SEZ within the Pinto Mountains DWMA. The Riverside East SEZ is situated between the two DWMAs (Figure 9.4.12.1-1), and provides connectivity between them and other Wildlife Habitat Management Areas (WHMAs) defined in the BLM NECO Plan (BLM and CDFG 2002) to facilitate the movement of desert tortoises and increase genetic diversity (Stout 2009).

9.4.12.1.2 BLM-Designated Sensitive Species

There are 25 BLM-designated sensitive species that may occur in the affected area of the Riverside East SEZ (Table 9.4.12.1-1). These BLM-designated sensitive species include the following (1) plants: alkali mariposa-lily, chaparral sand-verbena, creamy blazing star, giant Spanish-needle, Harwood's eriastrum, Latimer's woodland-gilia, Little San Bernardino Mountains linanthus, Munz's cholla, Orocopia sage, and white-margined beardtongue; (2) reptiles: Mojave fringe-toed lizard and rosy boa; (3) birds: Bendire's thrasher, ferruginous hawk, and western burrowing owl; and (4) mammals: California leaf-nosed bat, cave myotis, Nelson's bighorn sheep, pallid bat, Palm Springs pocket mouse, spotted bat, Townsend's big-eared bat, western mastiff bat, western small-footed bat, and western yellow bat. Of these species, the Orocopia sage, Bendire's thrasher, western burrowing owl, California leaf-nosed bat, cave myotis, Nelson's bighorn sheep, pallid bat, Townsend's big-eared bat, and western mastiff bat have been recorded in the affected area. Habitats in which these species are found, the amount of potentially suitable habitat in the affected area, and known locations of the species relative to the SEZ are discussed below and presented in Table 9.4.12.1-1. Additional life history information for these species is provided in Appendix J.

Alkali Mariposa-Lily

The alkali mariposa-lily is a perennial forb in the lily family that is known only from wetlands in the western Mojave Desert region of southern California. It inhabits alkaline seeps, springs, and meadows. The species is not known to occur on the SEZ, but potentially suitable habitat does occur there and in other portions of the affected area (Table 9.4.12.1-1). The nearest known occurrence of the species is about 40 mi (64 km) west of the Riverside East SEZ.

Chaparral Sand-Verbena

The chaparral sand-verbena is a flowering for that is endemic to southern California. It historically occurred in the vicinity of the Riverside East SEZ and within the area of indirect effects. The most recent recorded occurrences for this species are 23 mi (37 km) west of the SEZ. Although the species has not been recently recorded near the SEZ, potentially suitable sand dune habitat does occur there and in other portions of the affected area (Table 9.4.12.1-1).

Creamy Blazing-Star

The creamy blazing-star is an annual forb in the aster family that is endemic to the Mojave Desert in southern California. It inhabits desert creosotebush scrub communities on rocky and sandy substrates. The species is not known to occur on the SEZ, but potentially suitable habitat does occur there and in other portions of the affected area (Table 9.4.12.1-1). The nearest known occurrence of the species is about 45 mi (72 km) west of the Riverside East SEZ.

Giant Spanish-Needle

The giant Spanish-needle is a flowering forb endemic to sand dune habitats in the Sonoran Desert of southern California and southwestern Arizona. Populations are known to occur as near as 40 mi (64 km) south of the SEZ. Populations are not known to occur on the Riverside East SEZ, but suitable desert dune habitats may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Harwood's Eriastrum

The Harwood's eriastrum is an annual forb that is known only from the Mojave Desert in southern California where it inhabits desert dunes. The species is not known to occur on the SEZ, but potentially suitable habitat does occur there and in other portions of the affected area (Table 9.4.12.1-1). The nearest known occurrence of the species is about 15 mi (24 km) northwest of the Riverside East SEZ in the Pinto Mountains DWMA.

Latimer's Woodland-Gilia

The Latimer's woodland-gilia is an annual forb in the phlox family that is endemic to southern California from San Bernardino and Riverside Counties. It inhabits desert scrub, washes, and pinyon-juniper woodland communities on rocky or sandy substrates. The species is not known to occur on the SEZ, but potentially suitable habitat does occur there and in other portions of the affected area (Table 9.4.12.1-1). The nearest known occurrence of the species is about 30 mi (48 km) west of the Riverside East SEZ.

Little San Bernardino Mountains Linanthus

The Little San Bernardino Mountains linanthus is an annual forb in the phlox family that is endemic to southern California in Riverside and San Bernardino Counties. It inhabits desert dunes and sandy flats within creosotebush and Joshua tree woodland communities. The species is not known to occur on the SEZ, but potentially suitable habitat does occur there and in other portions of the affected area (Table 9.4.12.1-1). The nearest known occurrence of the species is about 30 mi (48 km) west of the Riverside East SEZ.

Munz's Cholla

The Munz's cholla is a tree-like cactus endemic to southern California where it is known only from the Chocolate Mountains in Imperial and Riverside Counties as near as 20 mi (32 km) south of the SEZ. The species inhabits Sonoran Desert creosotebush scrub communities. The species is not known to occur on the Riverside East SEZ, but potentially suitable habitat occurs on the SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Orocopia Sage

The Orocopia sage is a flowering evergreen shrub that is endemic to southern California in dry desert washes and floodplains. The species is known to occur as near as 2 mi (3 km) south of the Riverside East SEZ within the area of indirect effects. Potentially suitable habitat for the species occurs on the SEZ and in other portions of the affected area (Table 9.4.12.1-1).

White-Margined Beardtongue

The white-margined beardtongue is a perennial forb in the figwort family that occurs in the deserts of Arizona, California, and Nevada. In California, it is known from fewer than 20 locations. It inhabits desert dunes and desert scrub communities of the Mojave Desert. The nearest known occurrence of the species is about 50 mi (80 km) north of the Riverside East SEZ; potentially suitable habitat exists on the SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard is a fairly small, smooth-skinned lizard that inhabits desert sand dune habitats the Mojave Desert of southern California. The species occurs in scattered populations in dunes composed of fine, loose, windblown sand deposits. The nearest known occurrence of the species is about 25 mi (40 km) north of the Riverside East SEZ; potentially suitable dune habitats are known to occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Rosy Boa

The rosy boa is a heavy-bodied snake that inhabits desert scrublands, rocky deserts, and canyons in southern California south of the Death Valley region. The nearest known occurrence is from Joshua Tree NP, approximately 25 mi (40 km) west of the Riverside East SEZ. Potentially suitable habitat occurs on the SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Bendire's Thrasher

The Bendire's thrasher is a small neotropical migrant bird that is a summer breeding resident in southern California. This species inhabits desert succulent shrub and Joshua tree habitats in the Mojave Desert where it is associated with sagebrush, pinyon-juniper woodlands, cholla cactus, Joshua tree, palo verde, mesquite, and agave species. The species is known to occur as near as the Chuckwalla DWMA, 2 mi (3 km) south of the Riverside East SEZ in the area of indirect effects. Potentially suitable scrub and wash habitats may occur in the SEZ and other portions of the affected area (Table 9.4.12.1-1).

Ferruginous Hawk

The ferruginous hawk is a winter resident and migrant in the Riverside East SEZ region. The species inhabits open grasslands, sagebrush flats, desert scrub, and the edges of pinyon-juniper woodlands. It is known to occur in Riverside County, and potentially suitable foraging habitat occurs on the Riverside East SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Western Burrowing Owl

The western burrowing owl is a year-round resident of open, dry grasslands and desert habitats in southern California and Arizona. The species occurs locally in open areas with sparse vegetation. The species is known to occur as near as 1 mi (1.6 km) east of the Riverside East SEZ in the area of indirect effects. Potentially suitable foraging and nesting habitat may occur in the SEZ and other portions of the affected area (Table 9.4.12.1-1). The availability of nest sites (burrows) within the affected area has not been determined; shrubland habitat that may be suitable for either foraging or nesting occurs throughout the affected area.

California Leaf-Nosed Bat

The California leaf-nosed bat is a large-eared bat with a leaflike flap of protective skin on the tip of its nose. It primarily occurs along the Colorado River, from southern Nevada, through Arizona and California, to Baja California and Sinaloa Mexico. The species forages in a variety of desert habitats, including desert riparian, desert wash, desert scrub, and palm oasis. It roosts in caves, crevices, and mines. The nearest recorded occurrences are from the Palen/McCoy Wilderness within 2 mi (3 km) of the SEZ in the area of indirect effects. Potentially suitable habitat may occur on the Riverside East SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Cave Myotis

The cave myotis is known to occur in the lower Colorado River Basin in southern California and Arizona. It inhabits desert scrublands, washes, and riparian habitats. This species roosts in colonies in caves. The nearest recorded occurrences are from the Mule Mountains ACEC about 2 mi (3 km) south of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Nelson's Bighorn Sheep

The Nelson's bighorn sheep is one of several subspecies of bighorn sheep known to occur in the southwestern United States. This species occurs in desert mountain ranges in Arizona, California, Nevada, Oregon, and Utah. The Nelson's bighorn sheep uses primarily montane shrubland, forest, and grassland habitats and may utilize desert valleys as corridors for travel between range habitats. In California, the species is known from the desert mountain ranges from the White Mountains, south to the San Bernardino Mountains, and southeastward to the Mexican border. The Nelson's bighorn sheep uses primarily montane shrubland, forest, and grassland habitats, and may utilize desert valleys as corridors for travel between range habitats. The nearest recorded occurrences are from the Joshua Tree Wilderness and the Chuckwalla DWMA, about 2 mi (3 km) north, west, and south of the SEZ. The SEZ and other portions of the affected area may provide important habitat for sheep travelling between ranges (Table 9.4.12.1-1).

Pallid Bat

The pallid bat is a large, pale bat with large ears that is locally common in desert grasslands and shrublands in the southwestern United States. It roosts in caves, crevices, and mines. The species is a year-round resident throughout southern California. The nearest recorded occurrence is from the Chuckwalla Mountains Wilderness, approximately 5 mi (8 km) south of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Palm Springs Pocket Mouse

The Palm Springs pocket mouse is a pocket mouse subspecies known only to occur in Riverside County within the Coachella Valley. This species inhabits desert scrub and grassland communities on sandy soils. The nearest recorded occurrences are 25 mi (40 km) west of the SEZ. Potentially suitable habitat occurs on the Riverside East SEZ and in other portions of the affected area (Table 9.4.12.1-1).

Spotted Bat

The spotted bat is considered a rare year-round resident of southern California where it forages in mountain foothills, desert shrublands, grasslands, washes, riparian areas, and mixed conifer forests. The species roosts in rock crevices along cliffs. The nearest recorded occurrences are approximately 40 mi (64 km) west of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Townsend's Big-Eared Bat

The Townsend's big-eared bat is widely distributed throughout the western United States. In California, the species forages year-round in a wide variety of desert and non-desert habitats. The species roosts in caves, mines, tunnels, buildings, and other man-made structures. The nearest recorded occurrences are approximately 4 mi (6 km) southeast of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Western Mastiff Bat

The western mastiff bat is a large uncommon resident of southern California and western Arizona. The species forages in many open semiarid habitats, including conifer and deciduous woodlands, shrublands, grassland, and urban areas. It roosts in crevices, trees, and buildings. The nearest recorded occurrences are 5 mi (8 km) west of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Western Small-Footed Myotis

The western small-footed myotis is a common year-round resident in desert habitats of southern California. It occurs in a variety of desert woodland and riparian habitats. This species roosts in caves, buildings, mines, and rock crevices. The nearest recorded occurrences are from the Chocolate Mountains, approximately 30 mi (48 km) south of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) and 115,700 acres (468 km^2) of rocky cliffs and outcrops on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

Western Yellow Bat

The western yellow bat is an uncommon year-round resident in the foothill and desert regions of southern California and southwestern Arizona. It occurs in a variety of desert wash, riparian, and palm oasis habitats. This species roosts in trees. The nearest recorded occurrences are from the vicinity of Blythe, California, approximately 6 mi (10 km) east of the Riverside East SEZ. Potentially suitable habitat may occur on the SEZ and in other portions of the affected area (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ and in the area of indirect effects could include foraging and roosting habitat. On the basis of an evaluation of land cover types, approximately 223 acres (1 km^2) and 335 acres (1.5 km^2) of riparian woodlands on the SEZ and in the area of direct effects, respectively, could be potentially suitable roosting habitat for this species.

9.4.12.1.3 State-Listed Species

There are two species listed by the State of California that may occur in the Riverside East SEZ affected area—the desert tortoise and Gila woodpecker (Table 9.4.12.1-1). The desert tortoise is listed as threatened under the CESA; this species is discussed in Section 9.4.12.1.1 because of its status under the ESA.

The Gila woodpecker is listed as an endangered species under the CESA. It is a fairly uncommon resident in southern California and southwestern Arizona, where it occurs in desert riparian and wash habitats along the lower Colorado River Basin. Additional life history information for this species is provided in Appendix J. The nearest recorded occurrence for this species is from the Colorado River, approximately 6 mi (10 km) east of the Riverside East SEZ. According to the CAReGAP habitat suitability model, potentially suitable habitat for this species does not occur on the SEZ; however, potentially suitable foraging and nesting habitat may occur in portions of the area of indirect effects (Table 9.4.12.1-1).

9.4.12.1.4 Rare Species

There are 68 rare species (i.e., state rank of S1 or S2 in California or a species of concern by the State of California or USFWS) that may occur in the affected area of the Riverside East SEZ (Table 9.4.12.1-1). Of these species, there are 42 that have not been discussed as ESA-listed (Section 9.4.12.1.1), BLM-designated sensitive (Section 9.4.12.1.2), or state-listed (Section 9.4.12.1.3).

9.4.12.2 Impacts

This section discusses the potential for impacts on special status species from utility-scale solar energy development within the proposed Riverside East SEZ. The types of impacts that special status species could incur from construction and operation of utility-scale solar energy facilities are discussed in Section 5.10.4.

The assessment of impacts on special status species is based on available information on the presence of species in the affected area, as presented in Section 9.4.12.1, following the analysis approach described in Appendix M. It is assumed that, prior to development, surveys would be conducted to determine the presence of special status species and their habitats in and near areas where ground-disturbing activities would occur. Additional NEPA assessments, ESA consultations, and coordination with state natural resource agencies may be needed to address project-specific impacts more thoroughly. These assessments and consultations could result in additional required actions to avoid, minimize, or mitigate impacts on special status species (see Section 9.4.12.3).

Solar energy development within the Riverside East SEZ could affect a variety of habitats (see Section 9.4.10). These impacts on habitats could in turn affect special status species that are dependent on those habitats. Based on CNDDB records and information provided by the USFWS, there are 29 special status species known to occur in the affected area of the Riverside East SEZ (Section 9.4.12.1). These species are listed in bold in Table 9.4.12.1-1. No other special status species have been recorded in the affected area (CDFG 2010b). Other special status species may occur on the SEZ or within the affected area based on the presence of potentially suitable habitat. As discussed in Section 9.4.12.1, this approach to identifying the species that could occur in the affected area probably overestimates the number of species that actually occur in the affected area, and may therefore overestimate impacts on some special status species.

Potential direct and indirect impacts on special status species within the SEZ and in the area of indirect effect outside the SEZ are presented in Table 9.4.12.1-1. In addition, the overall potential magnitude of impacts on each species (assuming programmatic design features are in place) is presented along with any potential species-specific mitigation measures that could further reduce impacts.

Impacts on special status species could occur during all phases of development (construction, operation, and decommissioning and reclamation) of a utility-scale solar energy project within the SEZ. Construction and operation activities could result in short- or long-term impacts on individuals and their habitats, especially if these activities are sited in areas where special status species are known to or could occur. As presented in Section 9.4.1.2, impacts of access road and transmission line construction, upgrade, or operation are not assessed in this evaluation because of the proximity of existing infrastructure to the SEZ.

Direct impacts would result from habitat destruction or modification. It is assumed that direct impacts would occur only within the SEZ where ground-disturbing activities are expected to occur. Indirect impacts could result from surface water and sediment runoff from disturbed areas, fugitive dust generated by project activities, accidental spills, harassment, and lighting. No ground-disturbing activities associated with project facilities are anticipated to occur within the area of indirect effects. Decommissioning of facilities and reclamation of disturbed areas after operations cease could result in short-term negative impacts to individuals and habitats adjacent to project areas, but long-term benefits would accrue if original land contours and native plant communities were restored in previously disturbed areas.

The successful implementation of programmatic design features (discussed in Appendix A, Section A.2.2) would reduce direct impacts on some special status species, especially those that depend on habitat types that can be easily avoided (e.g., dunes and sand transport systems, playa and desert wash habitats). Indirect impacts on special status species could be reduced to negligible levels by implementing programmatic design features, especially those engineering controls that would reduce runoff, sedimentation, spills, and fugitive dust.

9.4.12.2.1 Impacts on Species Listed under the ESA

The desert tortoise is the only ESA-listed species that has the potential to occur in the affected area of the Riverside East SEZ and is the only ESA-listed species the USFWS identified as potentially affected by solar energy development on the SEZ (Stout 2009). The desert tortoise is known to occur in the Chuckwalla DWMA adjacent to the southern boundary of the SEZ in the area of indirect effects; populations are also known to occur in Joshua Tree NP and Pinto Mountains DWMA, adjacent to the western and northwestern border of the SEZ (Figure 9.4.12.1-1). According to the CAReGAP habitat suitability model, approximately

185,274 acres (750 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations of solar energy development on the SEZ (Table 9.4.12.1-1). This direct effects area represents about 4.4% of available suitable habitat of the desert tortoise in the region. The USGS desert tortoise model (Nussear et al. 2009) indicates that the majority of the SEZ is composed of less suitable habitat than the surrounding landscape (modeled suitability value ≤0.5 out of 1.0). About 542,622 acres (2,200 km^2) of suitable habitat occurs in the area of potential indirect effects; this area represents about 12.9% of the available suitable habitat in the region (Table 9.4.12.1-1).

On the basis of desert tortoise surveys conducted in Joshua Tree NP, adjacent to the western border of the SEZ, the USFWS estimated that full-scale solar energy development on the SEZ may directly affect up to 2,865 desert tortoises on the SEZ (Stout 2009). In addition to direct impacts, development on the SEZ could indirectly affect desert tortoises by fragmenting and degrading adjacent habitat (refer to Section 5.10.4 for a discussion of possible indirect impacts). Fragmentation would be exacerbated by the installation of exclusionary fencing at the perimeter of the SEZ or individual project areas. The SEZ is situated between the Chuckwalla and Pinto Mountains DWMAs (these DWMAs also contain USFWS-designated critical habitat), and WHMAs within the SEZ may provide important connectivity for desert tortoise movements between the DWMAs (BLM and CDFG 2002; Stout 2009). Therefore, development on the SEZ may disrupt desert tortoise population dynamics in nearby DWMAs and designated critical habitat.

The overall impact on the desert tortoise from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents between 1% and 10% of potentially suitable habitat in the region and the implementation of programmatic design features alone is unlikely to substantially reduce these impacts. Avoidance of all potentially suitable habitats for this species is not a feasible means of mitigating impacts because these habitats (desert scrub) are widespread throughout the area of direct effects.

Development of actions to reduce impacts (e.g., reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions) for the desert tortoise, including development of a survey protocol, avoidance measures, minimization measures, and, potentially, translocation actions and compensatory mitigation, would require formal consultation with the USFWS under Section 7 of the ESA. These consultations may be used to authorize incidental take statements per Section 10 of the ESA (if necessary). In addition, the CESA provides authority to the CDFG to regulate potential impacts on the desert tortoise and other species listed under the CESA. Therefore, formal consultation with the CDFG would also be required to permit the incidental take of desert tortoises in the SEZ.

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

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

9.4.12.2.2 Impacts on BLM-Designated Sensitive Species

Impacts on the 25 BLM-designated sensitive species that have potentially suitable habitat within the affected area of the Riverside East SEZ are discussed below.

Alkali Mariposa-Lily

The alkali mariposa-lily is not known to occur in the affected area of the Riverside East SEZ; however, approximately 1,570 acres (6 km^2) of potentially suitable desert playa habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 2.3% of available suitable habitat in the region. About 828 acres (3 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 1.2% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the alkali mariposa-lily from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. The implementation of programmatic design features may be sufficient to reduce indirect impacts to negligible levels.

Potentially suitable habitat for the alkali mariposa-lily occurs in a limited portion of the SEZ (primarily associated with Ford Dry Lake and Palen Lake) and could be completely avoided during the development of facilities and protected from indirect effects. Alternatively, avoiding or minimizing disturbance to occupied habitats also would reduce impacts on this species. If avoidance or minimization is not a feasible option, plants could be translocated from the area of direct effects to protected areas that would not be affected directly or indirectly by future development. Alternatively, or in combination with translocation, a compensatory mitigation plan could be developed and implemented to mitigate direct effects on occupied habitats. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or more of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Chaparral Sand-Verbena

The chaparral sand-verbena historically occurred on the SEZ, but it is currently only known to occur outside of the area of indirect effects approximately 23 mi (37 km) from the SEZ. Approximately 26,798 acres (108 km^2) of potentially suitable desert sand dune habitat within the SEZ may be directly affected by project construction and operations (Table 9.4.12.1-1). This direct impact area represents 31.8% of available suitable habitat in the region. About 15,987 acres (65 km^2) of potentially suitable habitat occurs within the area of indirect effects; this area represents about 19.0% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the chaparral sand-verbena from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered large because the amount of potentially suitable habitat for this species in the area of direct effects represents 10% or more of potentially suitable habitat in the region. The implementation of programmatic design features would reduce indirect impacts to negligible levels.

Chaparral sand-verbena habitat (desert sand dunes) occupies portions of the SEZ that could be avoided during the development of facilities and protected from indirect effects. In conjunction with the implementation of programmatic design features, avoiding or minimizing disturbance to occupied habitats and desert dunes and sand transport systems and applying the mitigation measures described previously for the alkali mariposa-lily could further reduce impacts on this species. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Creamy Blazing-Star

The creamy blazing-star is not known to occur in the affected area of the Riverside East SEZ; however, approximately 109,933 acres (445 km^2) of potentially suitable desert scrub habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 5.0% of available suitable habitat in the region. About 229,999 acres (931 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.4% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the creamy blazing-star from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Avoidance of all potentially suitable habitats is not feasible to mitigate impacts on the creamy blazing-star because some of these habitats (desert scrub) are widespread throughout the area of direct effect. However, impacts could be reduced to negligible levels with the implementation of programmatic design features and the mitigation options described previously for the alkali mariposa-lily. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Giant Spanish-Needle

The giant Spanish-needle is not known to occur in the affected area of the Riverside East SEZ; however, approximately 26,798 acres (108 km^2) of potentially suitable desert dune habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents 31.8% of available suitable habitat in the SEZ region. About 15,987 acres (65 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 19.0% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the giant Spanish-needle from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered large because the amount of potentially suitable habitat for this species in the area of direct effects represents 10% or more of potentially suitable habitat in the SEZ region. The implementation of programmatic design features would reduce indirect impacts to negligible levels.

Giant Spanish-needle habitat (desert dunes) occupies portions of the SEZ that could be avoided during the development of solar facilities and protected from indirect effects. In conjunction with the implementation of programmatic design features, avoiding or minimizing disturbance to occupied habitats and desert dunes and sand transport systems and applying the mitigation measures described previously for the alkali mariposa-lily could further reduce impacts on this species. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Harwood's Eriastrum

The Harwood's eriastrum is not known to occur in the affected area of the Riverside East SEZ; however, approximately 26,798 acres (108 km^2) of potentially suitable desert dune habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 31.8% of available suitable habitat in the region. About 15,987 acres (65 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 19.0% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the Harwood's eriastrum from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered large because the amount of potentially suitable habitat for this species in the area of direct effects represents 10% or more of potentially suitable habitat in the SEZ region. The implementation of programmatic design features would reduce indirect impacts to negligible levels.

Harwood's eriastrum habitat (desert dunes) occupies portions of the SEZ that could be avoided during the development of solar facilities and protected from indirect effects. In conjunction with the implementation of programmatic design features, avoiding or minimizing disturbance to occupied habitats and desert dunes and sand transport systems and applying the mitigation measures described previously for the alkali mariposa-lily could further reduce impacts on this species. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Latimer's Woodland-Gilia

The Latimer's woodland-gilia is not known to occur in the affected area of the Riverside East SEZ; however, approximately 136,472 acres (552 km^2) of potentially suitable desert scrub and wash habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 4.7% of available suitable habitat in the SEZ region. About 314,674 acres (1,273 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.8% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the Latimer's woodland gilia from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Avoidance of all potentially suitable habitats is not feasible to mitigate impacts on the Latimer's woodland gilia because some of these habitats (desert scrub) are widespread throughout the area of direct effect. However, impacts could be reduced to negligible levels with the implementation of mitigation options described previously for the alkali mariposa-lily. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Little San Bernardino Mountains Linanthus

The Little San Bernardino Mountains linanthus is not known to occur in the affected area of the Riverside East SEZ; however, approximately 26,798 acres (108 km^2) of potentially suitable desert dune habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 31.8% of available suitable habitat in the region. About 15,987 acres (65 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 19.0% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the Little San Bernardino Mountains linanthus from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered large because the amount of potentially suitable habitat for this species in the area of direct effects represents 10% or more of potentially suitable habitat in the SEZ region. The implementation of programmatic design features would reduce indirect impacts to negligible levels.

Little San Bernardino Mountains linanthus habitat (desert dunes) occupies portions of the SEZ that could be avoided during the development of solar facilities and protected from indirect effects. In conjunction with the implementation of programmatic design features, avoiding or minimizing disturbance to occupied habitats and desert dunes and sand transport systems and applying the mitigation measures described previously for the alkali mariposa-lily could further reduce impacts on this species. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Munz's Cholla

The Munz's cholla is not known to occur in the affected area of the Riverside East SEZ; however, approximately 171,716 acres (695 km^2) of potentially suitable desert scrub and wash habitats on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 4.1% of available suitable habitat in the SEZ region. About 570,180 acres (2,307 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 13.6% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the Munz's cholla from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Avoidance of all potentially suitable habitats is not a feasible way to mitigate impacts on the Munz's cholla because these habitats (mostly desert scrub) are widespread throughout the area of direct effect. However, impacts could be reduced to negligible levels with the implementation of programmatic design features and the mitigation options described previously for the alkali mariposa-lily. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Orocopia Sage

The Orocopia sage is known from the Chuckwalla DWMA within the Riverside East SEZ area of indirect effects. Approximately 134,909 acres (546 km^2) of potentially suitable desert scrub and wash habitats on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 4.7% of available suitable habitat in the SEZ region. About 309,323 acres (1,252 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.8% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the Orocopia sage from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Avoidance of all potentially suitable habitats is not a feasible way to mitigate impacts on the Orocopia sage because potentially suitable desert scrub habitats are widespread throughout the area of direct effect. However, impacts could be reduced to negligible levels with the implementation of programmatic design features and the mitigation options described previously for the alkali mariposa-lily. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

White-Margined Beardtongue

The white-margined beardtongue is not known to occur on the Riverside East SEZ; however, approximately 138,294 acres (560 km^2) of potentially suitable desert scrub and dune habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 5.8% of available suitable habitat in the SEZ region. About 251,337 acres (1,017 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.6% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the white-margined beardtongue from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Avoidance of all potentially suitable habitats is not feasible to mitigate impacts on the white-margined beardtongue because some of these habitats (desert scrub) are widespread throughout the area of direct effect. However, impacts could be reduced to negligible levels with the implementation of programmatic design features and the mitigation options described previously for the alkali mariposa-lily. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard is not known to occur on the Riverside East SEZ; however, according to the CAReGAP habitat suitability model, approximately 140,506 acres (569 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 7.6% of available suitable habitat in the SEZ region. About 380,038 acres (1,538 km^2) of potentially suitable foraging habitat occurs in the area of potential indirect effect; this area represents about 20.6% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the Mojave fringe-toed lizard from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features would reduce indirect impacts to negligible levels.

Avoidance of all potentially suitable habitats is not a feasible option for mitigating impacts on the Mojave fringe-toed lizard because, according to the CAReGAP habitat suitability model, these habitats are widespread throughout the area of direct effects. However, avoiding or minimizing disturbance to occupied habitats, dune and sand transport systems, and desert wash habitats would reduce impacts on this species. If avoidance or minimization is not feasible, impacts could be reduced by conducting pre-disturbance surveys and avoiding or minimizing impacts on occupied habitats on the SEZ. If avoidance or minimization is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects on occupied habitats. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Rosy Boa

The rosy boa is not known to occur on the Riverside East SEZ; however, according to the CAReGAP habitat suitability model, approximately 185,274 acres (750 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 4.4% of available habitat in the

SEZ region. About 544,126 acres (2,200 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 13.0% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the rosy boa from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of all potentially suitable habitats is not a feasible option for mitigating impacts on the rosy boa because potentially suitable desertscrub habitats are widespread throughout the area of direct effects. Impacts could be reduced to negligible levels through implementing programmatic design features and avoiding or minimizing disturbance to occupied habitats on the SEZ. If avoidance or minimization is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects on occupied habitats. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Bendire's Thrasher

The Bendire's thrasher is a summer resident in southern California and is known to occur in the Chuckwalla DWMA within the area of indirect effects. According to the CAReGAP land cover model, approximately 111,496 acres (451 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations of solar energy development on the SEZ (Table 9.4.12.1-1). This direct effects area represents about 4.4% of available suitable habitat in the region. About 235,350 acres (952 km^2) of suitable habitat occurs in the area of potential indirect effects; this area represents about 9.3% of the available suitable habitat in the region (Table 9.4.12.2-2).

The overall impact on the Bendire's thrasher from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of all potentially suitable habitats is not feasible to mitigate impacts on the Bendire's thrasher, because potentially suitable foraging habitats (desert scrub) are widespread throughout the area of direct effect. Impacts could be reduced to small or negligible levels through the implementation of programmatic design features and by avoiding or minimizing disturbance to occupied nesting habitats on the SEZ, such as those that may occur in ironwood communities in desert wash habitats. If avoidance or minimization is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects on occupied habitats. Compensation could involve the protection and enhancement of existing occupied or suitable nesting habitats to compensate for habitats lost to development. A comprehensive mitigation strategy that used one or both of these options could be designed to completely offset the impacts of development. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

Ferruginous Hawk

The ferruginous hawk is a winter resident in the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 112,197 acres (454 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 5.7% of available suitable habitat in the region. About 287,942 acres (1,165 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 14.6% of the available suitable habitat in the region (Table 9.4.12.1-1).

The overall impact on the ferruginous hawk from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because direct effects would occur only on potentially suitable foraging habitat, and the amount of this habitat in the area of direct effects represents between 1 and 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels. Avoidance of direct impacts on all potentially suitable foraging habitat is not a feasible option for mitigating impacts on the ferruginous hawk because potentially suitable shrubland is widespread throughout the area of direct effects and readily available in other portions of the affected area.

Western Burrowing Owl

The western burrowing owl is known to occur in the SEZ area of indirect effects within 1 mi (1.6 km) east of the SEZ. According to the CAReGAP habitat suitability model, approximately 202,844 acres (821 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents 4.4% of available suitable habitat in the region. About 652,982 acres (2,642 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 14.0% of the available suitable habitat in the region (Table 9.4.12.1-1). Most of this area could serve as foraging and nesting habitat (shrublands). The abundance of burrows suitable for nesting on the SEZ and in the area of indirect effects has not been determined.

The overall impact on the western burrowing owl from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the SEZ region. The implementation of programmatic design features is expected to be sufficient to reduce indirect impacts on this species to negligible levels.

Avoidance of all potentially suitable habitats is not feasible to mitigate impacts on the western burrowing owl because potentially suitable desert scrub habitats are widespread throughout the area of direct effect. However, impacts on the western burrowing owl could be reduced by avoiding or minimizing disturbance to occupied burrows and habitat in the area of direct effects. If avoidance or minimization of disturbance to all occupied habitat is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that used one or both of these options could be designed to completely offset the impacts of development. The need for mitigation should first be determined by conducting pre-disturbance surveys for the species and its habitat on the SEZ.

California Leaf-Nosed bat

The California leaf-nosed bat is a year-round resident in southern California within the Riverside East SEZ region. Approximately 142,335 acres (576 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 3.6% of available suitable habitat in the region. About 430,378 acres (1,742 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.8% of the available suitable habitat in the region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 115,700 acres (468 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the California leaf-nosed bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effect and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Cave Myotis

The cave myotis is a year-round resident in the lower Colorado River Basin within the Riverside East SEZ region. Approximately 142,335 acres (576 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 3.4% of available suitable habitat in the region. About 430,704 acres (1,742 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.4% of the available suitable habitat in the region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 115,700 acres (468 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the cave myotis from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Nelson's Bighorn Sheep

The Nelson's bighorn sheep (also called the desert bighorn sheep) is known to occur in the affected area from the Joshua Tree Wilderness and Chuckwalla DWMA within 2 mi (3 km) north, west, and south of the Riverside East SEZ. Sheep may utilize habitats within the SEZ as migration corridors between these ranges. According to the CAReGAP habitat suitability model, approximately 42,020 acres (170 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 2.2% of available suitable habitat in the SEZ region. About 223,604 acres (905 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 11.8% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the Nelson's bighorn sheep from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable habitat in the region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Impacts on the Nelson's bighorn sheep could be reduced to small or negligible levels by conducting pre-construction surveys and avoiding or minimizing disturbance to occupied habitats and important movement corridors on the SEZ. If avoidance or minimization is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects on occupied habitats. Compensation could involve the protection and enhancement of existing occupied or suitable habitats to compensate for habitats lost to development. A comprehensive mitigation strategy that used one or both of these options could be designed to completely offset the impacts of development. The need for mitigation should first be determined by conducting pre-construction surveys for the species and its habitat on the SEZ.

Pallid Bat

The pallid bat is a year-round resident in southern California within the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 117,359 acres (475 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 3.2% of available suitable habitat in the region. About 351,380 acres (1,421 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 9.6% of the available suitable habitat in the region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 115,700 acres (468 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the pallid bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Palm Springs Pocket Mouse

The Palm Springs pocket mouse is not known to occur in the Riverside East SEZ affected area; however, according to the CAReGAP habitat suitability model, approximately 198,472 acres (803 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 5.3% of available suitable habitat in the SEZ region. About 512,782 acres (2,075 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 13.7% of the available suitable foraging habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the Palm Springs pocket mouse from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features alone is unlikely to substantially reduce impacts.

Avoidance of all potentially suitable habitats is not a feasible option for mitigating impacts on the Palm Springs pocket mouse because potentially suitable desertscrub habitats are widespread throughout the area of direct effects. Impacts could be reduced to negligible levels through the implementation of programmatic design features and avoidance or minimization of disturbance to occupied habitats on the SEZ. If avoidance or minimization is not a feasible option, a compensatory mitigation plan could be developed and implemented to mitigate direct effects on occupied habitats. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation should first be determined by conducting preconstruction surveys for the species and its habitat on the SEZ.

Spotted Bat

The spotted bat is considered to be a rare year-round resident in the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 111,719 acres (452 km^2) of potentially suitable habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 4.7% of available suitable foraging habitat in the SEZ region. About 235,684 acres (954 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 10.0% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland); however, suitable roosting habitat may occur on the SEZ. On the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 115,700 acres (468 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the spotted bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not feasible, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Townsend's Big-Eared Bat

The Townsend's big-eared bat is a year-round resident in the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 202,912 acres (821 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 4.0% of available suitable habitat in the SEZ region. About 655,256 acres (2,651 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 12.9% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 1,500 acres (6 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 41,000 acres (166 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the Townsend's big-eared bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not feasible, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Western Mastiff Bat

The western mastiff bat is a year-round resident in the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 202,912 acres (821 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 5.0% of available suitable habitat in the SEZ region. About 655,256 acres (2,651 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 16.1% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 115,700 acres (468 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the western mastiff bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not feasible, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats to compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Western Small-Footed Myotis

The western small-footed myotis is a year-round resident in the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 25,199 acres (102 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 3.8% of available suitable foraging habitat in the SEZ region. About 79,658 acres (322 km^2) of potentially suitable foraging habitat occurs in the area of potential indirect effect; this area represents about 12.0% of the available suitable foraging habitat in the SEZ region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 5,600 acres (23 km^2) of rocky cliffs and outcrops that may be potentially suitable roosting habitat occurs on the SEZ. An additional 115,700 acres (468 km^2) of rocky cliffs and outcrops occurs in the area of direct effects.

The overall impact on the western small-footed myotis from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (rocky cliffs and outcrops) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not feasible, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

Western Yellow Bat

The western yellow bat is a year-round resident in the Riverside East SEZ region. According to the CAReGAP land cover model, approximately 25,199 acres (102 km^2) of potentially suitable foraging habitat on the SEZ could be directly affected by construction and operations (Table 9.4.12.1-1). This direct impact area represents about 1.9% of available suitable foraging habitat in the SEZ region. About 79,658 acres (322 km^2) of potentially suitable foraging habitat occurs in the area of potential indirect effect; this area represents about 5.9% of the available suitable foraging habitat in the SEZ region (Table 9.4.12.1-1). The potentially suitable habitat on the SEZ is primarily foraging habitat (desert shrubland). However, on the basis of an evaluation of land cover types, approximately 223 acres (1 km^2) of riparian woodlands that may be potentially suitable roosting habitat occurs on the SEZ. An additional 335 acres (1.5 km^2) of riparian woodlands occurs in the area of direct effects.

The overall impact on the western yellow bat from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered moderate because the amount of potentially suitable habitat for this species in the area of direct effects represents greater than 1% but less than 10% of potentially suitable foraging habitat in the SEZ region. The implementation of programmatic design features is expected to reduce indirect impacts to negligible levels.

Avoidance of direct impacts on all foraging habitat (shrublands) is not feasible because suitable foraging habitat (shrublands) is widespread in the area of direct effects and readily available in other portions of the affected area. However, avoiding or minimizing disturbance of all potentially suitable roosting habitat (riparian woodlands) on the SEZ is feasible and could reduce impacts. If avoiding or minimizing disturbance of all occupied or suitable roosting habitat is not feasible, a compensatory mitigation plan could be developed and implemented to mitigate direct effects. The protection and enhancement of existing occupied or suitable habitats could compensate for habitats lost to development. A comprehensive mitigation strategy that uses one or both of these options could be designed to completely offset the impacts of development. The need for mitigation, other than programmatic design features, should be determined by conducting pre-disturbance surveys for the species and its habitat within the area of direct effects.

9.4.12.2.3 Impacts on State-Listed Species

There are two species listed by the State of California that could occur in the affected area of the Riverside East SEZ (Section 9.4.12.1.3; Table 9.4.12.1-1)—desert tortoise and Gila woodpecker. Impacts on the desert tortoise are discussed in Section 9.4.12.2.1 because of the status of this species under the ESA; impacts on the Gila woodpecker are discussed below.

The Gila woodpecker is not known to occur in the affected area of the Riverside East SEZ. However, the species is known to occur along the Colorado River about 6 mi (10 km) east of the SEZ. According to the CAReGAP habitat suitability model, there is no suitable habitat for this species on the SEZ (Table 9.4.12.1-1). However, about 300 acres (1 km^2) of potentially suitable habitat occurs in the area of potential indirect effect; this area represents about 0.1% of the available suitable habitat in the SEZ region (Table 9.4.12.1-1).

The overall impact on the Gila woodpecker from construction, operation, and decommissioning of utility-scale solar energy facilities within the Riverside East SEZ is considered small because no suitable habitat occurs on the SEZ and only indirect effects are possible. The implementation of programmatic design features would reduce indirect impacts to negligible levels. No species-specific mitigation for the Gila woodpecker is feasible or warranted.

9.4.12.2.4 Impacts on Rare Species

There are 69 species with a state rank of S1 or S2 in California or considered a species of concern by the State of California or USFWS that may occur in the affected area of the Riverside East SEZ. Impacts have been previously discussed for 27 of these species that are also listed under the ESA (Section 9.4.12.2.1), BLM-designated sensitive (Section 9.4.12.2.2), or state-listed (Section 9.4.12.2.3). Impacts on the remaining 42 rare species that do not have any other special status designation are presented in Table 9.4.12.1-1.

9.4.12.3 SEZ-Specific Design Features and Design Feature Effectiveness

The implementation of required programmatic design features described in Appendix A, Section A.2.2, would greatly reduce or eliminate the potential for effects of utility-scale solar energy development on special status species. While some SEZ-specific design features are best established when project details are being considered, some design features can be identified at this time, including the following:

- Pre-disturbance surveys should be conducted within the SEZ to determine the presence and abundance of special status species, including those identified in Table 9.4.12.1-1; disturbance to occupied habitats for these species should be avoided or minimized to the extent practicable. If avoiding or minimizing impacts to occupied habitats is not possible, translocation of individuals from areas of direct effects, or compensatory mitigation of direct effects on occupied habitats could reduce impacts. A comprehensive mitigation strategy for special status species that uses one or more of these options to offset the impacts of development should be developed in coordination with the appropriate federal and state agencies.

- Disturbance of desert playa and wash habitats within the SEZ should be avoided or minimized to the extent practicable. In particular, development should be avoided in and near Ford Dry Lake, Palen Lake, and McCoy Wash within the SEZ. Adverse impacts on the following species could be reduced with the avoidance of these playas and desert wash habitats on the SEZ: alkali mariposa-lily, California saw-grass, Coves' cassia, Emory's crucifixion-thorn, jackass-clover, Salt Spring checkerbloom, sand evening-primrose, Roberts' rhopalolemma bee, and crissal thrasher.

- Avoidance or minimization of disturbance to sand dune habitats and sand transport systems on the SEZ could reduce impacts on several special status species, including the chaparral sand-verbena, dwarf germander, giant Spanish-needle, Harwood's eriastrum, jackass-clover, little San Bernardino Mountains linanthus, and Mojave fringe-toed lizard.

- Consultations with the USFWS and the CDFG should be conducted to address the potential for impacts on the desert tortoise, a species listed as threatened under the ESA and CESA. Consultation would identify an appropriate survey protocol, avoidance measures, and, if appropriate, reasonable and prudent alternatives, reasonable and prudent measures, and terms and conditions for incidental take statements.

- Harassment or disturbance of special status species and their habitats in the affected area should be mitigated. This can be accomplished by identifying any additional sensitive areas and implementing necessary protection measures based upon consultation with the USFWS and CDFG.

If these SEZ-specific design features are implemented in addition to required programmatic design features, impacts on the special status and rare species would be reduced.

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9.4.13 Air Quality and Climate

9.4.13.1 Affected Environment

9.4.13.1.1 Climate

The proposed Riverside East SEZ is located in the eastern portion of Riverside County in southeastern California. The SEZ, with an average elevation of 580 ft (177 m), straddles the southernmost portion of the Mojave Desert and northernmost portion of the Sonoran Desert, which has an extremely arid climate—mild winters and hot summers, large daily temperature swings, scant precipitation, high evaporation rates, low relative humidity, and abundant sunshine. Meteorological data collected at the Blythe Airport,[7] which is about 1.5 mi (2.4 km) east of the eastern boundary of the Riverside East SEZ, are summarized below.

A wind rose from the Blythe Airport in Blythe, California, for the 5-year period 2005 to 2009 and taken at a level of 33 ft (10 m) is presented in Figure 9.4.13.1-1 (NCDC 2010a).[8] During this period, the annual average wind speed at the airport was about 7.6 mph (3.4 m/s), with a prevailing wind direction from the south (about 13% of the time) and secondarily from the north–northwest (about 9% of the time), parallel to nearby mountain ranges. Wind directions alternated between north–northwest (March, May, August, and October) and south (the rest of the months) throughout the year. In California, wind flow is generally from the west or northwest throughout the year, but the prevailing wind direction for a given site is influenced by local terrain (NCDC 2010b). Wind speeds categorized as calm (less than 1.1 mph [0.5 m/s]) occurred frequently (almost one-fifth of the time) because of the stable conditions caused by strong radiative cooling from late night to sunrise. Average wind speeds were relatively uniform by season; the highest was in summer and fall, at 7.8 mph (3.5 m/s); lower in winter, at 7.4 mph (3.3 m/s), respectively; and lowest in spring, at 7.2 mph (3.2 m/s).

For the period 1948 to 2009, the annual average temperature at the Blythe Airport was 73.7°F (23.2°C) (WRCC 2010b). December was the coldest month with an average minimum temperature of 41.2°F (5.1°C), and July was the warmest month with an average maximum of 108.4°F (42.4°C). On most days in summer, daytime maximum temperatures were in the 100s, and minimums were in the low 70s or higher. The minimum temperatures recorded were below freezing (≤32°F [0°C]) on about 2 to 3 days of the colder months (December and January), but subzero temperatures were never recorded. During the same period, the highest temperature, 123°F (50.6°C), was reached in June 1994, and the lowest, 20°F (–6.7°C), in January 1971.

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[7] Eagle Mountain station is located about 0.6 mi (1.0 km) from the western edge of the SEZ at an elevation of about 970 ft (296 m), which is higher than the elevation of Blythe Airport, at about 390 ft (119 m). The station also has collected temperature and precipitation data since 1933. Temperatures are a little lower and precipitation is a little higher at the Eagle Mountain station than at the Blythe Airport.

[8] Note that the Riverside East SEZ is spread over a wide area, about 50 mi (80 km) east–west and 25 mi (40 km) north–south and is in complex terrains. Accordingly, wind patterns at a location of interest might vary depending on elevation, orientation, and proximity to nearby mountains.

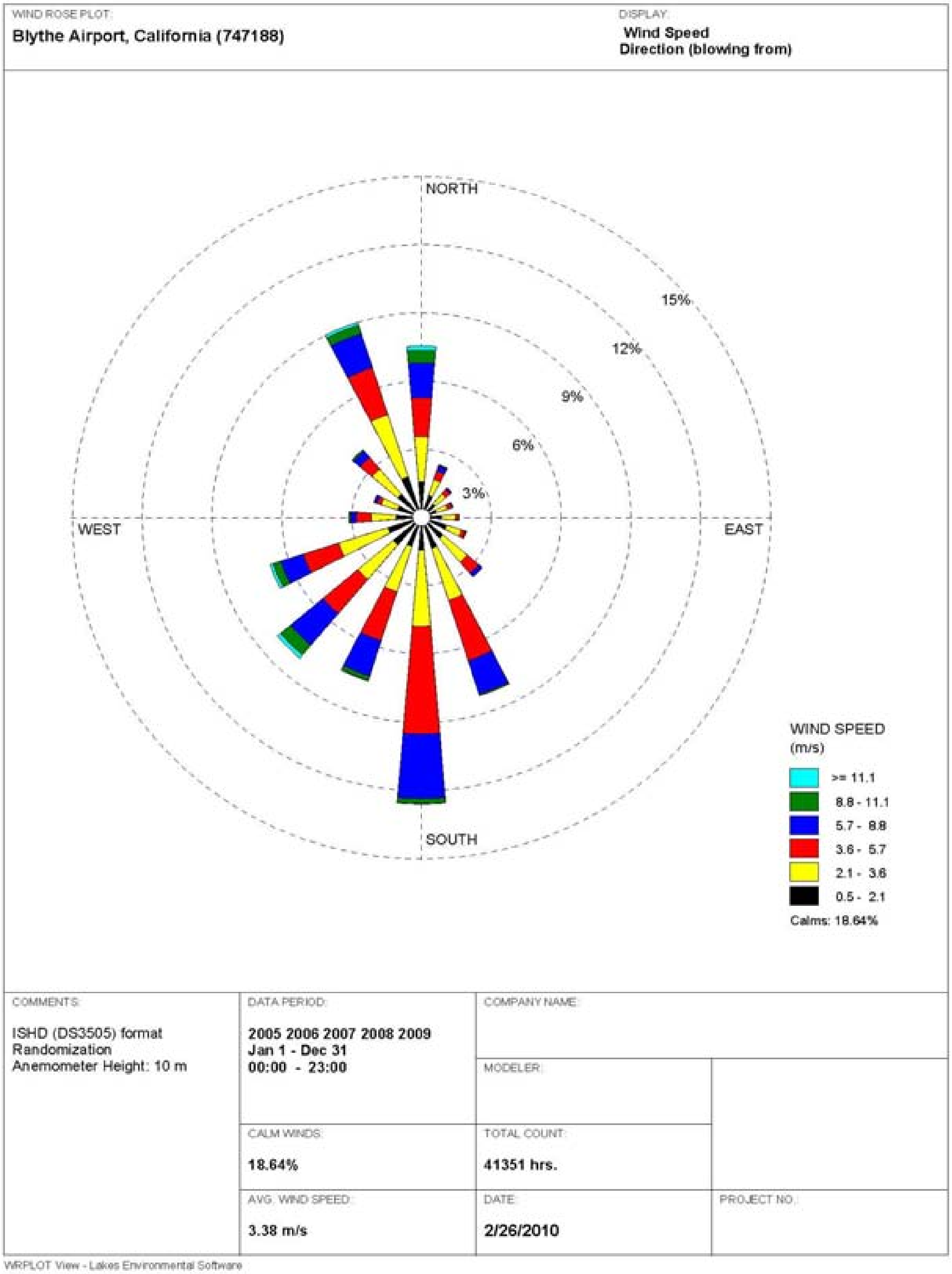

FIGURE 9.4.13.1-1 Wind Rose at 33-ft (10-m) Height at Blythe Airport, Blythe, California, 2005–2009 (Source: NCDC 2010a)

In a typical year, about 176 days had a maximum temperature of ≥90°F (32.2°C), while more than 5 days had a minimum temperature at or below freezing.

Pacific air masses lose most of their moisture on the windward side of mountain ranges parallel to the California coastline. Thus, leeward areas like the Riverside East SEZ experience a lack of precipitation. For the period 1948 to 2009, annual precipitation at the Blythe Airport averaged about 3.53 in. (9.0 cm) (WRCC 2010b). There is an average of 17 days annually with measurable precipitation (0.01 in. [0.025 cm] or higher). About 37% of the annual precipitation occurs during winter months, and 15% in spring, and the rest in summer and fall in almost equal amounts. No measurable snowfall was recorded at the Blythe Airport

Because the area surrounding the proposed Riverside East SEZ is far from major water bodies (more than 120 mi [193 km]) and because surrounding mountain ranges block air masses from penetrating into the area, severe weather events, such as hurricanes and tornadoes, are rare.

Since 1993, 137 floods (about 70% of which were flash floods), with peaks in July and August, have been reported in Riverside County (NCDC 2010c) and caused 6 deaths, 14 injuries, and considerable property and crop damage in total.

In Riverside County, 25 hail storms in total have been reported since 1960 and caused 2 injuries and minor property and crop damage. Hail measuring 2.75 in. (7.0 cm) in diameter was reported in 1960. In Riverside County, 112 high-wind events, peaking in winter months, have been reported since 1996 and caused 8 deaths, 68 injuries, and significant property and crop damage (NCDC 2010c). A high-wind event with a maximum wind speed of 120 mph (53.5 m/s) occurred in 1999. Since 1973, 87 thunderstorm wind events, peaking in summer months, have been reported and caused some property damage and minor crop damage. Many thunderstorms in California are accompanied by little to no precipitation, and lightning strikes sometimes cause forest fires (NCDC 2010b).

Since 1998, 15 dust storms have been reported in Riverside County (NCDC 2010c). The ground surface of the SEZ is covered predominantly with gravelly loams of alluvial fan terraces, which have relatively moderate dust storm potential. High winds can trigger large amounts of blowing dust in areas of Riverside County that have dry and loose soils with sparse vegetation. Dust storms can deteriorate air quality and visibility and have adverse effects on health..

Hurricanes and tropical storms formed off the coast of Central America and Mexico weaken over the cold waters off the California coast. Accordingly, hurricanes rarely hit California. Historically, four tropical storms/depressions have passed within 100 mi (160 km) of the proposed Riverside East SEZ (CSC 2010). Tornadoes in Riverside County, which encompasses the proposed Riverside East SEZ, occur infrequently. In the period 1950 to June 2010, a total of 19 tornadoes (0.3 per year) were reported in Riverside County (NCDC 2010c). However, most tornadoes occurring in Riverside County were relatively weak (i.e., 1 was uncategorized, 16 were weak F0 or F1, and 2 were strong F2 or F3 on the Fujita tornado scale). Several of these tornadoes caused two injuries and some property damage in total. Most tornadoes in Riverside County were reported far from the proposed Riverside East SEZ, except one F3 and one F0 tornadoes, which hit the area about 4 mi (6 km) east and 1 mi (1.6 km) south of the SEZ.

9.4.13.1.2 Existing Air Emissions

Riverside County has many industrial emission sources, which are mainly concentrated over the Valley Region near the City of Riverside. More than ten point source emissions are located around the proposed SEZ, mostly to the east in Blythe, and their annual emissions are relatively minor, except for a major source, the Southern California Gas Company compressor station in Blythe. Mobile source emissions are substantial, because the county is crossed by several interstate highways, including I-10, I-15, and I-215. Data on annual emissions of criteria pollutants and VOCs in Riverside County are presented in Table 9.4.13.1-1 for 2002 (WRAP 2009). Emission data are classified into six source categories: point, area, onroad mobile, nonroad mobile, biogenic, and fire (wildfires, prescribed fires, agricultural fires, structural fires). In 2002, nonroad sources were major contributors to total SO_2 emissions (about 47%) and secondary contributors to total NO_x emissions (about 27%). Onroad sources were major contributors to NO_x and CO emissions (about 61% and 64%, respectively) and secondary contributors to SO_2 emissions (about 31%). Biogenic sources (i.e., vegetation—including trees, plants, and crops—and soils) that release naturally occurring emissions accounted for most VOC emissions (about 87%). Area sources were primary contributors to PM emissions, which accounted for about 88% of PM_{10} and 67% of $PM_{2.5}$. Point and fire sources are minor contributors to criteria pollutants and VOCs in Riverside County.

TABLE 9.4.13.1-1 Annual Emissions of Criteria Pollutants and VOCs in Riverside County, California, Encompassing the Proposed Riverside East SEZ, 2002[a]

Pollutant[b]	Emissions (tons/yr)
SO_2	785
NO_x	55,220
CO	240,193
VOCs	267,693
PM_{10}	22,651
$PM_{2.5}$	6,934

a Includes point, area, onroad and nonroad mobile, biogenic, and fire emissions.

b Notation: CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter with a diameter of ≤2.5 μm; PM_{10} = particulate matter with a diameter of ≤10 μm; SO_2 = sulfur dioxide; and VOCs = volatile organic compounds.

Source: WRAP (2009).

In 2006, California produced about 483.9 MMt of *gross*[9] carbon dioxide equivalent (CO_2e)[10] emissions (CARB 2010a). Gross greenhouse gas (GHG) emissions in California increased by about 12% from 1990 to 2006, which was three-fourths of the increase in the national rate (about 16%). In 2006, transportation (38%) and electricity use (22%) were the primary contributors to gross GHG emission sources in California. Fossil fuel use in the

9 Excluding GHG emissions removed as a result of forestry and other land uses and excluding GHG emissions associated with exported electricity.

10 A measure used to compare the emissions from various GHGs on the basis of their global warming potential, defined as the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas, CO_2. The CO_2e for a gas is derived by multiplying the mass of the gas by the associated global warming potential.

residential, commercial, and industrial sectors combined accounted for about 29% of total state emissions. California's *net* emissions were about 479.8 MMt CO_2e, considering carbon sinks from forestry activities and agricultural soils throughout the state. The U.S. Environmental Protection Agency (EPA 2009a) also estimated 2005 emissions in California. Its estimate of CO_2 emissions from fossil fuel combustion was 390.6 MMt, which was comparable to the state's estimate. The transportation and residential, commercial, and industrial sectors accounted for about 59% and 30% of the CO_2 emissions total, respectively, while electric power generation accounted for the remainder (about 11%).

9.4.13.1.3 Air Quality

CAAQS address the same six criteria pollutants as the NAAQS (CARB 2010b; EPA 2010a): SO_2, NO_2, CO, O_3, PM_{10}, $PM_{2.5}$, and Pb. CAAQS are more stringent than NAAQS for most criteria pollutants. In addition, California has set standards for some pollutants not addressed by NAAQS—visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The NAAQS and CAAQS for criteria pollutants are presented in Table 9.4.13.1-2.

Most of Riverside County is located administratively within the Southeast Desert Intrastate AQCR (Title 40, Part 81, Section 167 of the *Code of Federal Regulations* [40 CFR 81.167]), along with parts of Kern, Los Angeles, and San Bernardino Counties, and all of Imperial County. In addition, the Riverside East SEZ is located within the Mojave Desert Air Basin, one of 15 geographic air basins designated for the purpose of managing air resources in California, which also includes the desert portions of Kern, Los Angeles, Riverside, and San Bernardino Counties. Currently, the area surrounding the proposed SEZ is designated as being in unclassifiable/attainment of NAAQS for all criteria pollutants (40 CFR 81.305). However, the area is designated as a nonattainment area for O_3 and PM_{10} based on CAAQS (CARB 2010c).

With a low population density, the Mojave Desert area has no significant emission sources of its own, except mobile emissions along interstate highways. Air quality in the Mojave Desert area primarily depends on upwind emissions transported from the South Coast Air Basin, including Los Angeles. As a result of upwind emission controls, air quality of the Mojave Desert area has improved, but concentrations of ozone are still relatively high.

There are no ambient air-monitoring stations in Riverside County near the proposed Riverside East SEZ, except an ozone-monitoring station in Joshua Tree NP and Blythe. To characterize ambient air quality around the SEZ, two monitoring stations in the Coachella Valley of Riverside County were chosen: Indio, about 44 mi (71 km), and Palm Springs, about 62 mi (100 km) west of the SEZ. These monitoring stations, which are not in the Mojave Desert area but upwind of the SEZ along I-10, are considered representative of the proposed SEZ, although the Coachella Valley is designated as a nonattainment area for PM_{10}. Ambient concentrations of O_3, PM_{10}, and $PM_{2.5}$ are recorded at Indio, while those of NO_2, CO, O_3, PM_{10}, and $PM_{2.5}$ are recorded at Palm Springs. No SO_2 and Pb measurements are made either in the Mojave Desert area or in the Coachella Valley, so their measurements from Rubidoux are presented to demonstrate that these pollutants are not a concern in Riverside County. The background concentrations of criteria pollutants at these stations for the period 2004 to 2008 are presented in

TABLE 9.4.13.1-2 NAACQS, CAAQS, and Background Concentration Levels Representative of the Proposed Riverside East SEZ in Riverside County, California, 2004–2008

				Background Concentration Level	
Pollutant[a]	Averaging Time	NAAQS	CAAQS	Concentration[b,c]	Measurement Location, Year
SO_2	1-hour	0.075 ppm[d]	0.25 ppm	0.019 ppm (NA; 7.6%)	Rubidoux, 2005
	3-hour	0.5 ppm	NA[e]	0.015 ppm (3.0%; NA)	Rubidoux, 2004
	24-hour	0.14 ppm	0.04 ppm	0.015ppm (11%; 38%)	Rubidoux, 2004
	Annual	0.030 ppm	NA	0.004 ppm (13%; NA)	Rubidoux, 2005
NO_2	1-hour	0.100 ppm[f]	0.18 ppm	0.085 ppm (NA; 47%)	Palm Springs, 2006
	Annual	0.053 ppm	0.030 ppm	0.013 ppm (25%; 43%)	Palm Springs, 2004
CO	1-hour	35 ppm	20 ppm	2.0 ppm (5.7%; 10%)	Palm Springs, 2005
	8-hour	9 ppm	9.0 ppm	0.8 ppm (8.9%; 8.9%)	Palm Springs, 2006
O_3	1-hour	0.12 ppm[g]	0.09 ppm	0.098 ppm (NA; 109%)	Joshua Tree NP, 2008
	8-hour	0.075 ppm	0.070 ppm	0.084 ppm (112%; 120%)	Joshua Tree NP, 2008
PM_{10}	24-hour	150 μg/m³	50 μg/m³	157 μg/m³ (105%; 314%)	Indio, 2007
	Annual	NA[h]	20 μg/m³	56 μg/m³ (NA; 280%)	Indio, 2007
$PM_{2.5}$	24-hour	35 μg/m³	NA	26.8 μg/m³ (77%; NA)	Indio, 2004
	Annual	15.0 μg/m³	12 μg/m³	10.8 μg/m³ (72%; 90%)	Indio, 2004
Pb	30-day	NA	1.5 μg/m³	NA	NA
	Calendar quarter	1.5 μg/m³	NA	0.02 μg/m³ (1.3%; NA)	Rubidoux, 2005
	Rolling 3-month	0.15 μg/m³ [i]	NA	NA	NA

a Notation: CO = carbon monoxide; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter with a diameter of ≤2.5 μm; PM_{10} = particulate matter with a diameter of ≤10 μm; and SO_2 = sulfur dioxide.

b Monitored concentrations are the highest for calendar-quarter Pb; second-highest for all averaging times less than or equal to 24-hour averages, except fourth-highest daily maximum for 8-hour O_3 and the 98th percentile for 24-hour $PM_{2.5;}$ and arithmetic mean for annual SO_2, NO_2, PM_{10}, and $PM_{2.5}$.

c Values in parentheses are background concentration levels as a percentage of NAAQS and CAAQS, respectively. Calculation of 1-hour SO_2, 1-hour NO_2, and rolling 3-month Pb to NAAQS was not made, because no measurement data based on new NAAQS are available.

d Effective August 23, 2010.

e NA = not applicable or not available.

f Effective April 12, 2010.

g The EPA revoked the 1-hour O_3 standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

h Effective December 18, 2006, the EPA revoked the annual PM_{10} standard of 50 μg/m³.

i Effective January 12, 2009.

Sources: CARB (2010b); EPA (2010a,b).

Table 9.4.13.1-2 (EPA 2010b). Monitored SO_2, NO_2, CO, and Pb levels were lower than their respective standards (up to 47%). Monitored O_3 and PM_{10} concentrations exceeded both NAAQS and CAAQS. Monitored $PM_{2.5}$ levels were lower than NAAQS and CAAQS but approaching CAAQS.

The PSD regulations (see 40 CFR 52.21), which are designed to limit the growth of air pollution in clean areas, apply to a major new source or modification of an existing major source within an attainment or unclassified area (see Section 4.11.2.3). As a matter of policy, the EPA recommends that the permitting authority notify Federal Land Managers when a proposed PSD source would locate within 62 mi (100 km) of a sensitive Class I area. There are several Class I areas around the Riverside East SEZ, only one of which is situated within 62 mi (100 km). The nearest Class I area is the Joshua Tree NP (40 CFR 81.405), adjacent to the Riverside East SEZ. The eastern portion of this Class I area is located downwind of prevailing winds at the Riverside East SEZ (Figure 9.4.13.1-1) and thus would be affected by activities at the proposed SEZ. The next nearest Class I areas are located beyond 62 mi (100 km), the San Jacinto WA and the San Gorgonio WA, which are about 66 mi (106 km) west and 73 mi (117 km) west-northwest of the Riverside East SEZ, respectively.

9.4.13.2 Impacts

Potential impacts on ambient air quality associated with a solar project would be of most concern during the construction phase. Impacts on ambient air quality from fugitive dust emissions resulting from soil disturbances are anticipated, but they would be of short duration. During the operations phase, only a few sources with generally low-level emissions would exist for any of the four types of solar technologies evaluated. A solar facility would either not burn fossil fuels or burn only small amounts during operation. (For facilities using heat transfer fluids [HTFs], fuel could be used to maintain the temperature of the HTFs for more efficient daily start-up.) Conversely, solar facilities would displace air emissions that would otherwise be released from fossil fuel–fired power plants.

Air quality impacts shared by all solar technologies are discussed in detail in Section 5.11.1, and technology-specific impacts are discussed in Section 5.11.2. Impacts specific to the proposed Riverside East SEZ are presented in the following sections. Any such impacts would be minimized through the implementation of required programmatic design features described in ,Appendix A, Section A.2.2, and through the application of any additional mitigation. Section 9.4.13.3, below, identifies SEZ-specific design features of particular relevance to the Riverside East SEZ.

9.4.13.2.1 Construction

The Riverside East SEZ has a relatively flat terrain; thus only a minimum number of site preparation activities, perhaps with no large-scale earthmoving operations, would be required. However, fugitive dust emissions from soil disturbances during the entire construction phase would be a major concern because of the large areas that would be disturbed in a region that experiences windblown dust problems. Fugitive dusts, which are released near ground level, typically have more localized impacts than similar emissions from an elevated stack, which has additional plume rise induced by buoyancy and momentum effects.

Methods and Assumptions

Air quality modeling for PM_{10} and $PM_{2.5}$ emissions associated with construction activities was performed by using the EPA-recommended AERMOD model (EPA 2009b). Details for emissions estimation, the description of AERMOD, input data processing procedures, and modeling assumption are described in Appendix M, Section M.13. Estimated air concentrations were compared with the applicable NAAQS/CAAQS levels at the site boundaries and nearby communities and with PSD increment levels at nearby Class I areas.[11] For the Riverside East SEZ, the modeling was conducted based on the following assumptions and input:

- Uniformly distributed emissions over the 3,000 acres (12.1 km^2) each and 9,000 acres (36.4 km^2) in total, and in the west-central portion of the SEZ, adjacent to the nearest Class I area (Joshua Tree NP) and north of many scattered residences, including Lake Tamarisk and Desert Center;

- Surface hourly meteorological data from the Blythe Airport and upper air sounding data from Desert Rock/Mercury, Nevada, for the 2005 to 2009 period;

- A regularly spaced receptor grid over a modeling domain of 62 × 62 mi (100 km × 100 km) centered on the proposed SEZ; and

- Additional discrete receptors at the SEZ boundaries and at the nearest Class I area—Joshua Tree NP—adjacent to the northwestern portion of the SEZ.

Results

The modeling results for both PM_{10} and $PM_{2.5}$ concentration increments and total concentrations (modeled plus background concentrations) that would result from construction-related fugitive emissions are summarized in Table 9.4.13.2-1. Maximum 24-hour PM_{10} concentration increments modeled to occur at the site boundaries would be an estimated 627 $\mu g/m^3$, which far exceeds the relevant NAAQS level of 150 $\mu g/m^3$ or the CAAQS level of 50 $\mu g/m^3$. Total 24-hour PM_{10} concentrations of 784 $\mu g/m^3$ would also exceed the NAAQS and CAAQS levels at the SEZ boundary. However, high PM_{10} concentrations would be limited to

[11] To provide a quantitative assessment, the modeled air impacts of construction were compared to the NAAQS/CAAQS levels and the PSD Class I increment levels. Although the Clean Air Act exempts construction activities from PSD requirements, a comparison with the Class I increment levels was used to quantify potential impacts. Only monitored data can be used to determine the attainment status. Modeled data are used to assess potential problems and as a consideration in the permitting process.

TABLE 9.4.13.2-1 Maximum Air Quality Impacts from Emissions Associated with Construction Activities for the Proposed Riverside East SEZ

			Concentration ($\mu g/m^3$)				Percentage of NAAQS/CAAQS[e]	
Pollutant[a]	Averaging Time	Rank[b]	Maximum Increment[b]	Background[c]	Total	NAAQS/ CAAQS[d]	Increment	Total
PM_{10}	24-hour	H6H	627	157	784	150/50	418/1,255	523/1,569
	Annual	NA[f]	94.1	56.0	150	NA/20	NA/471	NA/751
$PM_{2.5}$	24-hour	H8H	44.2	26.8	71.0	35/NA	126/NA	203/NA
	Annual	NA	9.4	10.8	20.2	15.0/12	63/78	135/168

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

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

c See Table 9.4.13.1-2.

d First and second values are NAAQS and CAAQS, respectively.

e First and second values are concentration levels as a percentage of NAAQS and CAAQS, respectively.

f NA = not applicable.

the immediate area surrounding the SEZ boundary and would decrease quickly with distance. Predicted maximum 24-hour PM_{10} concentration increments would be about 90 to 150 $\mu g/m^3$ at the nearest residences, scattered over the north of Lake Tamarisk; about 80 $\mu g/m^3$ at Lake Tamarisk; 40 $\mu g/m^3$ at Desert Center; 20 $\mu g/m^3$ at Eagle Mountain Pumping Station; and 10 $\mu g/m^3$ or less at residences around the eastern SEZ near Blythe. Concentration contours indicate that higher concentrations are limited to the boundary of Joshua Tree NP and from around the foot of higher elevations. Concentrations at higher elevations are relatively low (a maximum of about 20 $\mu g/m^3$). Annual average modeled PM_{10} concentration increments and total concentrations (increment plus background) at the SEZ boundary would be about 94.1 $\mu g/m^3$ and 150 $\mu g/m^3$, respectively, which are much higher than the CAAQS level of 20 $\mu g/m^3$. Annual PM_{10} increments would be much lower for the mentioned residences, about 2 to 10 $\mu g/m^3$ at the nearest residences, scattered over the north of Lake Tamarisk; about 2 $\mu g/m^3$ at Lake Tamarisk; and about 1 $\mu g/m^3$ at Desert Center and Eagle Mountain Pumping Station. Total 24-hour $PM_{2.5}$ concentrations would be 71 $\mu g/m^3$ at the SEZ boundary, which is much higher than the NAAQS level of 35 $\mu g/m^3$; the modeled increment contributes about twice as much as background concentrations to this total. The total annual average $PM_{2.5}$ concentration would be 20.2 $\mu g/m^3$, which is above the NAAQS and CAAQS levels of 15.0 and 12 $\mu g/m^3$, respectively. At the nearby residences, predicted maximum 24-hour and annual $PM_{2.5}$ concentration increments would be about 7.6 and 0.7 $\mu g/m^3$, respectively.

Predicted 24-hour and annual PM_{10} concentration increments at the nearest Class I Area, Joshua Tree NP, would be about 417 and 29.8 $\mu g/m^3$, or 5,200% and 746% of the PSD increments for Class I Areas, respectively.

In conclusion, predicted 24-hour and annual PM_{10} and $PM_{2.5}$ concentration levels could exceed NAAQS and CAAQS levels at the SEZ boundaries and in immediate surrounding areas during the construction of solar facilities. To reduce potential impacts on ambient air quality and to comply with BLM design features, aggressive dust control measures would be used. Potential air quality impacts on nearby residences and cities would be lower. Modeling indicates that construction activities could result in concentrations far above Class I PSD PM_{10} increments at the nearest federal Class I area (Joshua Tree NP). Construction activities are not subject to the PSD program and the comparison provides only a screen for gauging the size of the impact. Additionally, the assumed scenario—in which three construction projects would occur simultaneously near the western central portion of the SEZ—is quite conservative. If locations of construction were spread across the SEZ or the projects occurred at different times, potential impacts would be anticipated to be much lower than the aforementioned values. Accordingly, impacts of construction activities on ambient air quality would be expected to be moderate and temporary.

Construction emissions from the engine exhaust from heavy equipment and vehicles could cause impacts on AQRVs (e.g., visibility and acid deposition) at the adjacent federal Class I area, Joshua Tree NP, which is located downwind of prevailing winds, if construction were to occur in the western portion of the SEZ. SO_x emissions from engine exhaust would be very low, because BLM design features would require that ultra-low-sulfur fuel with a sulfur content of 15 ppm be used. NO_x emissions from engine exhaust would be primary contributors to potential impacts on AQRVs. Construction-related emissions are temporary in nature and thus would cause some unavoidable but short-term impacts.

For this analysis, the impacts of construction and operation of transmission lines outside of the SEZ were not assessed, assuming that one or more of the existing transmission lines (ranging from 69 kV to 500 kV) located within the SEZ might be used to connect some new solar facilities to load centers, and that additional project-specific analysis would be done for new transmission construction or line upgrades. However, some construction of transmission lines could occur within the SEZ. Potential impacts on ambient air quality would be a minor component of construction impacts in comparison with solar facility construction and would be temporary in nature.

9.4.13.2.2 Operations

Emission sources associated with the operation of a solar facility would include auxiliary boilers; vehicle (commuter, visitor, support, and delivery) traffic; maintenance (e.g., mirror cleaning and repair and replacement of damaged mirrors); and drift from cooling towers for the parabolic trough or power tower technologies if wet cooling was implemented (drift consists of low-level PM emissions).

The type of emission sources caused by and offset by operation of a solar facility are discussed in Appendix M, Section M.13.4.

Estimates of potential air emissions displaced by the solar project development at the Riverside East SEZ are presented in Table 9.4.13.2-2. Total power generation capacity ranging from 18,035 to 32,463 MW is estimated for the Riverside East SEZ for various solar technologies (see Section 9.4.2). The estimated amount of emissions avoided for the solar technologies evaluated depends only on the megawatts of conventional fossil fuel–generated power displaced, because a composite emission factor per megawatt-hour of power by conventional technologies is assumed (EPA 2009c). If the Riverside East SEZ were fully developed, emissions avoided would be expected to be substantial. Development of solar power in the SEZ would result in avoided air emissions ranging from 30% to 54% of total emissions of SO_2, NO_x, Hg, and CO_2 from electric power systems in the state of California (EPA 2009c).

TABLE 9.4.13.2-2 Annual Emissions from Combustion-Related Power Generation Displaced by Full Solar Development of the Proposed Riverside East SEZ

Area Size (acres)	Capacity (MW)[a]	Power Generation (GWh/yr)[b]	Emissions Displaced (tons/yr; 10^3 tons/yr for CO_2)[c]			
			SO_2	NO_x	Hg	CO_2
202,896	18,035–32,463	31,598–56,876	4,040–7,272 (23,867–42,961)	6,636–11,944 (35,174–63,313)	0.06–0.11 (0.28–0.50)	15,699–28,258 (24,932–44,878)
Percentage of total emissions from electric power systems in California[d]			30–54%	30–54%	30–54%	30–54%
Percentage of total emissions from all source categories in California[e]			5.7–10%	0.55–1.0%	NA[f]	3.6–6.6%
Percentage of total emissions from electric power systems in the six-state study area[d]			1.6–2.9% (9.5–17%)	1.8–3.2% (9.5–17%)	2.0–3.6 (9.5–17%)	6.0–11% (9.5–17%)
Percentage of total emissions from all source categories in the six-state study area[e]			0.86–1.5% (5.1–9.1%)	0.25–0.44% (1.3–2.3%)	NA (NA)	1.9–3.4% (3.0–5.4%)

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

[b] Assumed a capacity factor of 20%.

[c] Composite combustion-related emission factors for SO_2, NO_x, Hg, and CO_2 of 0.26, 0.42, 3.7×10^{-6}, and 994 lb/MWh, respectively, were used for the state of California. Values in parentheses are estimated based on composite combustion-related emission factors for SO_2, NO_x, Hg, and CO_2 of 1.51, 2.23, 1.8×10^{-5}, and 1,578 lb/MWh, respectively, averaged over six southwestern states.

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

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

[f] NA = not estimated.

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

Avoided emissions would be up to 11% of total emissions from electric power systems in the six-state study area. When compared with all source categories, power production from the same solar facilities would displace up to 10% of SO_2, 1.0% of NO_x, and 6.6% of CO_2 emissions in the state of California (EPA 2009a; WRAP 2009). These emissions would be up to 3.4% of total emissions from all source categories in the six-state study area. Power generation from fossil fuel–fired power plants accounts for only 53% of the total electric power generation in California, most of which is from natural gas combustion. Thus, solar facilities to be built in the Riverside East SEZ could considerably reduce fuel combustion-related emissions in California but relatively less so than those built in other states with higher fossil use rates.

About one-quarter of electricity consumed in California is generated out of state, with about three-quarters of this amount coming from the southwestern states. Thus, it is possible that a solar facility in California would replace power from fossil fuel–fired power plants outside of California but within the six-state study area. It is also possible that electric power transfer between the states will increase in the future. To assess potential region-wide emissions benefit, emissions being displaced were also estimated based on composite emission factors averaged over the six-state study area. For SO_2, NO_x, and Hg, composite emission factors for the six-state study area would be about 5 to 6 times higher than those for California alone. For CO_2, the six-state emission factor is about 60% higher than the California-only emission factor. If the Riverside East SEZ were fully developed, emissions avoided would be considerable. Development of solar power in the SEZ would result in avoided air emissions ranging from 9.5% to 17% of total emissions of SO_2, NO_x, Hg, and CO_2 from electric power systems in the six southwestern states. These emissions would be up to 9.1% of total emissions from all source categories in the six-state study area.

As discussed in Section 5.11.1.5, the operation of associated transmission lines would generate some air pollutants from activities such as periodic site inspections and maintenance. However, these activities would occur infrequently, and the amount of emissions would be small. In addition, transmission lines could produce minute amounts of O_3 and its precursor NO_x associated with corona discharge (i.e., the breakdown of air near high-voltage conductors), which is most noticeable for higher-voltage lines during rain or very humid conditions. Since the Riverside East SEZ is located in an arid desert environment, these emissions would be small, and potential impacts on ambient air quality would be negligible, considering the infrequent occurrences and small amount of emissions from corona discharges.

9.4.13.2.3 Decommissioning/Reclamation

As discussed in Section 5.11.1.4, decommissioning/reclamation activities are similar to construction activities but on a more limited scale and of shorter duration. Potential impacts on ambient air quality would be correspondingly less than those from construction activities. Decommissioning activities would last for a short period, and their potential impacts would be moderate and temporary. The same mitigation measures adopted during the construction phase would be implemented during the decommissioning phase (Section 5.11.3).

9.4.13.3 SEZ-Specific Mitigation Measures and Mitigation Effectiveness

No SEZ-specific design features are required. Limiting dust generation during construction and operations at the proposed Riverside East SEZ (such as increased watering frequency or road paving or treatment) is a required design feature under BLM's proposed Solar Energy Program. These extensive fugitive dust control measures would keep off-site PM levels as low as possible during construction.

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9.4.14 Visual Resources

9.4.14.1 Affected Environment

The proposed Riverside East SEZ is located in the Chuckwalla Valley and the southern portion of the Palen Valley approximately 6.7 mi (10.9 km) west of the California–Arizona border within the CDCA in Riverside County in southern California. The SEZ lies within the Mojave basin and range physiographic province, typified by small, rocky mountain ranges with jagged peaks alternating with talus slopes and desert floor. Flat basins form broad flat expanses of barren plains, generally with low scrub vegetation and expansive views. Dark browns and garnets are the dominant mountain hues, although blues and purples prevail as viewing distance increases. In contrast, lighter brown and tan soils dominate the desert floor, sparsely dotted with the grey-green of Sonoran creosotebush and golden bursage scrub vegetation (BLM and CEC 2010a).

The SEZ includes portions of both the Sonoran Basin and Range ecoregion and the western portion of the Mojave Basin and Range ecoregion (EPA 2007) and is located within two of the USFS's ecological subsections: Chuckwalla Valley and Palo Verde Valley and Mesa. Both are characterized by very gently to moderately sloping alluvial fans, with nearly level basin floors (USFS 1997).

Within the Chuckwalla Valley, elevations range from 350 ft (106.7 m) at Ford Dry Lake to about 800 ft (243.8 m). The small surrounding mountain ranges rise 3,000 to 5,000 ft (914.4 to 1,524 m) above mean sea level. Visually prominent mountain ranges around the valley include the Big Maria Mountains to the east; the Little Maria, Palen, and McCoy ranges to the north; the Coxcomb Mountains within Joshua Tree NP to the northwest; the Eagle Mountains to the west, the majority of which are within Joshua Tree NP; the Chuckwalla and Little Chuckwalla Mountains to the south; and the Mule and Palo Verde Mountains to the southeast. The SEZ and surrounding mountain ranges are shown in Figure 9.4.14.1-1.

The Riverside East SEZ (202,896 acres [821 km^2]) occupies an area approximately 46 mi (74 km) east to west (at greatest extent) and 27 mi (43 km) north to south (at greatest extent), and is located approximately 8.4 mi (13.5 km) (at closest approach) west of the town of Blythe and 47 mi (76 km) east of the community of Indio. The community of Desert Center is located adjacent to the southwest corner of the SEZ. I-10 runs through the eastern portion of the SEZ and then along most of its southern border. There are a number of exits to local roads off I-10 as it passes by and through the SEZ. State Route 177 passes through the west side of the SEZ in a northeasterly direction, and the Midland-Rice Road and a railroad pass through the eastern portion of the SEZ in a northwesterly direction.

The SEZ is located within the flat plains of the Chuckwalla and Palen Valley floors, and the strong horizon line and the above-mentioned mountain ranges surrounding the valley are the dominant visual features. Elevation within the SEZ ranges from a low of 250 ft (76 m) on the southeastern border of the SEZ near Blythe to a high of 1,690 ft (516 m) on the northeastern border of the SEZ in the Big Maria Mountains; however, the valley floor ranges from

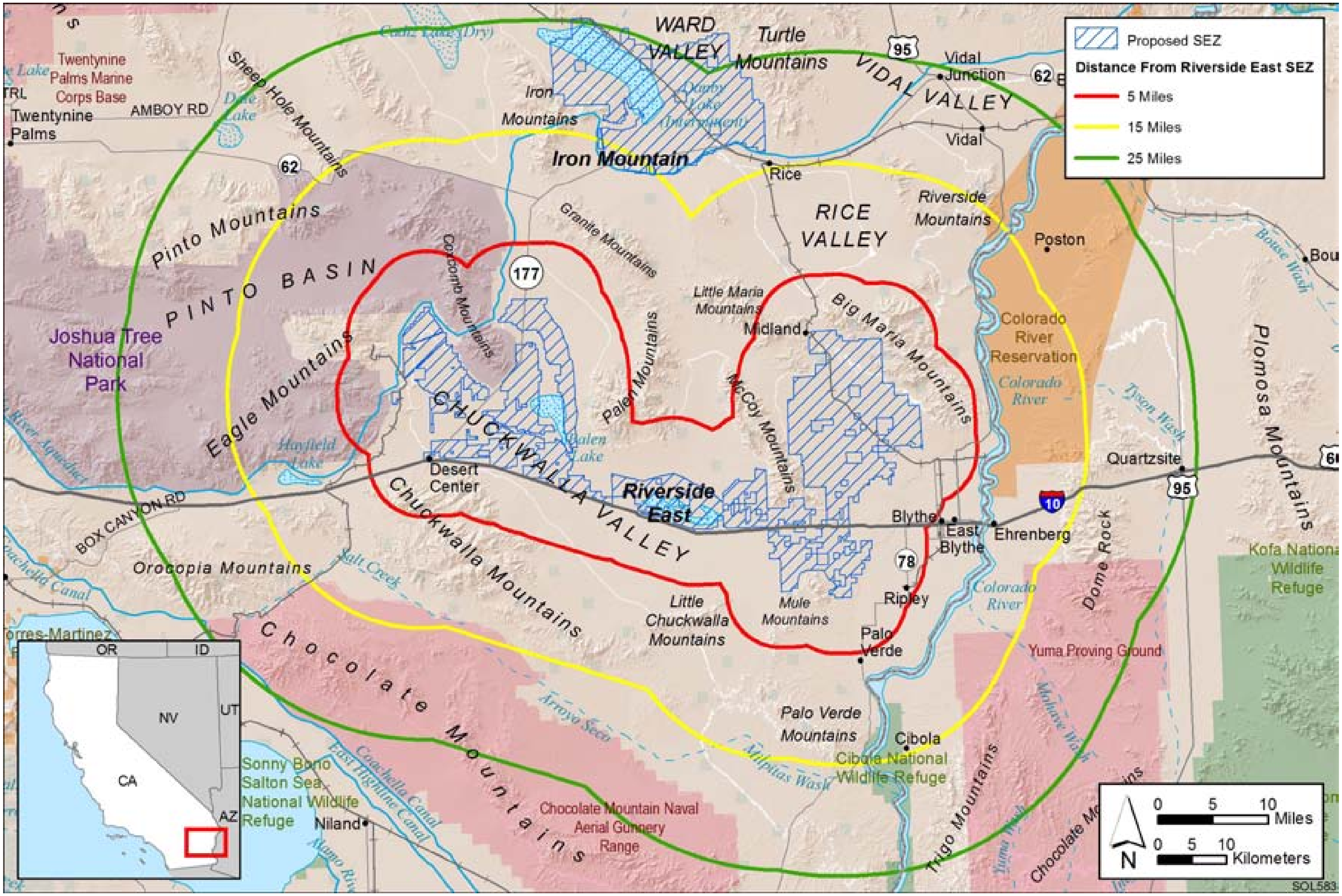

FIGURE 9.4.14.1-1 Proposed Riverside East SEZ and Surrounding Lands

approximately 360 to 750 ft (110 to 230 m). The western portion generally slopes gently southward to a low point at Ford Dry Lake, while the eastern portion of the SEZ slopes southeastward toward the Colorado River. The flatness of the valley and general absence of screening vegetation afford panoramic views of the vast valley floor and the surrounding mountain ranges that form a visual backdrop.

The Chuckwalla Valley is located within the ecotone between the Mojave and Sonoran Deserts; thus the SEZ, although very flat, is vegetatively diverse. While much of the area is dominated by creosote shrublands or areas with very little vegetation, the eastern portion of the SEZ, especially along McCoy Wash and its tributaries, contains a well-developed ironwood/palo verde community.

Much of the SEZ consists of flats with widely spaced, olive green creosote bushes and other low shrubs of various green and brown hues, but there are also dry lake beds, sandy areas, and dry washes with ironwood and other trees. The diverse landscape types result in somewhat varied colors and textures, although foreground textures are generally coarse. Soils are generally very light tan and visually prominent over most of SEZ due to the sparse vegetation. Other portions of the SEZ contain generally light gray gravel flats. Some areas are devoid or nearly devoid of vegetation.

No permanent water features are present on the SEZ. This landscape type is common within the region.

Although the SEZ itself is generally natural appearing, cultural modifications within the SEZ detract somewhat from the SEZ's scenic quality. In addition to I-10, State Route 177, and Midland Road, several gravel and dirt roads of various sizes cross the SEZ. Transmission lines also cross the SEZ. An apparently abandoned railroad runs through the eastern portion of the SEZ. The Midland Long Term Visitor Area is also located on the east side of the SEZ. An existing 500-kV transmission line runs east–west along I-10 and parallel to the southern SEZ boundary. In addition, a 230-kV line passes through the far western section of the SEZ, and a 69-kV line passes through the eastern portion of the SEZ, along with other transmission lines (see Section 9.4.2).

Off-site views are dominated by the surrounding mountain ranges, which, in some cases, for example, the Coxcomb, McCoy, Big Maria, Little Maria, and Mule Mountains, rise from the valley floor immediately adjacent to the SEZ. Other ranges, such as the Eagle, Chuckwalla, Little Chuckwalla, and Palen Mountains, are separated from the SEZs by one to several miles of bajadas or valley floor. The mountain slopes and peaks around the SEZ are, in general, visually pristine, as they are largely within congressionally designated WAs.

The general lack of topographic relief, water, and variety results in low scenic quality on the valley floor; however, because of the flatness of the landscape, the lack of trees, and the breadth of the Chuckwalla Valley, the SEZ presents a vast panoramic landscape with sweeping views of the surrounding mountains that add significantly to the scenic quality of the SEZ. In general, the mountains appear to be devoid of vegetation, and their generally jagged, irregular form and brown/garnet colors provide dramatic visual contrasts to the strong horizontal line, green vegetation, and light-colored soils of the valley floor, particularly when viewed from nearby locations within the SEZ. Panoramic views of the SEZ are shown in Figures 9.4.14.1-2, 9.4.14.1-3, and 9.4.14.1-4.

Off-site cultural modifications near the SEZ detract somewhat from the SEZ's scenic quality. The abandoned Eagle Mountain Mine is prominently visible in the Eagle Mountains from the far northwest portion of the SEZ. Near the western boundary of the SEZ are several small, private lots and homes, including a housing development at Lake Tamarisk, immediately adjacent to the farthest southwest portion of the SEZ. Ironwood State Prison is visible from nearby locations within the far southeastern portion of the SEZ. Traffic on I-10 adjacent to or near the SEZ is visible from the southern portions of the SEZ.

While the lands to the north and west of the SEZ are generally undeveloped mountains, the lands to the southeast are agricultural, and there is development visible along I-10 just south of the SEZ, though areas south of the SEZ beyond I-10 are generally undeveloped. Aside from agriculture and development in the I-10 corridor, off-site views from the SEZ include isolated ranches, homes, and associated structures located on private lands near the SEZ, as well as local roads and airstrips. Scattered tanks and other structures associated with ranching and farming are also visible.

While these cultural modifications within and around the SEZ generally detract from the scenic quality of the SEZ, the SEZ is so large that from many locations within it, these features are either not visible or so distant as to have minimal effect on views. In addition, most of the cultural disturbances are found in or near the southern and far western portions of the SEZ. From most locations within the SEZ, particularly in the northern and eastern portions of the SEZ, the landscape is generally natural in appearance, with little disturbance apparent.

The BLM conducted a Visual Resource Inventory (VRI) for the SEZ and surrounding lands in 2010 (BLM 2010e). The VRI evaluates BLM-administered lands based on *scenic quality*; *sensitivity level,* in terms of public concern for preservation of scenic values in the evaluated lands; and *distance* from travel routes or key observation points. Based on these three factors, BLM-administered lands are placed into one of four Visual Resource Inventory Classes, which represent the relative value of the visual resources. Class I and II are the most valued; Class III represents a moderate value; and Class IV represents the least value. Class I is reserved for specially designated areas, such as national wildernesses and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape. Class II is the highest rating for lands without special designation. More information about VRI methodology is available in Section 5.7 and in *Visual Resource Inventory*, BLM Manual Handbook 8410-1 (BLM 1986a).

The VRI map for the SEZ and surrounding lands is shown in Figure 9.4.14.1-5. The VRI classes for the SEZ are VRI Class II, indicating high relative visual values; Class III, indicating moderate relative visual values; and Class IV, indicating low relative visual values. Within the SEZ, VRI Class II areas include lands within 5 mi (8 km) of Joshua Tree NP in the northwestern portion of the SEZ, and lands in the southeastern portion of the SEZ between the Palen Mountains and the Little Chuckwalla Mountains. The inventory indicates moderate scenic

FIGURE 9.4.14.1-2 Approximately 120° Panoramic View of Western Portion of the Proposed Riverside East SEZ from Desert Center Facing Northeast, Including Lake Tamarisk (foreground) and Coxcomb Mountains in Joshua Tree NP (background center)

FIGURE 9.4.14.1-3 Approximately 180° Panoramic View of the Proposed Riverside East SEZ from I-10 near Ford Dry Lake Facing North, Including Chuckwalla Mountains (far left), Palen Mountains (background center), and McCoy Mountains (right)

FIGURE 9.4.14.1-4 Approximately 120° Panoramic View of the Northeastern Portion of the Proposed Riverside East SEZ from McCoy Wash Facing Northeast, Including Big Maria Mountains

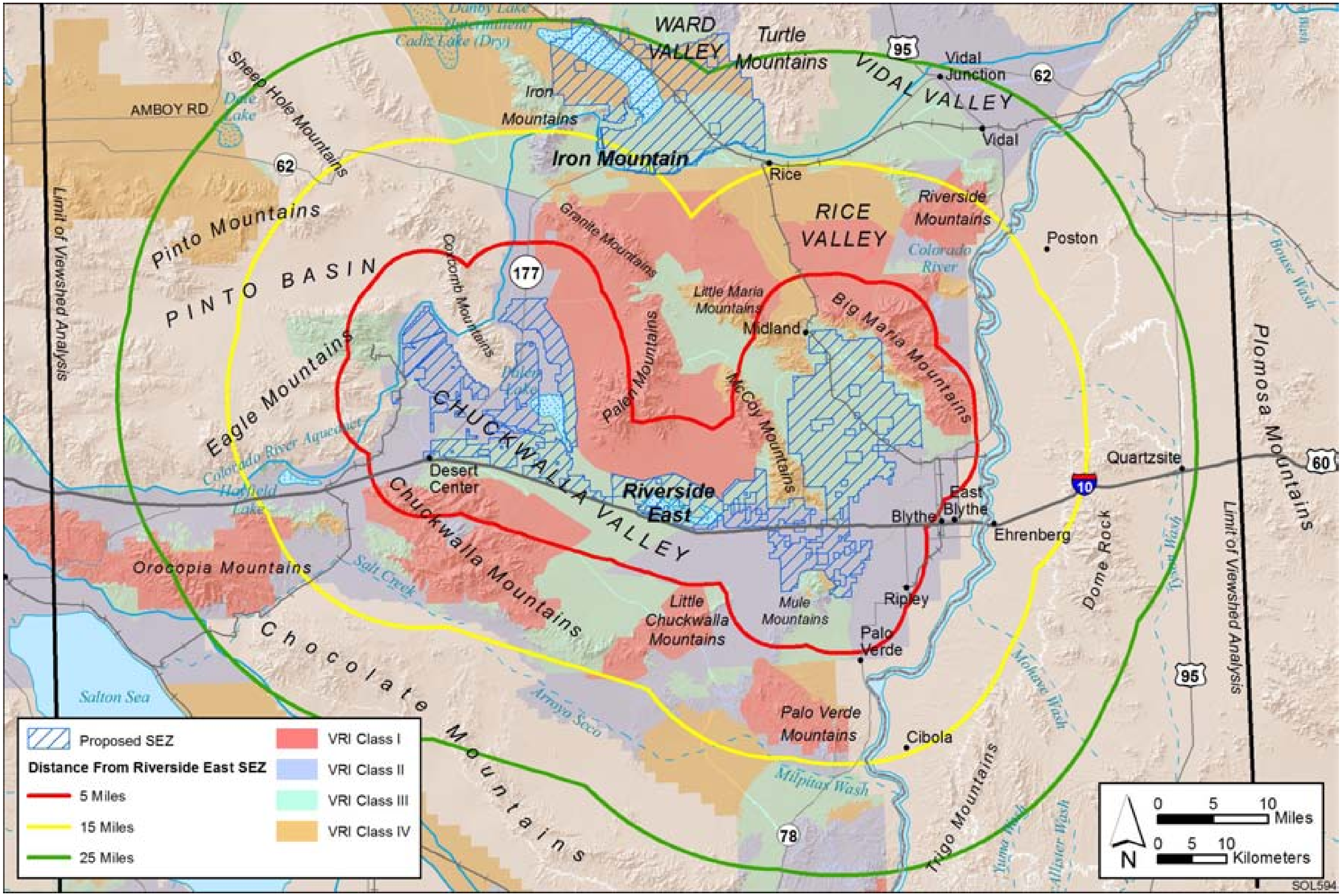

FIGURE 9.4.14.1-5 Visual Resource Inventory Values for the Proposed Riverside East SEZ and Surrounding Lands

quality for the Chuckwalla Valley. The scenic quality rating includes a high score for attractive off-site views and low scores for landform variety and the presence of water. The inventory indicates high sensitivity for the SEZ lands near Joshua Tree NP, noting a high level of public concern for the heavily visited NP. The inventory indicates high sensitivity for the Class II area in the southeastern portion of the SEZ, based on heavy recreational use, the presence of a BLM Backcountry Byway (the Bradshaw Trail) and historic trails, and close proximity to congressionally designated wilderness and ACECs. Both areas were designated as foreground–middleground distance zones, based on proximity to major or secondary travel routes.

VRI Class III lands include the central portion of the Chuckwalla Valley within the west–central, southern, and northeastern parts of the SEZ. These lands received lower sensitivity ratings than the Class II areas, primarily because they are farther from Joshua Tree NP and other high-value scenic resource areas. They received moderate scores for sensitivity, in part because of high visibility from I-10, their inclusion in the CDCA, and their proximity to the NP and other WAs. VRI Class IV lands include very small areas on the edges of the northeastern part of the SEZ, corresponding to areas where mining damage in the McCoy and Big Maria Mountains is visible.

In the Barstow, El Centro, Needles, and Palm Springs-South Coast FOs, lands within the 25-mi (40-km), 650-ft (198-m) viewshed of the SEZ contain 318,419 acres (1,288.60 km^2) of VRI Class I areas in Palen-McCoy WA and other special designation lands; 390,052 acres (1,578.48 km^2) of VRI Class II areas, primarily west, southwest, and southeast of the SEZ; 429,146 acres (1,736.69 km^2) of Class III areas, primarily in the Chuckwalla Valley north and south of the SEZ; and 176,428 acres (713.98 km^2) of VRI Class IV areas, concentrated primarily in heavily mined mountain ranges and the floors of valleys adjacent to Chuckwalla Valley, including Rice and Ward Valleys.

BLM has not assigned VRM classes to the SEZ and surrounding lands. More information about the BLM VRM program is available in Section 5.12 and in *Visual Resource Management*, BLM Manual Handbook 8400 (BLM 1984).

9.4.14.2 Impacts

The potential for impacts from utility-scale solar energy facilities on visual resources within the proposed Riverside East SEZ and surrounding lands, as well as the impacts of related projects (e.g., access roads and transmission lines) outside of the SEZ, is presented in this section.

Site-specific impact assessment is needed to systematically and thoroughly assess visual impact levels for a particular project. Without precise information about the location of a project and a relatively complete and accurate description of its major components and their layout, it is not possible to assess precisely the visual impacts associated with the facility. However, if the general nature and location of a facility are known, a more generalized assessment of potential visual impacts can be made by describing the range of expected visual changes and discussing contrasts typically associated with these changes. In addition, a general analysis can be used to identify sensitive resources that may be at risk if a future project is sited in a particular area. Detailed information about the methodology employed for the visual impact assessment for this PEIS, including assumptions and limitations, is presented in Appendix M.

Potential Glint and Glare Impacts. Similarly, the nature and magnitude of potential glint- and glare-related visual impacts for a given solar facility are highly dependent on viewer position, sun angle, the nature of the reflective surface and its orientation relative to the sun and the viewer, atmospheric conditions, and other variables. The determination of potential impacts from glint and glare from solar facilities within a given proposed SEZ would require precise knowledge of these variables and is not possible given the scope of this PEIS. Therefore, the following analysis does not describe or suggest potential contrast levels arising from glint and glare for facilities that might be developed within the SEZ; however, it should be assumed that glint and glare are possible visual impacts from *any* utility-scale solar facility, regardless of size, landscape setting, or technology type. The occurrence of glint and glare at solar facilities could potentially cause large though temporary increases in brightness and visibility of the facilities. The visual contrast levels projected for sensitive visual resource areas discussed in the following analysis do not account for potential glint and glare effects; however, these effects would be incorporated into a future site- and project-specific assessment that would be conducted for specific proposed utility-scale solar energy projects. For more information about potential glint and glare impacts associated with utility-scale solar energy facilities, see Section 5.12 of this PEIS.

9.4.14.2.1 Impacts on the Proposed Riverside East SEZ

Some or all of the SEZ could be developed for one or more utility-scale solar energy projects, utilizing one or more of the solar energy technologies described in Appendix F. Because of the industrial nature and large size of utility-scale solar energy facilities, large visual impacts on the SEZ would occur as a result of the construction, operation, and decommissioning of solar energy projects. In addition, large impacts could occur at solar facilities utilizing highly reflective surfaces or major light-emitting facility components (solar dish, parabolic trough, and power tower technologies), with lesser impacts associated with reflective surfaces expected from PV facilities. These impacts would be expected to involve major modification of the existing character of the landscape and would likely dominate the views from nearby locations. Additional, and potentially large impacts would occur as a result of the construction, operation, and decommissioning of related facilities, such as access roads and electric transmission lines within the SEZ (however, no new transmission line construction outside of the proposed SEZ was assessed; see Section 9.4.1.2). While the primary visual impacts associated with solar energy development within the SEZ would occur during daylight hours, lighting required for utility-scale solar energy facilities would be a potential source of visual impacts at night, both within the SEZ and on surrounding lands.

Common and technology-specific visual impacts from utility-scale solar energy development, as well as impacts associated with electric transmission lines, are discussed in Section 5.12 of this PEIS. Impacts would last throughout construction, operation, and decommissioning, and some impacts could continue after project decommissioning. Visual impacts resulting from solar energy development in the SEZ would be in addition to impacts from solar energy development and other development that may occur on other public or private lands within the SEZ viewshed and are subject to cumulative effects. For discussion of cumulative impacts, see Section 9.4.22.4.13 of the PEIS.

The changes described above would be expected to be consistent with BLM VRM objectives for VRM Class IV, as seen from nearby KOPs. The BLM has not assigned VRM classes to the SEZ and surrounding lands. More information about impact determination using the BLM VRM program is available in Section 5.12 and in *Visual Resource Contrast Rating*, BLM Manual Handbook 8431-1 (BLM 1986b).

Implementation of the programmatic design features intended to reduce visual impacts (described in Appendix A, Section A.2.2) would be expected to reduce visual impacts associated with utility-scale solar energy development within the SEZ; however, 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 would generally be limited, but would be important to reduce visual contrasts to the greatest extent possible.

9.4.14.2.2 Impacts on Lands Surrounding the Proposed Riverside East SEZ

Impacts on Selected Sensitive Visual Resource Areas

Because of the large size of utility-scale solar energy facilities and the generally flat, open nature of the proposed SEZ, lands outside the SEZ would be subjected to visual impacts related to construction, operation, and decommissioning of utility-scale solar energy facilities. The affected areas and extent of impacts would depend on a number of visibility factors and viewer distance (for a detailed discussion of visibility and related factors, see Section 5.12). A key component in determining impact levels is the intervisibility between the project and potentially affected lands; if topography, vegetation, or structures screen the project from viewer locations, there is no impact.

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

Because of the large size of the SEZ, the area's topography, and the general lack of screening vegetation, the viewshed of the SEZ is enormous. Within 25 mi (41 km) of the SEZ, 650-ft (198-m) power towers within the SEZ could theoretically be visible within an area of more than 2,100,000 acres (8,500 km^2), which is more than twice the land area of the state of Rhode Island. The viewshed includes large portions of the mountain ranges surrounding the Chuckwalla Valley and some neighboring valleys, including Ward and Rice Valleys, and the Pinto Basin. Because the lands surrounding the SEZ contain a number of sensitive visual resource areas, these areas could be subject to visual impacts associated with solar energy development within the SEZ.

Figure 9.4.14.2-1 shows the combined results of the viewshed analyses for all four solar technologies. The colored portions indicate areas with clear lines of sight to one or more areas within the SEZ and from which solar facilities within these areas of the SEZ would be expected to be visible, assuming the absence of screening vegetation or structures and adequate lighting and other atmospheric conditions. The light brown areas are locations from which PV and parabolic trough arrays located in the SEZ could be visible. Solar dishes and power blocks for CSP technologies would be visible from the areas shaded in light brown and the additional areas shaded in light purple. Transmission towers and short solar power towers would be visible from the areas shaded light brown, light purple, and the additional areas shaded in dark purple. Power tower facilities located in the SEZ could be visible from areas shaded light brown, light purple, dark purple, and at least the upper portions of power tower receivers could be visible from the additional areas shaded in medium brown.

For the following visual impact discussion, the tall solar power tower (650 ft [198.1 m]) and PV and parabolic trough array (24.6 ft [7.5 m]) viewsheds are shown in figures and discussed in the text. These heights represent the maximum and minimum landscape visibility for solar energy technologies analyzed in this PEIS. Viewsheds for solar dish and CSP technology power blocks (38 ft [11.6 m]) and for transmission towers and short solar power towers (150 ft [45.7 m]) are presented in Appendix N. The visibility of these facilities would fall between that for tall power towers and PV and parabolic trough arrays.

Impacts on Selected Federal-, State-, and BLM-Designated Sensitive Visual Resource Areas

Figure 9.4.14.2-2 shows the results of a GIS analysis that overlays selected federal-, state-, and BLM-designated sensitive visual resource areas onto the combined tall solar power tower (650 ft [198.1 m]) and PV and parabolic trough array (24.6 ft [7.5 m]) viewsheds, in order to illustrate which of these sensitive visual resource areas could have views of solar facilities within the SEZ and therefore potentially would be subject to visual impacts from those facilities. Distance zones that correspond with BLM's VRM system-specified foreground–middleground distance (5 mi [8 km]), background distance (15 mi [24.1 km]), and a 25-mi (40.2-km) distance zone are shown as well, in order to indicate the effect of distance from the SEZ on impact levels, which are highly dependent on distance.

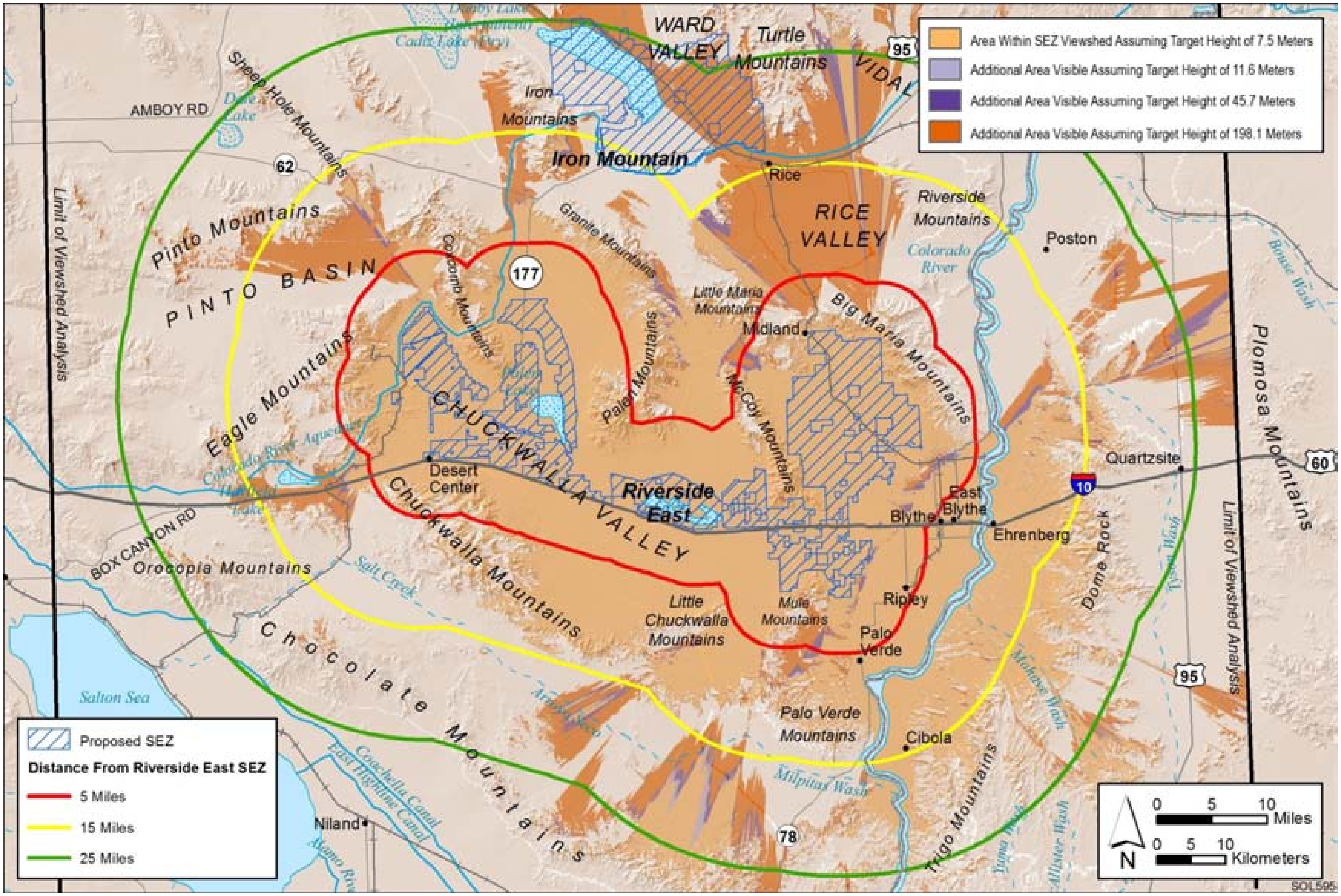

FIGURE 9.4.14.2-1 Viewshed Analyses for the Proposed Riverside East SEZ and Surrounding Lands, Assuming Solar Technology Heights of 24.6 ft (7.5 m), 38 ft (11.6 m), 150 ft (45.7 m), and 650 ft (198.1 m) (shaded areas indicate lands from which solar development within the SEZ could be visible)

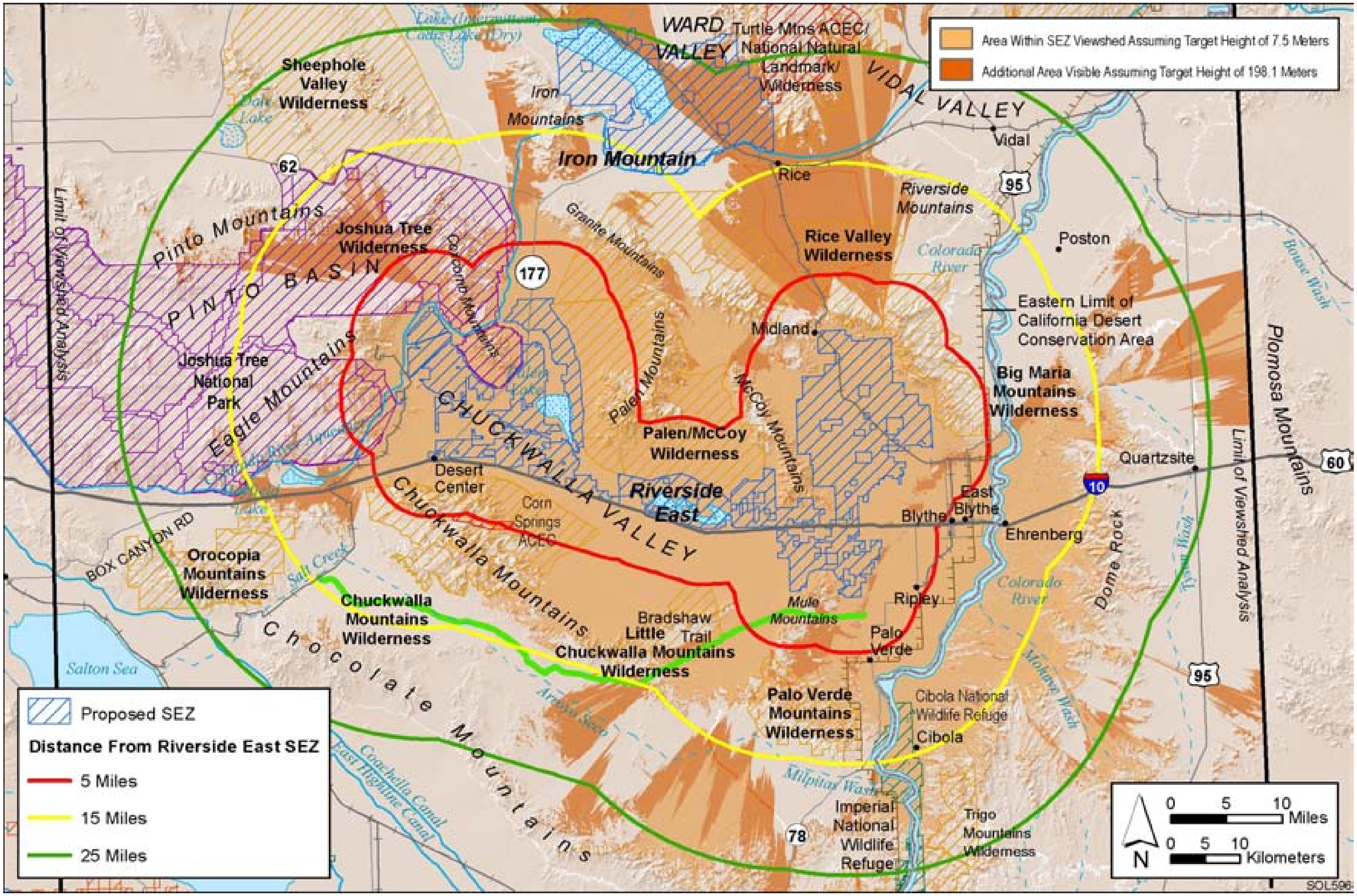

FIGURE 9.4.14.2-2 Overlay of Selected Sensitive Visual Resource Areas onto Combined 650-ft (198.1-m) and 24.6-ft (7.5-m) Viewsheds for the Proposed Riverside East SEZ

The scenic resources included in the analysis were as follows:

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

- Congressionally authorized Wilderness Areas;

- Wilderness Study Areas;

- National Wild and Scenic Rivers;

- Congressionally authorized Wild and Scenic Study Rivers;

- National Scenic Trails and National Historic Trails;

- National Historic Landmarks and National Natural Landmarks;

- All-American Roads, National Scenic Byways, State Scenic highways, and BLM- and USFS-designated scenic highways/byways; BLM-designated Special Recreation Management Areas; and

- ACECs designated because of outstanding scenic qualities.

Potential impacts on specific sensitive resource areas visible from and within 25 mi (40 km) of the proposed Riverside East SEZ are discussed below. The results of this analysis are also summarized in Table 9.4.14.2-1. Further discussion of impacts on these areas is available in Sections 9.4.3 (Specially Designated Areas and Lands with Wilderness Characteristics) and 9.4.17 (Cultural Resources) of this PEIS.

The following visual impact analysis describes *visual contrast levels* rather than *visual impact levels*. *Visual contrasts* are changes in the landscape as seen by viewers, including changes in the forms, lines, colors, and textures of objects seen in the landscape. A measure of *visual impact* includes potential human reactions to the visual contrasts arising from a development activity, based on viewer characteristics, including attitudes and values, expectations, and other characteristics that that are viewer- and situation-specific. Accurate assessment of visual impacts requires knowledge of the potential types and numbers of viewers for a given development and their characteristics and expectations; specific locations where the project might be viewed from; and other variables that were not available or not feasible to incorporate in this PEIS analysis. These variables would be incorporated into a future site- and project-specific assessment that would be conducted for specific proposed utility-scale solar energy projects. For more discussion of visual contrasts and impacts, see Section 5.12 of the PEIS.

TABLE 9.4.14.2-1 Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40.2-km) Viewshed of the Proposed Riverside East SEZ, Assuming a Viewshed Analysis Target Height of 650 ft (198.1 m)

		Feature Area or Linear Distance[a]		
			Visible between	
Feature Type	Feature Name (Total Acreage)	Visible within 5 mi	5 and 15 mi	15 and 25 mi
National Conservation Area	California Desert (25,919,319 acres)	763,254 acres (3%)[b]	479,968 acres (2%)	251,330 acres (1%)
NPs	Joshua Tree (793,331 acres)	53,426 acres (7%)	57,990 acres (7%)	6,175 acres (0.8%)
Scenic Highway	Bradshaw Trail	9 mi (15 km)	14 mi (23 km)	0 acres
WAs	Big Maria Mountains (46,056 acres)	8,873 acres (19%)	0 acres	0 acres
	Chuckwalla Mountains (88,202 acres)	31,482 acres (36%)	18,470 acres (21%)	0 acres
	Imperial Refuge (15,714 acres)	0 acres	0 acres	560 acres (4%)
	Joshua Tree (586,623 acres)	40,421 acres (7%)	55,696 acres (9%)	3,343 acres (0.5%)
	Little Chuckwalla Mountains (28,708 acres)	76 (0.3%)	16,603 acres (58%)	0 acres
	Orocopia Mountains (54,709 acres)	0 acres	143 acres (0.3%)	2,108 acres (4%)
	Palen-McCoy (224,414 acres)	95,559 acres (43%)	75,107 acres (33%)	0 acres
	Palo Verde Mountains (30,403 acres)	0 acres	13,254 acres (44%)	0 acres
	Rice Valley (43,412 acres	7,881 acres (18%)	27,892 acres (64%)	0 acres

TABLE 9.4.14.2-1 (Cont.)

Feature Type	Feature Name (Total Acreage)	Feature Area or Linear Distance[a]		
		Visible within 5 mi	Visible between 5 and 15 mi	Visible between 15 and 25 mi
WAs *(Cont.)*	Sheephole Valley (195,002 acres)	0 acres	357 acres (0.2%)	2,376 acres (1%)
	Trigo Mountains (30,046 acres)	0 acres	0 acres	3,512 acres (12%)
	Turtle Mountains (182,610 acres)	0 acres	0 acres	13,827 acres (8%)
NWRs	Cibola (18,398 acres)	0 acres	7,336 acres (40%)	9,785 acres (53%)
	Imperial (31,465 acres)	0 acres	0 acres	1,749 acres (6%)
National Natural Landmarks	Turtle Mountains (50,057 acres)	0 acres	0 acres	2,355 acres (5%)
ACECs designated for outstanding scenic values	Corn Springs (2,463 acres)	352 acres (14%)	723 acres (29%)	0 acres
	Turtle Mountains (50,057 acres)	0 acres	0 acres	2,355 acres (5%)

[a] To convert acres to km^2, multiply by 0.004047; to convert mi to km, multiply by 1.609.

[b] Percentage of total feature area for areal features.

National Conservation Areas

- *California Desert Conservation Area*—The CDCA is a 26-million-acre (105,000-km^2) parcel of land in southern California designated by Congress in 1976 through the Federal Land Policy and Management Act. About 10 million acres (40,000 km^2) of the CDCA is administered by the BLM. The proposed Riverside East SEZ is located within the CDCA.

- The CDCA management plan notes the "superb variety of scenic values" in the CDCA (BLM 1980), and lists scenic resources as needing management to preserve their value for future generations. The CDCA management plan

GOOGLE EARTH™ VISUALIZATIONS

The visual impact analysis discussion in this section utilizes three-dimensional Google Earth™ perspective visualizations of hypothetical solar facilities placed within the SEZ. The visualizations include simplified wireframe models of a hypothetical solar power tower facility. The models were placed at various locations within the SEZ as visual aids for assessing the approximate size and viewing angle of utility-scale solar facilities. The visualizations are intended to show the apparent size, distance, and configuration of the SEZ, as well as the apparent size of a typical utility-scale solar power tower project and its relationship to the surrounding landscape, as viewed from potentially sensitive visual resource areas within the viewshed of the SEZ.

The visualizations are not intended to be realistic simulations of the actual appearance of the landscape or of proposed utility-scale solar energy projects. The placement of models within the SEZ did not reflect any actual planned or proposed projects within the SEZ and did not take into account engineering or other constraints that would affect the siting or choice of facilities for this particular SEZ. The number of facility models placed in the SEZ does not reflect the 80% development scenario analyzed in this PEIS, but the discussion of expected visual contrast levels does account for the 80% development scenario. A solar power tower was chosen for the models because the unique height characteristics of power tower facilities make their visual impact potential extend beyond other solar technology types.

divides CDCA lands into multiple-use classes based on management objectives. The class designations govern the type and degree of land use actions allowed within the areas defined by class boundaries. All land use actions and resource-management activities on public lands within a multiple-use class delineation must meet the guidelines given for that class.

The proposed SEZ is within areas classified as multiple use classes "L" and "M." The area of the SEZ around Joshua Tree NP and east of Palen-McCoy WA is designated as Class "L." Class "L" protects sensitive, natural, scenic, ecological, and cultural resource values. Class "L" management provides for generally lower intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. Multiple-Use Class "M" (Moderate Use) is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class "M" management is also designed to conserve desert resources and to mitigate damage to those resources caused by permitted uses.

- Utility-scale solar development within the SEZ would be an allowable use under the CDCA management plan, assuming mitigation measures were used to minimize visual impacts; however, construction and operation of solar facilities under the PEIS development scenario would result in substantial visual impacts on the SEZ and some surrounding lands within the SEZ viewshed that could not be completely mitigated.

- Portions of the CDCA within the 650-ft (198.1-m) viewshed for the Riverside East SEZ include approximately 1,494,552 acres (6,048 km^2), or 6% of the total CDCA acreage. Portions of the CDCA within the 24.6-ft (7.5-m) viewshed encompass approximately 1,048,201 acres (4,242 km^2), or 4% of the total CDCA acreage.

National Parks

- *Joshua Tree NP*—A portion of the eastern boundary of Joshua Tree NP is adjacent to the SEZ's northwestern boundary, and other portions of the NP are located between 0.2 and 2.5 mi (0.3 to 4 km) of the SEZ. The park contains paved roads popular for scenic driving, several miles of hiking trails, and four-wheel drive roads. There are campgrounds; backcountry camping and hiking are allowed; and the park is a popular winter climbing area. Stargazing is popular year-round, as is bird watching. Most of the park's services and facilities are in the western portion of the park, as is most recreational use; however, the undeveloped wilderness portions of the park, including those areas near the SEZ, are visited by persons seeking solitude and wilderness experiences or engaging in other activities appropriate to the relatively undisturbed environment.

  As shown in Figure 9.4.14.2-3, the northwest-southeast trending Coxcomb Mountains within the national park project into the northwestern portion of the SEZ. Portions of the SEZ are located both northeast and southwest of the projection, in essence "wrapping around" the Coxcomb Mountains on all sides except the northwest, where the Coxcomb Mountain portion of the national park connects to the main portion of the park. The park is separated from the SEZ by State Route 177 (about 0.05 mi [0.09 km] in width) for about 4 mi (6.4 km), and approximately another 44 mi (71 km) of the park boundary is within 5 mi (8 km, the BLM VRM foreground–middleground distance) of the SEZ.

  The area of the national park within the 650-ft (198.1-m) viewshed of the SEZ includes 117,591 acres (476 km^2), or 15% of the total park acreage. The area within the 24.6-ft (7.5-m) viewshed of the SEZ includes 68,860 acres (279 km^2), or 9% of the total park acreage. The 650-ft (198.1-m) SEZ viewshed extends approximately 14.2 mi (22.9 km) into the national park from the northwestern boundary of the SEZ.

  Figure 9.4.14.2-4 is a Google Earth visualization of the SEZ as seen from an unnamed ridge in the northeastern portion of the national park, near the southeast end of the Coxcomb Mountains. The visualization includes simplified wireframe models of a hypothetical solar power tower facility. The models were placed at various locations within the SEZ, as a visual aid for assessing the approximate size and viewing angle of utility-scale solar

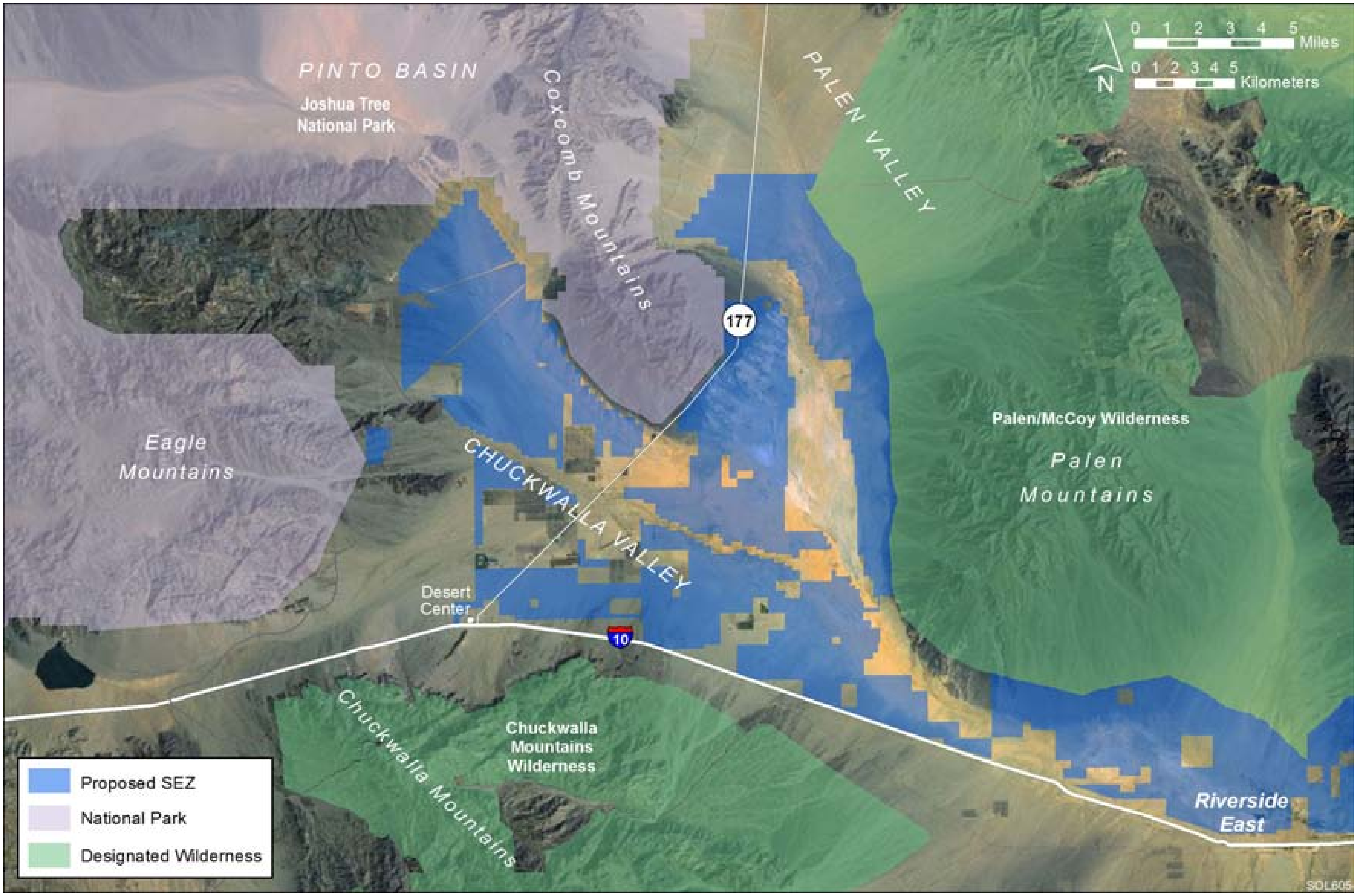

FIGURE 9.4.14.2-3 Photomap of the Proposed Riverside East SEZ (shown in blue tint) and Surrounding Lands in the Vicinity of Joshua Tree NP

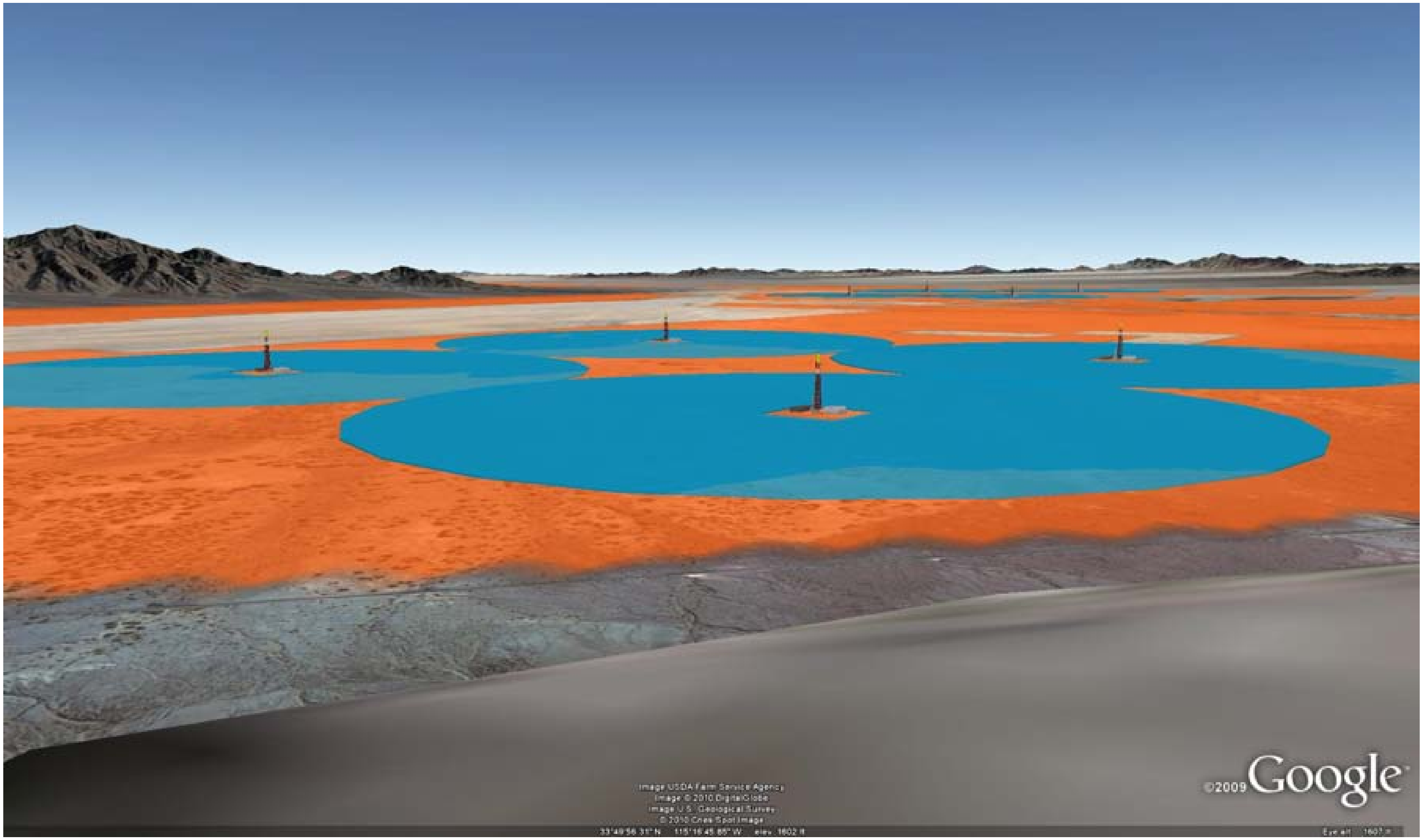

FIGURE 9.4.14.2-4 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Viewpoint in Southeast Coxcomb Mountains within Joshua Tree NP

facilities. The receiver towers depicted in the visualization are properly scaled models of a 459-ft (139.9-m) power tower with an 867-acre (3.5-km^2) field of 12-ft (3.7-m) heliostats, each representing approximately 100 MW of electric generating capacity. Eleven groups of four models and two groups of two models were placed in the SEZ for this and other visualizations shown in this section of this PEIS. In the visualization, the SEZ area is depicted in orange, the heliostat fields in blue.

The viewpoint in the visualization is from a highpoint on the first ridge in the Coxcomb Mountains within the NP west of the SEZ, and approximately 0.8 mi (1.3 km) from the SEZ boundary. The viewpoint elevation is approximately 1,600 ft (490 m) above mean sea level, and the viewpoint is elevated roughly 1,100 ft (340 m) above the valley floor at the closest point within the SEZ.

The upper slopes and peaks of the Coxcomb Mountains are barren with little opportunity for screening. The visualization suggests that from this elevated viewpoint and very short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. The view direction shown in the visualization (south–southeast) is near the middle of an approximately 180-degree horizontal arc in which portions of the SEZ and associated solar facilities would be visible from this location before nearby mountains screened the view of the SEZ.

Two clusters of four power tower facility models are visible; the closest tower of the model cluster in the immediate foreground is approximately 1.8 mi (2.8 km) from the viewpoint, and the closest tower of the model cluster in the background is approximately 9.0 mi (14.5 km) from the viewpoint. The potential visual contrast expected for this viewpoint would vary depending on project locations, technologies, and site designs; however, if facilities were located at these distances, the following might be observed: The tops of solar collector/reflector arrays in the closest parts of the SEZ would be visible. Details of array components (mirrors, panels, dishes, heliostats, and so on) would likely be visible and could be a source of reflections. At short distances, the effects of atmospheric haze would be reduced, so that any bright colors on facilities and shadow contrasts might be easily seen. Worker activity would likely be visible as well.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) likely would be visible projecting above the collector/reflector arrays, and their structural details could be evident at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power towers were present within the SEZ, when operating, receivers at distances of a few miles or less would likely appear as brilliant nonpoint (i.e., having visible cylindrical or rectangular surfaces) light sources atop clearly discernable tower structures against the backdrop of the valley floor and could potentially cause discomfort when looked at directly. Also, during certain times of the day from certain angles, sunlight on dust particles in the air might result in the appearance of light streaming down from the tower(s). The power towers likely would strongly attract visual attention, as seen from this viewpoint.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from the national park and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

Facilities at greater distances from the viewpoint would be seen at a lower viewing angle, and because the facilities would be seen more edge-on, the visible area of the facilities would be much smaller. Facilities sufficiently far away would appear as lines or thin bands that would tend to repeat the line of the horizon, reducing visual contrast. Atmospheric haze would tend to reduce color contrast and the sharpness of shadows and strong geometric outlines of facility components and, when combined with the low viewing angle, could make distant facilities harder to discern from the background textures, colors, and forms.

Because the viewpoint in this visualization is elevated and very close to the SEZ, the SEZ would occupy most of the field of view, and under the 80% development scenario analyzed in this PEIS, solar facilities within the SEZ would likely dominate the view from this location. Because there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, a visually complex, man-made appearing industrial landscape could result. This essentially industrial-appearing landscape would contrast greatly with the surrounding natural-appearing lands and would be expected to create strong visual contrasts as viewed from this location within the NP.

Figure 9.4.14.2-5 is a Google Earth visualization of the SEZ as seen from within the national park on the Chuckwalla Valley floor, near State Route 177, beyond the southern end of the Coxcomb Mountains. The viewpoint is at the same elevation as the valley floor at the closest point within the SEZ and is located approximately 0.4 mi (0.7 km) from the nearest point on the northern

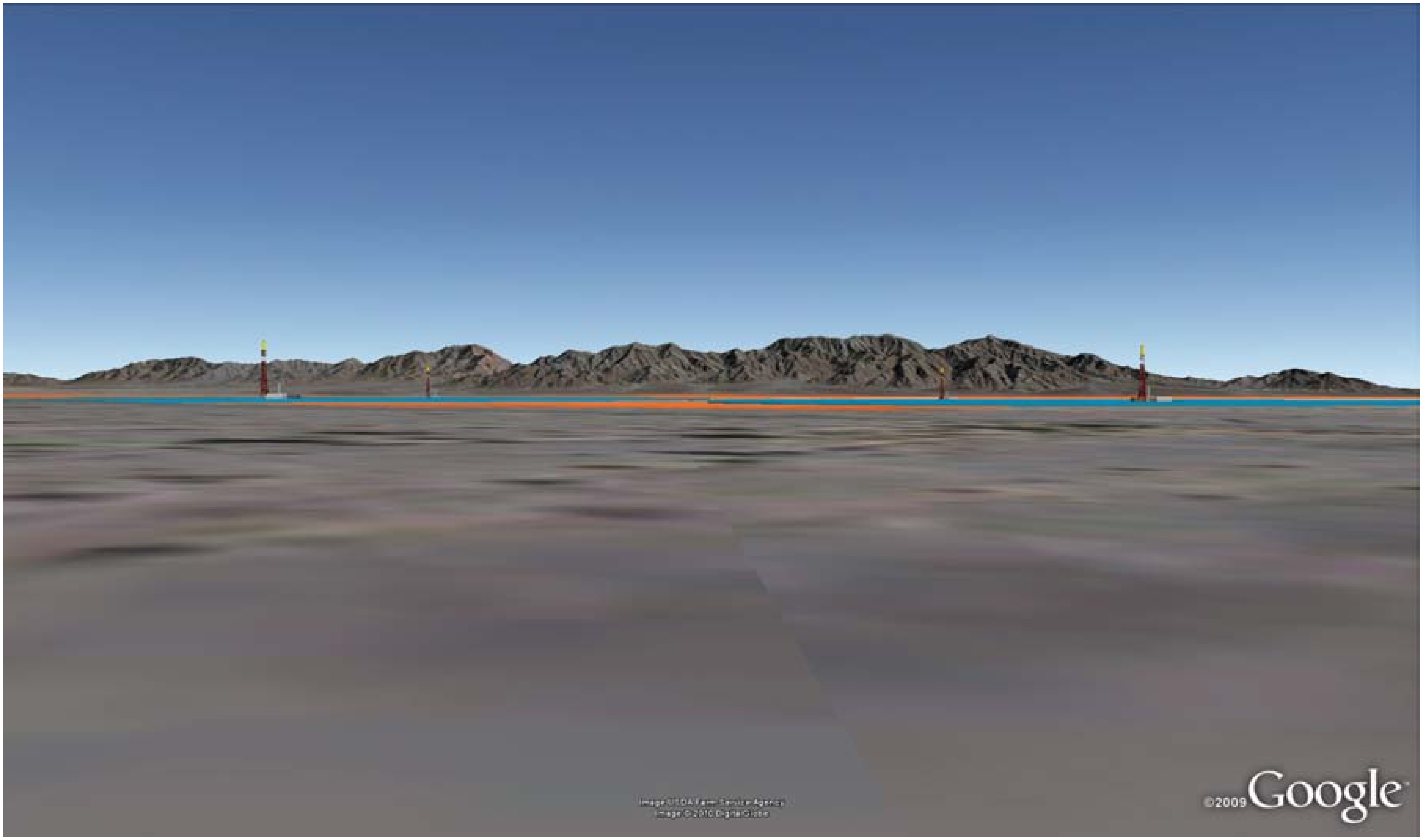

FIGURE 9.4.14.2-5 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Viewpoint near State Route 177 within Joshua Tree NP

boundary of the SEZ. The viewpoint is less than 0.1 mi (0.2 km) northwest of State Route 177, and the views from this location are very similar to what would be seen by travelers on State Route 177. The view direction shown in the visualization (east–southeast) is near the middle of an approximately 260-degree horizontal arc in which portions of the SEZ and associated solar facilities would be visible from this location before nearby mountains screened the view of the SEZ.

The visualization suggests that from this very short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. One cluster of four power tower facility models is visible; the two closest towers are nearly equidistant from the viewpoint at approximately 2 mi (3.2 km).

The visualization suggests that despite the very short distance to the power towers and associated collector/reflector arrays, because the viewpoint is at the same elevation as the facility, the collector/reflector arrays would be viewed nearly edge-on, greatly reducing the visible area for each facility, and presenting a banded appearance that would repeat the line of the horizon, tending to reduce visual contrast. If nearby facilities used PV systems and low-profile ancillary facilities, the visual impacts would be minimized, but for facilities utilizing STGs, there would be taller structures visible projecting above the collector/reflector arrays, and in some conditions steam plumes could be present that would add significantly to visual contrasts. These taller elements would add vertical line and form contrasts, and likely color contrasts as well; steam plumes would add color, and possibly line or form contrasts, depending on conditions. Depending on height, these ancillary facilities could add significantly to visual contrasts for some facilities. The tops of solar collector/reflector arrays in the closest parts of the SEZ likely would not be visible.

If power towers were present within the SEZ, when operating, nearby receivers likely would appear as brilliant nonpoint (i.e., having visible cylindrical or rectangular surfaces) light sources atop clearly discernable tower structures against the backdrop of the sky above the Palen Mountains or against the mountain slopes, and could potentially cause discomfort when looked at directly. Also, during certain times of the day from certain angles, sunlight on dust particles in the air might result in the appearance of light streaming down from the tower(s). The power towers likely would strongly attract visual attention, as seen from this viewpoint. More distant receivers likely would appear as distant points of light against the sky, against the backdrop of the valley floor, or against the bajadas and slopes of the Palen Mountains.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from the national park and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The nature of the visual contrasts from solar facilities in the SEZ as observed from this location would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because the viewpoint is very close to the SEZ, the SEZ would occupy the entire horizontal field of view, and under the 80% development scenario analyzed in this PEIS, solar facilities within the SEZ would likely dominate the view from this location. Because there could be numerous solar facilities within the SEZ, with a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, a visually complex, man-made appearing industrial landscape could result. This essentially industrial-appearing landscape would contrast greatly with the surrounding natural-appearing lands and would be expected to create strong to very strong visual contrasts as viewed from this location within the NP.

Figure 9.4.14.2-6 is a Google Earth visualization of the SEZ as seen from a mountain peak north of the Pinto Basin, at the northwestern end of the Coxcomb Mountains within the NP. The viewpoint elevation is approximately 4,300 ft (1,300 m), about 3,400 ft (1,040 m) above the valley floor at the closest point within the SEZ. The viewpoint is located approximately 8 mi (13 km) from the nearest point on the northern boundary of the SEZ. The view direction shown in the visualization is southeast.

The visualization suggests that from this longer distance deeper into the NP, the SEZ can be encompassed in one view. Five clusters of four power tower facility models are visible; the two closest towers are nearly equidistant from the viewpoint at approximately 10 mi (16 km). The farthest tower visible in the image (visible just beyond the end of the Coxcomb Mountains) is approximately 26 mi (42 km) from the viewpoint.

The visualization shows that while facilities in the SEZ would be viewed at relatively long distances, from this viewpoint height the tops of solar collector/reflector arrays could be seen, increasing the apparent size of the facility, changing its apparent shape, and increasing potential for glinting and glare. The visualization also shows that the SEZ is large enough that even at relatively long distances, it can occupy a substantial portion of the field of view.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but while the viewpoint is 8 mi (13 km) from the SEZ, the SEZ would occupy nearly the entire horizontal field of view.

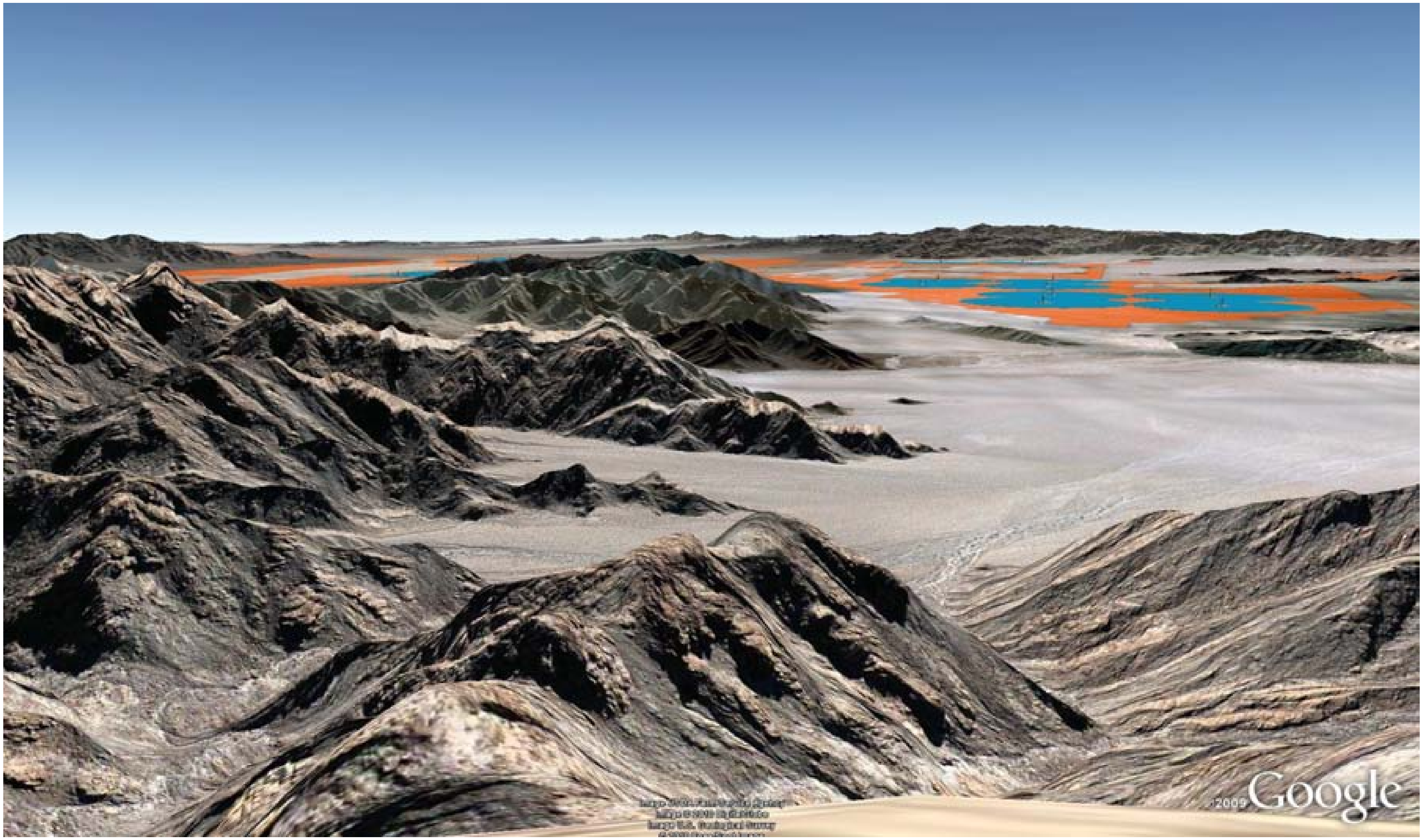

FIGURE 9.4.14.2-6 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Viewpoint in Northwest Coxcomb Mountains within Joshua Tree NP

Under the 80% development scenario analyzed in this PEIS, solar facilities within the SEZ would attract visual attention, and would be expected to create strong visual contrasts as viewed from this location within the NP.

Figure 9.4.14.2-7 is a Google Earth visualization of the SEZ as seen from a peak within the Eagle Mountains. The viewpoint elevation is approximately 4,000 ft (1,300 m), about 3,200 ft (580 m) above the valley floor at the closest visible point within the SEZ. The viewpoint is located approximately 11 mi (18 km) from the nearest point on the far western boundary of the SEZ. The view direction shown in the visualization is east. Two clusters of four power tower facility models are partially visible; the closest towers are approximately 15 mi (24 km) from the viewpoint.

The visualization shows a more typical view of the SEZ from the interior of the national park. The mountainous portions of the park are quite rugged, and many views out of the park toward the SEZ would be partially or fully screened by intervening terrain. In this case, much of the view of the distant SEZ is screened by mountains along the eastern edge of the Eagle Mountains. A portion of the SEZ is visible, but solar facilities in the visible area would be distant and seen edge-on. The SEZ occupies too small a portion of the field of view to be visually dominant.

Power tower receivers visible within the SEZ would likely appear as points of light near the eastern horizon; lower height facilities might be difficult to distinguish at the long distances involved, at least in many lighting conditions. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from this viewpoint, given the dark night skies in the vicinity of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors. Under the 80% development scenario analyzed in this PEIS, solar facilities within the SEZ would be expected to create weak visual contrasts as viewed from this location within the park.

In summary, Joshua Tree NP borders or is very close to the border of the SEZ, and the southeastern part of the Coxcomb Mountains is essentially surrounded by the SEZ in all directions except looking northwest into the main part of the park. Many of the higher elevations in the Coxcomb Mountains have unobstructed, panoramic views of the SEZ from relatively short distances and elevated viewpoints, a situation conducive to strong levels of visual contrast, especially given the large size of the SEZ and the number, size, and variety of solar facilities that might be visible under the 80% development scenario analyzed in this PEIS. These viewpoints and similar viewpoints would likely be subject to strong levels of visual contrast resulting from solar development within the SEZ under the 80% development scenario. Lower elevation

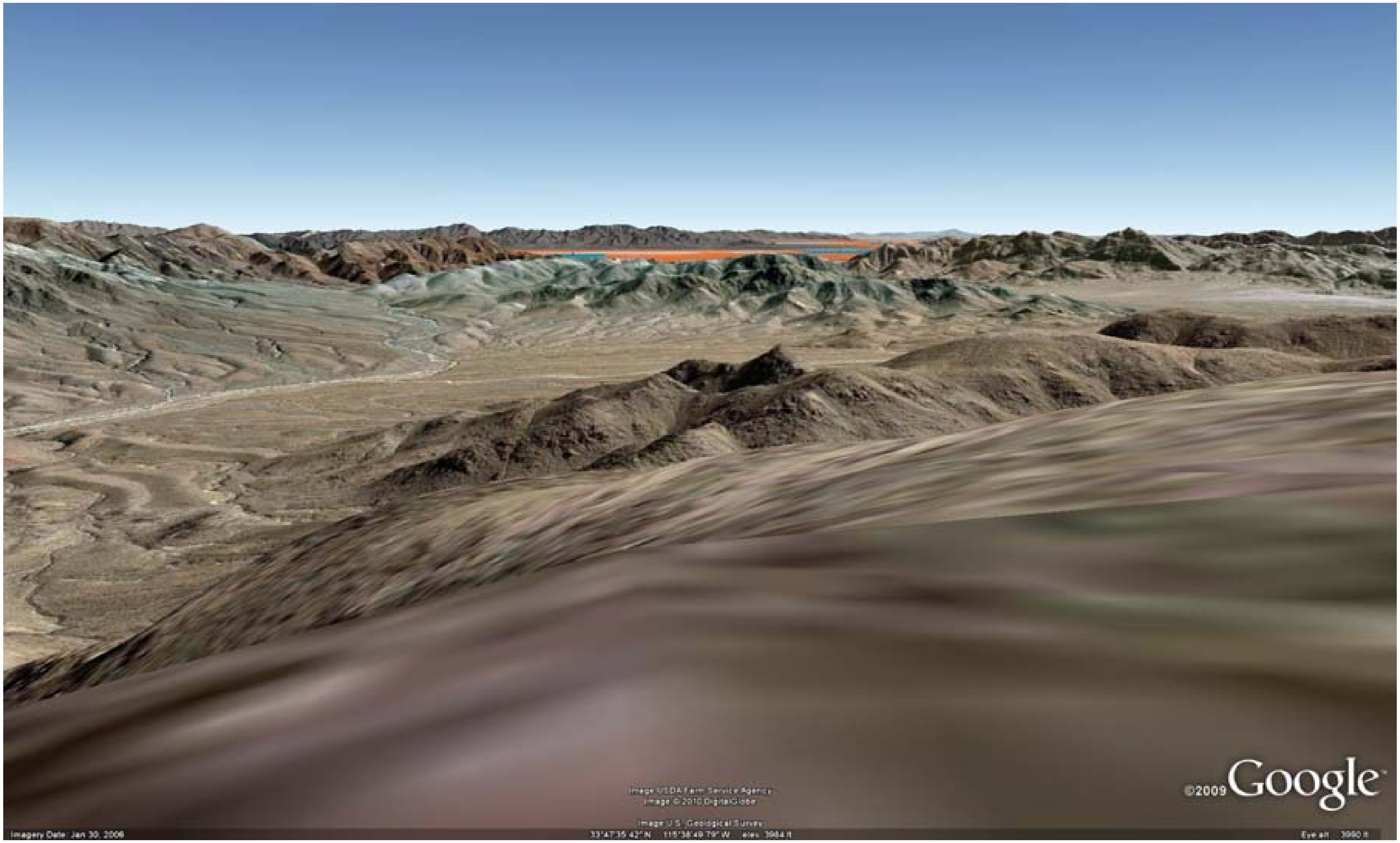

FIGURE 9.4.14.2-7 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Viewpoint in Eagle Mountains within Joshua Tree NP

viewpoints are more likely to be screened by nearby topography, and there are many locations in the park, for example, in valleys, where views of the SEZ are completely screened. Lower elevation viewpoints with clear views of the SEZ will have lower viewing angles, which would be expected to reduce contrasts, but many viewpoints could still be subject to strong visual contrasts. Farther to the west, in the interior of the park, contrasts would be reduced as screening increased and distance to the SEZ increased. Solar facilities within the SEZ might be visible, but they would be either too far or too small in apparent size to cause substantial visual contrasts.

Note that some locations within the Coxcomb Mountains and within the main portion of the park also have partial views of the much more distant proposed Iron Mountain SEZ. Overall, under the 80% development scenario analyzed in this PEIS, solar energy development in the Iron Mountain SEZ would be expected to result in much weaker visual impacts on Joshua Tree NP than expected from development within the Riverside East SEZ, but where views of both SEZs existed, additional impacts to those described here would occur.

Wilderness Areas

- *Big Maria Mountains WA*—The 46,056-acre (186-km^2) Big Maria Mountains is a congressionally designated wilderness area located adjacent to the northeast corner of the SEZ. It then runs parallel to the northeastern boundary and is 0.3 mi (0.5 km) at the point of closest approach east of the SEZ. The Big Maria Mountains contain gently sloping bajadas and rough, craggy peaks separated by steep canyons. Camping, hunting, hiking, backpacking, horseback riding, and wildlife viewing are recreational activities in the wilderness area. There are no trails, but there are abandoned jeep tracks that are used for hiking.

  As shown in Figure 9.4.14.2-2, much of the eastern portion of the SEZ is visible from the south- and southwest-facing slopes of the Big Maria Mountains within the wilderness area. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 8,875 acres [36 km^2], or 19% of the total WA acreage), extend from the point of closest approach at the northeast corner of the SEZ to approximately 0.9 mi (1.5 km) from the SEZ. Portions of the WA within the 24.6-ft (7.5-m) SEZ viewshed encompass approximately 7,420 acres (30.0 km^2), or 16% of the total WA acreage.

  Figure 9.4.14.2-8 is a Google Earth visualization of the SEZ (highlighted in orange) as seen from an unnamed peak in the Big Maria Mountains, elevated roughly 3,100 ft (940 m) above the bajada at the closest point within the SEZ, and 3,600 ft (1,100 m) above the lowest point in the SEZ. The viewpoint is approximately 2.0 mi (3.2 km) from the nearest point on the northeastern boundary of the SEZ.

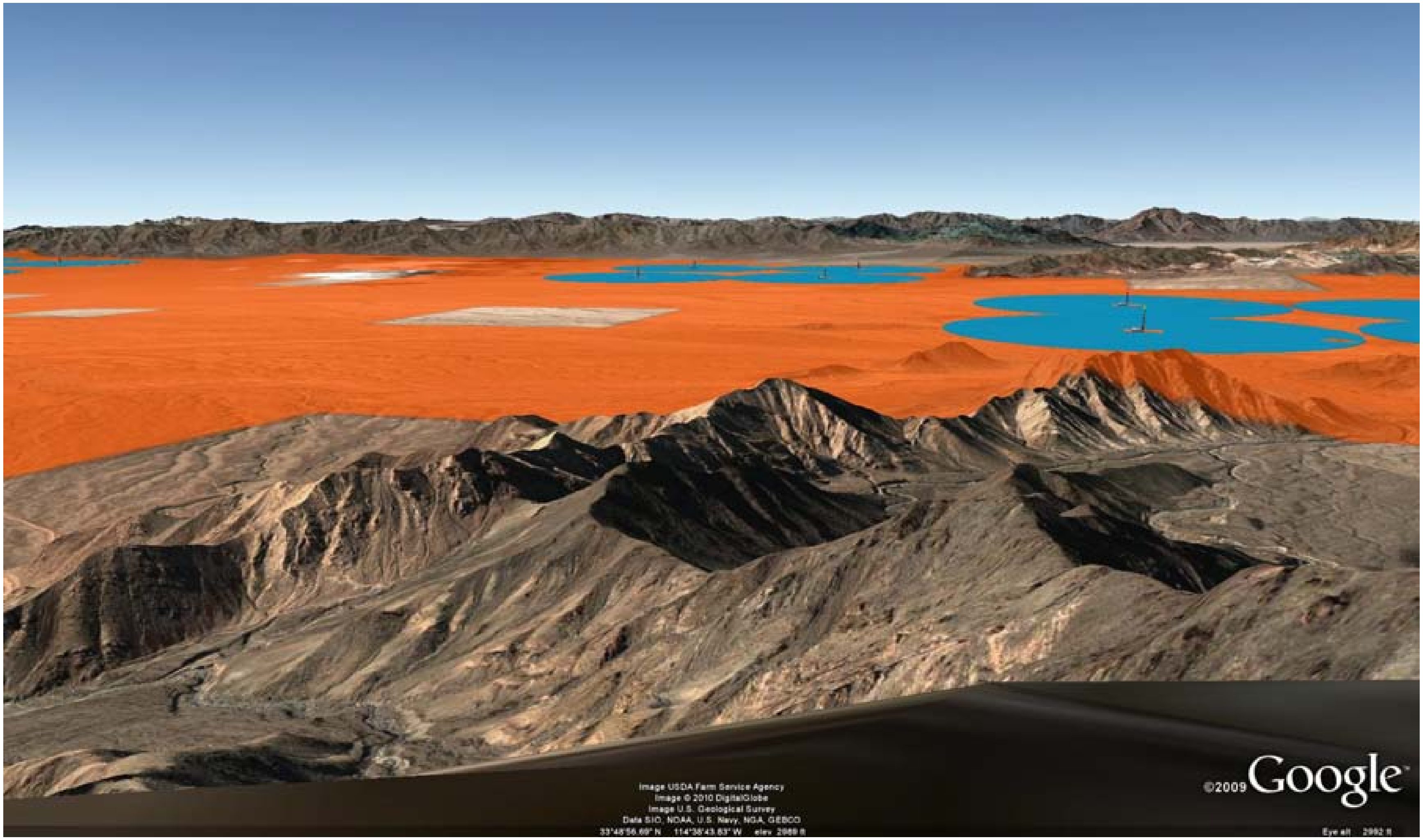

FIGURE 9.4.14.2-8 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Peak in Big Maria Mountains WA

The visualization suggests that from this elevated viewpoint and very short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. Three clusters of power tower facility models are visible; the right-most model cluster is approximately 5 mi (8 km) from the viewpoint, and the right center model cluster is 9 mi (15 km) from the viewpoint (both distances to center points of model clusters). The tops of solar collector/reflector arrays in the closest parts of the SEZ would be visible, and the angle of view is high enough that these closer facilities would not repeat the horizontal line of the valley plain. Because of the oblique angle of view, the facilities would appear larger in areal extent than they would from less elevated viewpoints at the same distance, and the strong regular geometry of the collector/reflector arrays would be apparent. These factors would increase visual contrast relative to lower angle views. collector/reflector arrays

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) would likely be visible projecting above the collector/reflector arrays, and their structural details could be evident, at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power towers were present within the SEZ, when operating, the receivers at short distances would likely appear as brilliant white nonpoint (i.e., having visible cylindrical or rectangular shapes) atop clearly discernable tower structures against the backdrop of the valley floor, while power tower receivers at the longer distances shown here would appear as points of light against the backdrop of the valley floor or the bajadas of the McCoy Mountains. During certain times of the day from certain angles, sunlight on dust particles in the air might result in the appearance of light streaming down from nearby power tower(s).

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from the wilderness area, and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because the viewpoint is elevated and very close to the SEZ, the SEZ would occupy most of the field of view, stretching across the Chuckwalla Valley floor to the bajadas of the McCoy

Mountains. Under the 80% development scenario analyzed in this PEIS, there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, such as transmission towers and lines, substations, power block components, and roads. The resulting visually complex landscape would be essentially industrial in appearance and would contrast greatly with the surrounding mostly natural-appearing landscape. Solar facilities within the SEZ would likely dominate the view from this location and would be expected to create very strong visual contrasts as viewed from this location within the wilderness area.

Most southwest-facing slopes of the Big Maria Mountains within the WA have views similar to that shown in Figure 9.4.14.2-8. At lower elevations, the angle of view is lower, so facilities appear more edge-on, but even at the lowest elevations within the WA, where there is a view of the SEZ, it occupies so much of the field of view that strong visual contrasts from solar development within the SEZ would be likely. Lower levels of visual contrast would be expected for viewpoints farther northeast in the WA, where intervening mountains would be likely to screen views of the SEZ partially.

- *Chuckwalla Mountains WA*—The 88,202-acre (357-km^2) Chuckwalla Mountains is a congressionally designated wilderness area located 1.1 mi (1.8 km) at the point of closest approach south of the western portion of the SEZ. Rough, boulder-strewn hillsides and washes, thick with vegetation, allow opportunities for visitors to enjoy seclusion. Elevation varies widely from the low-lying bajada at 800 ft (244 m) to the area's highest peak, Black Butte, reaching up to 4,450 ft (1,356 m).

  The southern and western portions of the SEZ are visible from the bajada and northern slopes and peaks of the wilderness area, but numerous areas in the mountains farther south in the WA also have views of the SEZ. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 49,913 acres [202 km^2], or 57% of the total wilderness area acreage) extend from the point of closest approach at the southern boundary of the SEZ to approximately 5.9 mi (9.5 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 47,186 acres (191 km^2), or 54% of the total wilderness area acreage.

  Figure 9.4.14.2-9 is a Google Earth visualization of the SEZ as seen from an unnamed peak in the far northern Chuckwalla Mountains within the wilderness area, south of the western end of the SEZ and approximately 3 mi (5 km) southeast of Desert Center. The viewpoint is elevated roughly 1,400 ft (430 m) above the valley floor at the closest point within the SEZ. The viewpoint is approximately 2.4 mi (3.8 km) from the nearest point on the southern boundary of the SEZ. The view direction is north.

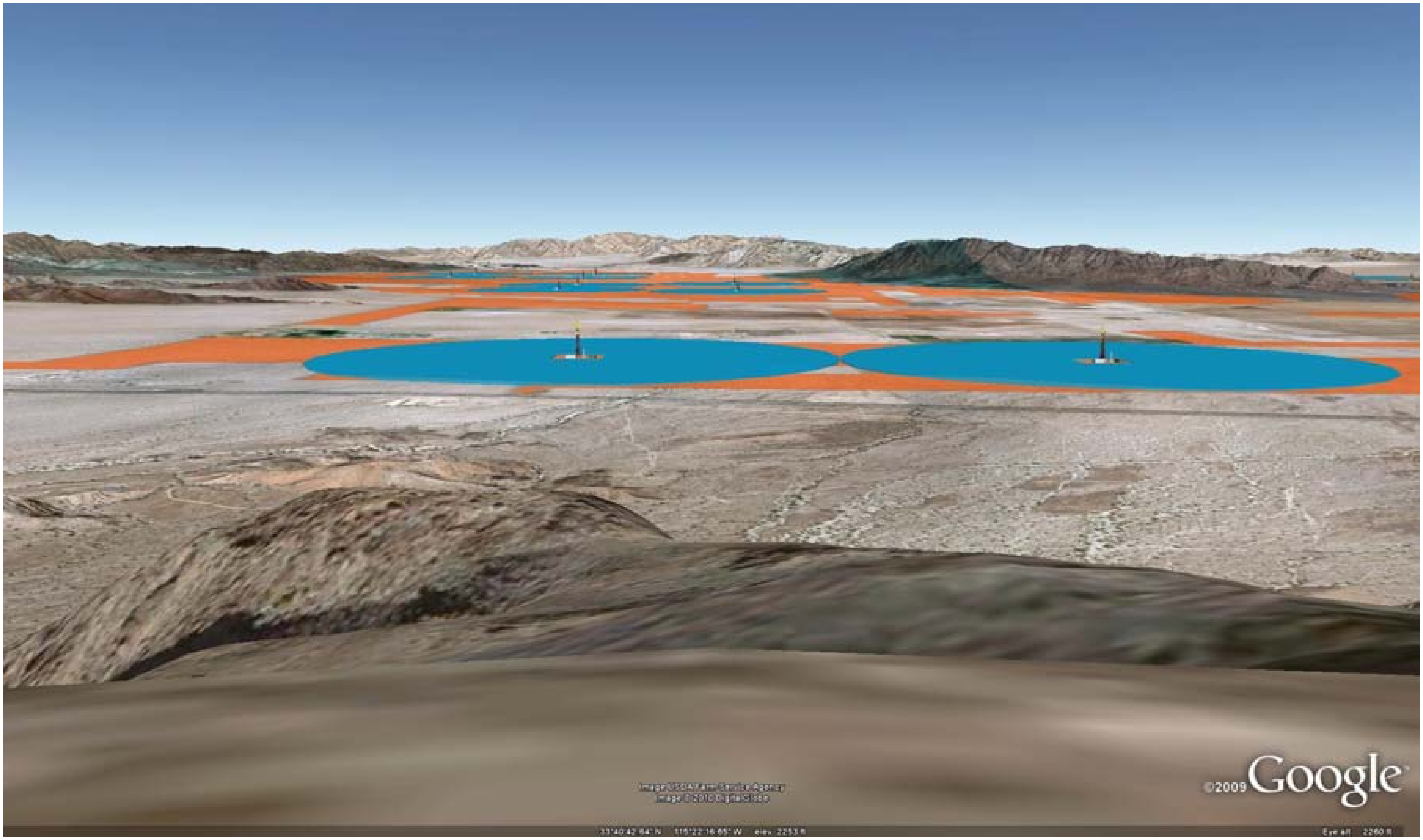

FIGURE 9.4.14.2-9 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Peak in Western Portion of Chuckwalla Mountains WA

The visualization suggests that from this elevated viewpoint and very short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to the right to scan across the whole SEZ, which would extend almost 90 degrees to the right. Four clusters of power tower facility models are visible; the closest tower is approximately 3 mi (5 km) from the viewpoint, and the center of the next model cluster is nearly 10 mi (16 km) from the viewpoint. From this vantage point, the tops of solar collector/reflector arrays in the closest parts of the SEZ would be visible, and the angle of view is high enough that these closer facilities would not repeat the horizontal line of the valley plain. Because of the oblique angle of view, the facilities would appear larger in areal extent than they would from less elevated viewpoints at the same distance.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) likely would be visible projecting above the collector/reflector arrays, and their structural details could be evident at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power towers were present within the SEZ at the distance corresponding to the closest tower in the model, the receivers would likely appear as brilliant nonpoint (i.e., having visible cylindrical or rectangular surfaces) light sources atop clearly discernable tower structures against the backdrop of the valley floor, while power tower receivers at the longer distances shown here would appear as points of light against the backdrop of the distant valley floor. For nearby power towers, during certain times of the day from certain angles, sunlight on dust particles in the air might result in the appearance of light streaming down from the tower(s). Details of solar array components and ancillary facilities might be visible in the closest parts of the SEZ.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from the wilderness area and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ; however, views would be across I-10, and lights from traffic likely would be visible. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because the viewpoint is elevated and very close to the SEZ, the SEZ would occupy most of the field of view, stretching across the Chuckwalla Valley floor almost to the bajadas of the distant Palen Mountains. Under the 80% development scenario analyzed in this PEIS, there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, such as transmission towers and lines, substations, power block components, and roads. The resulting visually complex landscape would be essentially industrial in appearance and would contrast greatly with the surrounding mostly natural-appearing landscape. Under the 80% development scenario, solar facilities within the SEZ would likely dominate the view from this location and would be expected to create strong visual contrasts as viewed from this location within the wilderness area.

Figure 9.4.14.2-10 is a Google Earth visualization of the SEZ as seen from an unnamed peak in the far eastern Chuckwalla Mountains within the wilderness area, south of the southeastern end of the Coxcomb Mountains. The viewpoint is elevated roughly 1,600 ft (430 m) above the valley floor at the closest point within the SEZ. The viewpoint is approximately 5.8 mi (9.3 km) from the nearest point on the southern boundary of the SEZ. The view direction is north.

The visualization suggests that from this elevated viewpoint because of the breadth of the SEZ east-to-west, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ, which would extend over much of the northern horizon. Four clusters of power tower facility models are visible; the closest tower is approximately 8 mi (13 km) from the viewpoint, and the center of the next model cluster is 14 mi (23 km) from the viewpoint. From this vantage point, the tops of solar collector/reflector arrays in the closest parts of the SEZ would be visible, but the angle of view is low enough that these closer facilities might repeat the horizontal line of the valley plain, depending on the facility layout. The low angle of view would reduce the apparent areal extent of the facilities.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) likely would be visible projecting above the collector/reflector arrays, and their structural details could be evident, at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would be possible for nearby facilities, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power towers were present within the SEZ at the distance corresponding to the closest tower in the model, the receivers would likely appear as bright light sources atop discernable tower structures against the backdrop of the valley floor, while power tower receivers at the longer distances shown here

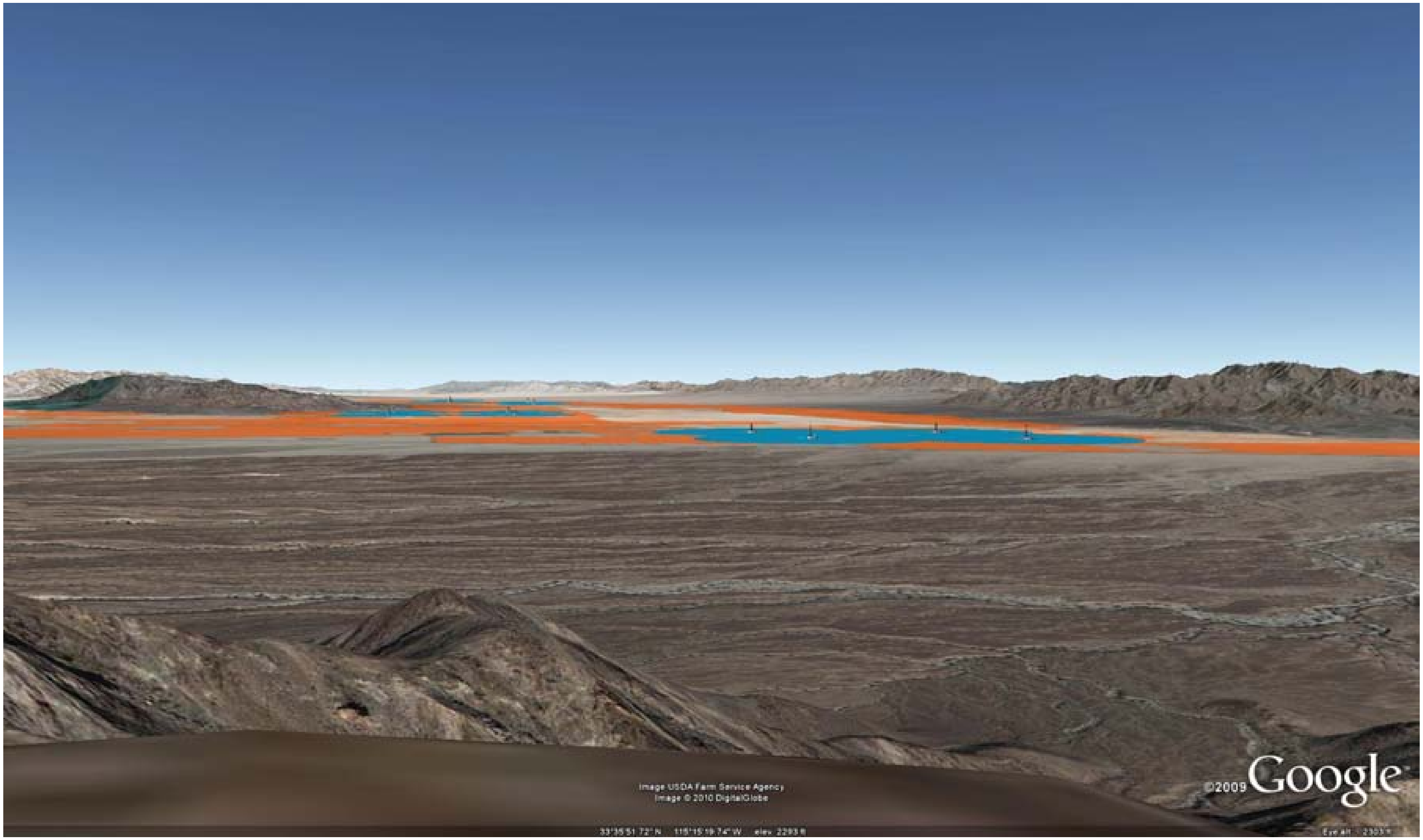

FIGURE 9.4.14.2-10 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Peak in Eastern Portion of Chuckwalla Mountains WA

would appear as distant points of light against the backdrop of the distant valley floor.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because the viewpoint is elevated and the SEZ so large, the SEZ would appear to stretch across the Chuckwalla Valley floor roughly 25 mi (40 km) to the east. Under the 80% development scenario analyzed in this PEIS, there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, such as transmission towers and lines, substations, power block components, and roads. The resulting visually complex landscape would be essentially industrial in appearance and would contrast greatly with the surrounding mostly natural-appearing landscape. Under the 80% development scenario, solar facilities within the SEZ would attract attention, might dominate the view from this location, and would be expected to create strong visual contrasts as viewed from this location within the WA.

Figure 9.4.14.2-11 is a Google Earth visualization of the SEZ as seen from Corn Springs Road on the bajada in the far northeastern portion of the WA. The viewpoint is elevated about 200 ft (60 m) above the valley floor at the closest point within the SEZ, and is approximately 3.3 mi (5.4 km) from the nearest point on the boundary of the SEZ. The view looks east down I-10 to the eastern portion of the SEZ.

The SEZ in the vicinity of this viewpoint is only a few miles across, north to south, and because the elevation of the viewpoint is only minimally elevated relative to the SEZ, the SEZ and very distant heliostat arrays depicted in the power tower model cluster appear edge-on, as a very narrow band parallel to, and repeating, the strong horizon line and thus greatly reducing their visible area and associated visual contrast. The closest model is approximately 17 mi (27 km) from the viewpoint. The visualization also shows that from this viewpoint, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ, which would span much of the northern and eastern horizons.

Transmission towers could be visible above the solar collector/reflector arrays. If power towers were present within the SEZ, at the distance shown here, the receivers could appear as distant point light sources against the

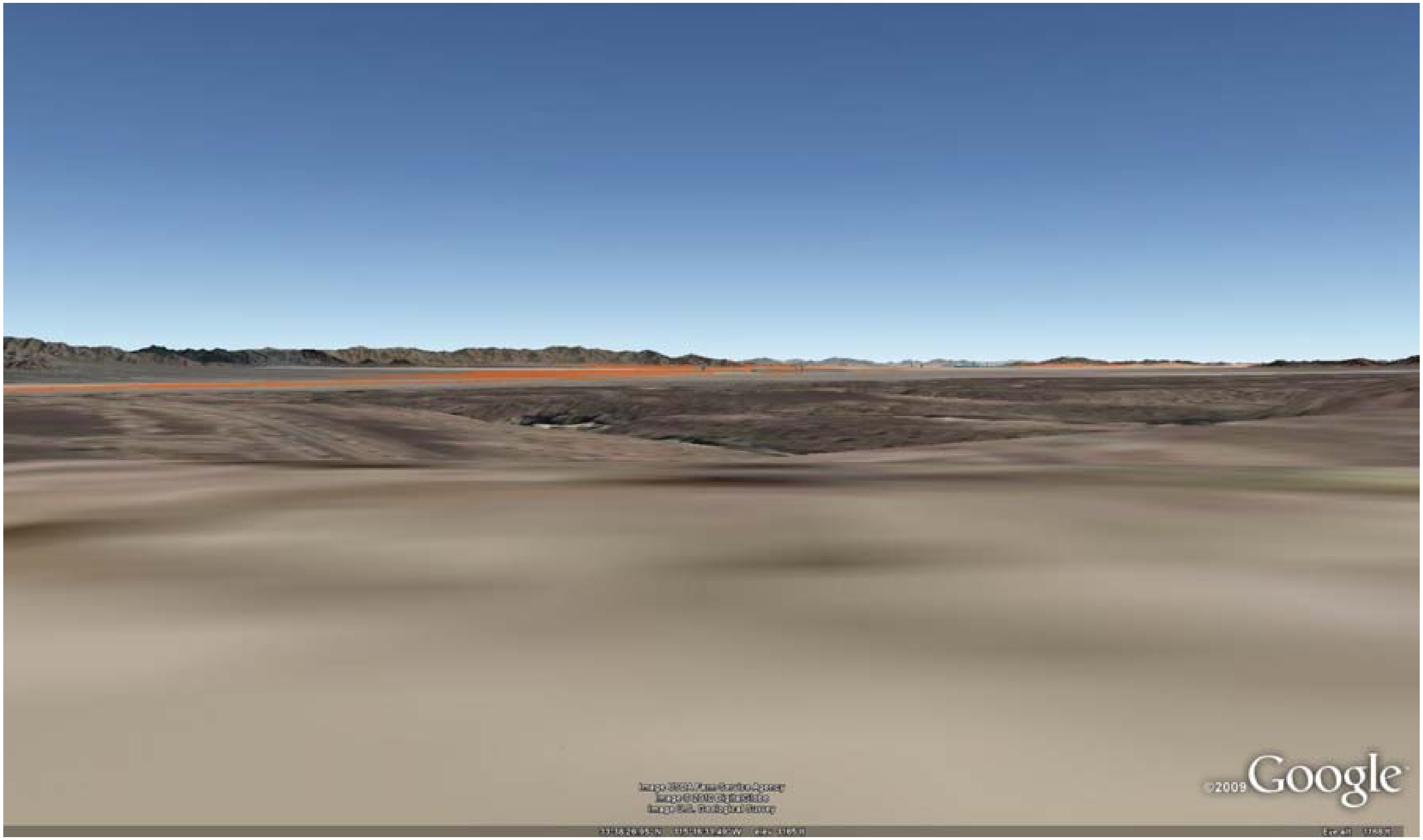

FIGURE 9.4.14.2-11 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Corn Springs Road on Bajada in Chuckwalla Mountains WA

backdrop of the McCoy Mountains. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be seen from this viewpoint, given the dark night skies in the vicinity of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors. Under the 80% development scenario, solar facilities within the SEZ would be expected to create weak to moderate visual contrasts as viewed from this location within the wilderness area.

In summary, higher elevations in the Chuckwalla WA have extended open views of the SEZ and could be subject to high levels of visual contrast associated with solar energy development within the wilderness area. Viewpoints on the bajada would still have expansive views of the SEZ but, primarily because of the lower viewing angle, would be expected to be subjected to substantially lower levels of visual contrast.

- *Imperial Refuge WA*—The 15,714-acre (64-km^2) Imperial Refuge is a congressionally designated wilderness area managed by the USFWS located 22 mi (36 km) at the point of closest approach south of the SEZ. The wilderness area includes low, heavily vegetated land along the Colorado River as well as higher areas with less vegetation on both sides of the river. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 560 acres [2 km^2], or 4% of the total wilderness area acreage) extend from the point of closest approach at the southern boundary of the SEZ to beyond 25 mi (41 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 468 acres (2 km^2), or 3% of the total wilderness area acreage.

  The far southeastern corner of the SEZ is visible from some areas within the northern portion of the wilderness area. Within 25 mi (41 km) of the SEZ, where vegetative screening is absent, solar facilities located in the far southeastern portions of the SEZ might be visible from the highest points within the wilderness area. Because of the very long distance to the SEZ and screening by the Palo Verde Mountains, visible portions of the SEZ would occupy a very small portion of the field of view. The wilderness area is at a slightly lower elevation than the SEZ. Any visible solar facilities within the SEZ would be viewed at very low angles. Solar collector/reflector arrays would be viewed edge-on and, at distance approaching 25 mi (41 km), are unlikely to be distinguishable. If power towers were visible, they would likely appear as distant point light sources on the northern horizon. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be visible from the wilderness area. Visual impacts on the Imperial Refuge WA from solar development within the SEZ would be expected to be minimal.

- *Joshua Tree WA*—Joshua Tree is a 586,623-acre (2,374-km^2) congressionally designated wilderness area managed by the NPS and located entirely within Joshua Tree NP. A section of the WA divides the western portion of the SEZ and is located adjacent to its boundaries. This section is almost entirely within the viewshed. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 99,460 acres [403 km^2], or 17% of the total wilderness area acreage) extend from the point of closest approach at the northwestern boundary of the SEZ to approximately 13.6 mi (21.9 km) northwest from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 55,203 acres (224 km^2), or 9% of the total wilderness area acreage. Expected visual contrast levels for the wilderness area are the same as those expected for the national park (see above).

- *Little Chuckwalla Mountains WA*—The 28,708-acre (116-km^2) Little Chuckwalla Mountains is a congressionally designated wilderness area located 5.0 mi (8.1 km) at the point of closest approach south of the SEZ. The wilderness area contains rugged mountains surrounded by a large, gently sloping bajada with a network of washes.

  Within the wilderness area, the SEZ is visible from the north- and northwest-facing slopes and the peaks of the Little Chuckwalla Mountains, as well as all of the north-facing bajada and the southern portions of the south-facing bajada. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 16,729 acres [68 km^2], or 58% of the total wilderness area acreage) extend from the point of closest approach at the southern boundary of the SEZ to approximately 14.0 mi (23 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 14,319 acres (58 km^2), or 50% of the total wilderness area acreage.

  Figure 9.4.14.2-12 is a Google Earth visualization of the SEZ as seen from a high, unnamed peak in the Little Chuckwalla Mountains, in the far eastern portion of the wilderness area, approximately 8 mi (13 km) from the SEZ, south of the Palen Dunes Drive interchange on I-10. At approximately 1,900 ft (530 m), the viewpoint elevation is about 1,700 ft (520 m) above the elevation of the valley floor. The visualization suggests that from this elevated viewpoint, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ; however, the angle of view is low enough that the valley floor would appear as a band across the base of the mountains. Because solar facilities in the valley would be viewed from a low oblique angle, the visible surface area of the facilities would be reduced, the strong regular geometry of the collector/reflector arrays would be less apparent, and associated visual impacts would be reduced in proportion.

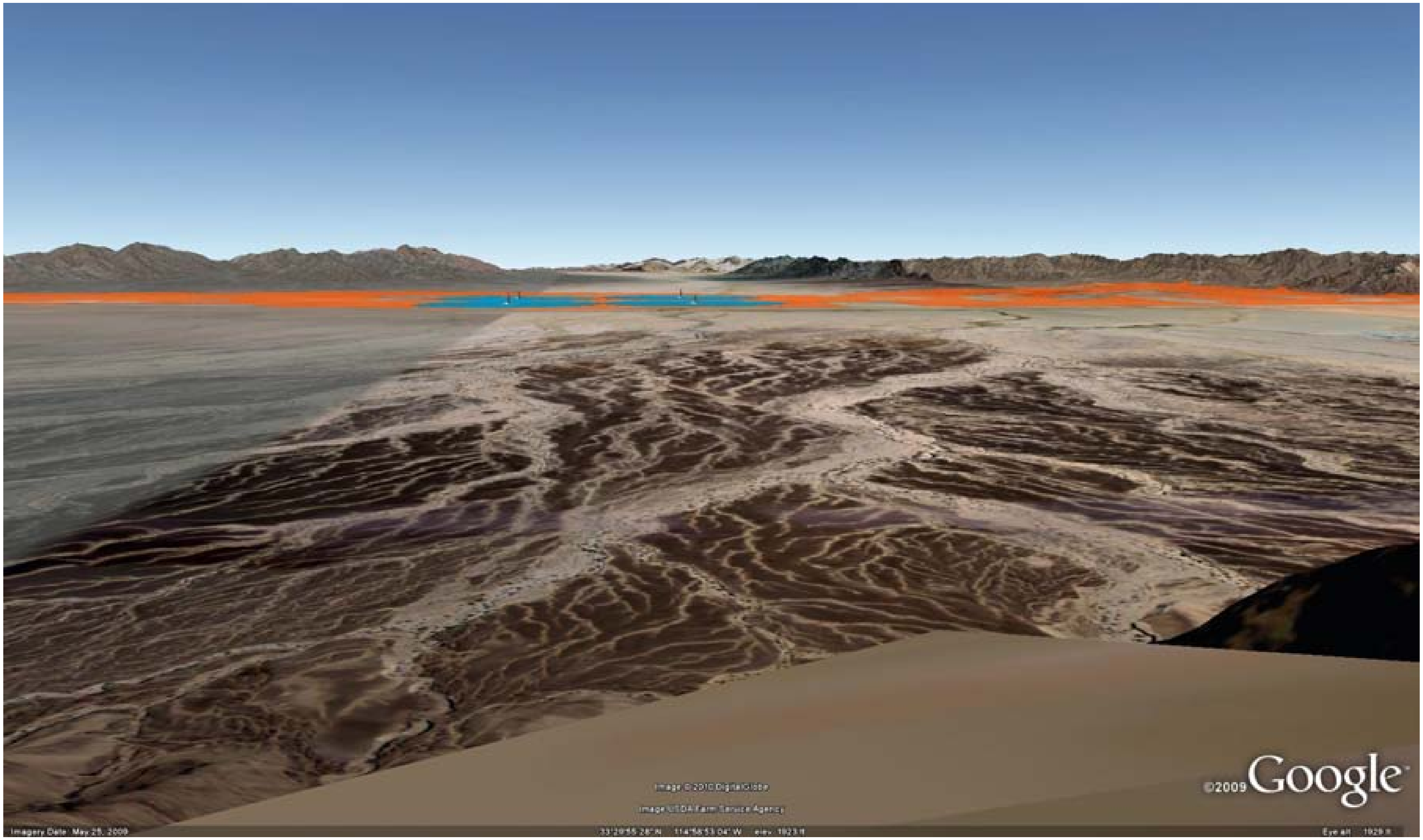

FIGURE 9.4.14.2-12 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Peak in Eastern Portion of Little Chuckwalla Mountains WA

At the 80% development scenario analyzed in this PEIS, a large portion of the Chuckwalla Valley north of I-10 visible from this location would be occupied by a variety of solar facilities with associated transmission facilities and roads, stretching across the valley floor to the base of the bajada of the Palen Mountains and to the other mountain ranges north of the SEZ. While the tops of solar collector/reflector arrays located within the SEZ nearest to this viewpoint might be visible, solar collector/reflector arrays within most of the SEZ visible from this viewpoint would be seen nearly edge-on, reducing their apparent size and repeating the line of the horizon, which would tend to reduce visual contrast.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) could potentially be visible projecting above the collector/reflector arrays. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays.

Power tower receivers within the SEZ could be visible as dim to bright points of light across almost the entire northern horizon, against the backdrop of the Palen Mountains and the other ranges north of the SEZ. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from the WA, and could be seen from this viewpoint.

Despite the low angle of view and considerable distance from many portions of the SEZ, the SEZ occupies such a large area within the view from this location that solar development within the SEZ under the 80% development scenario would be likely to create strong visual contrasts with the surrounding landscape that could dominate the views from this location, especially toward the northeast, where a larger portion of the SEZ is visible at a relatively shorter distance.

Figure 9.4.14.2-13 is a Google Earth visualization of the SEZ as seen from a two-track road on the bajada at the base of the northern slopes of the Little Chuckwalla Mountains in the northeastern portion of the wilderness area, approximately 6.4 mi (10.3 km) from the SEZ, southwest of the Palen Dunes Drive interchange on I-10. The viewpoint elevation is approximately 660 ft (200 m), about 300 ft (90 m) above the valley floor. In this case, the viewpoint is somewhat closer to the SEZ than that for the view shown in Figure 9.4.14.2-12, but the elevation is much lower, significantly decreasing the angle of view. The visualization suggests that from this viewpoint, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ; however, the angle of view is low enough that solar facilities in the valley would be viewed nearly edge-on, so the visible surface area of the facilities would be reduced, the

FIGURE 9.4.14.2-13 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Road on the Bajada in Little Chuckwalla Mountains WA

strong regular geometry of the collector/reflector arrays would be less apparent, and associated visual impacts would be reduced in proportion.

From this relatively low viewpoint, the tops of solar collector/reflector arrays located within the SEZ would not likely be visible, but power block facilities, transmission towers, steam plumes, and other tall facility components would likely project above collector/reflector arrays, adding short vertical lines to the strongly horizontal landscape, and adding some visual contrast. Power tower receivers within the SEZ could be visible as dim to bright points of light across almost the entire northern horizon, against the backdrop of the Palen Mountains and the other ranges north of the SEZ.

Visual contrasts observed from this low-elevation location would be expected to be lower than those from more elevated viewpoints at the same or somewhat longer distances from the SEZ. At the 80% development scenario analyzed in this PEIS, a variety of solar facilities with associated transmission and roads would appear to stretch across the valley floor across nearly the entire northern horizon and to the base of the bajada of the Palen Mountains and to the other mountain ranges north of the SEZ. Resulting visual contrasts would likely be strong.

Because of the southwest-to-northeast orientation of the wilderness area, viewpoints in the southwestern portion of the wilderness area are 10 to 14 mi (16 to 23 km) from the SEZ. From some locations in the southwest portion of the wilderness area, particularly at lower elevations, nearby mountain ridges screen portions of the SEZ to the extent that expected visual contrasts associated with solar facilities visible within the SEZ would be moderate.

- *Orocopia Mountains WA*—The 54,709-acre (221-km^2) Orocopia Mountains is a congressionally designated wilderness area located 13 mi (21 km) at the point of closest approach southwest of the SEZ. The wilderness area provides dramatic scenery, with open valleys, ridges, and highly colorful and dramatically eroded canyons.

  The SEZ is visible from both the low mountains in the far northeast portion of the wilderness area and the higher mountains closer to the center of the wilderness area. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 2,251 acres [9 km^2], or 4% of the total WA acreage) extend from the point of closest approach to approximately 15.7 mi (25.3 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 1,409 acres (6 km^2), or 3% of the total wilderness area acreage.

  From the far northeastern section of the WA, the SEZ is visible beyond I-10 through the western end of the Chuckwalla Valley. The distance to the SEZ exceeds 13 mi (21 km), so the angle of view is low. Parts of the SEZ are screened by the Eagle Mountains and the Chuckwalla Mountains, so the SEZ occupies a small portion of the horizontal field of view. Solar collector/reflector arrays within the SEZ that were visible from the wilderness area would be seen edge-on, reducing their apparent size, concealing their strong regular geometry, and repeating the line of the horizon, which would tend to reduce visual contrast. Power towers within the SEZ could be visible as distant points of light on the northeast horizon, against the backdrop of the Chuckwalla Valley floor or the mountain ranges northeast of the valley. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from the wilderness area.

The mountains closer to the center of the wilderness area, while higher, are more than 20 mi (36 km) distant from the SEZ, and in some areas, uplands in the northeast portion of the Orocopia Mountains themselves provide additional screening of the SEZ. Because of the additional distance to the SEZ and (in some areas) the additional screening, the SEZ occupies an even smaller portion of the field of view, with weaker visual contrasts expected as a result.

Visual contrasts associated with solar energy development within the SEZ would depend on viewer location within the wilderness area; the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors. Where there was a clear view of the SEZ, under the 80% development scenario analyzed in this PEIS, weak levels of visual contrast would be expected. The highest contrast levels would be expected for locations in the far northeastern part of the wilderness area, with lower contrasts expected for locations in the more central mountains in the wilderness area.

- *Palen-McCoy WA*—Palen-McCoy is a 224,414-acre (908-km^2) congressionally designated wilderness area located adjacent to both the northern boundary and eastern boundary of the western portion of the SEZ. The wilderness area contains five separate mountain ranges separated by wide bajadas and encompasses several landscape types, from desert pavement, bajadas, interior valleys, and canyons to dense ironwood forests, steep canyons, and rugged peaks. Unlike most other wilderness areas around the proposed SEZs, in some areas the Palen-McCoy WA extends well beyond the mountains down the bajada and as much as 7 mi (12 km) or more out onto the Chuckwalla Valley floor. Camping, hiking, backpacking, horseback riding, hunting, and wildlife viewing are recreational activities in the wilderness area.

  Much of the SEZ is visible from the various portions of this large wilderness area. The SEZ essentially surrounds the wilderness area on all sides except north (the north side of the wilderness area faces the Iron Mountain SEZ). Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 170,660 acres [691 km^2], or 76% of the total wilderness area acreage) extend from adjacent to the SEZ at the northeast corner of the western portion to approximately 7.6 mi (12.2 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 151,549 acres (613 km^2), or 68% of the total wilderness area acreage.

Figure 9.4.14.2-14 is a Google Earth visualization of the SEZ as seen from an unnamed peak at the far southern end of the Palen Mountains, elevated roughly 1,900 ft (580 m) above the valley floor at the closest point within the SEZ and approximately 4.0 mi (6.5 km) from the nearest point on the boundary of the SEZ, about 5 mi (8 km) north of I-10. The view direction is south–southeast.

The visualization shows that because the wilderness area extends several miles down the bajada to the south, the SEZ boundary is substantially farther away from the mountains than would be the case for many other wilderness areas, where the wilderness area boundaries typically are located at the base of the mountain slopes. The additional distance to the SEZ means that solar facilities within the SEZ would also be several miles farther from the wilderness area than they might otherwise be, substantially reducing visual contrast levels.

The visualization also shows that from this elevated viewpoint and relatively short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. Two clusters of power tower facility models are visible; the left-most model cluster is approximately 15 mi (24 km) from the viewpoint, and the right-most model cluster is 8 mi (13 km) from the viewpoint (both distances to center points of model clusters). The tops of solar collector/reflector arrays in the closest parts of the SEZ likely would be visible, but the angle of view is low enough that most solar collector/reflector arrays visible in the SEZ from this location would be viewed nearly edge-on, reducing their apparent size and repeating the horizontal line of the valley plain. If power towers were present within the SEZ, at the shorter distances shown here, the receivers could appear as very bright point or nonpoint (i.e., having visible cylindrical or rectangular surfaces) light sources atop discernable tower structures against the backdrop of the valley floor. Power tower receivers located at the farther distances depicted here would likely appear as distant points of light against the backdrop of the valley floor or the bajadas of the mountains on the eastern side of the SEZ.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from the WA and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ

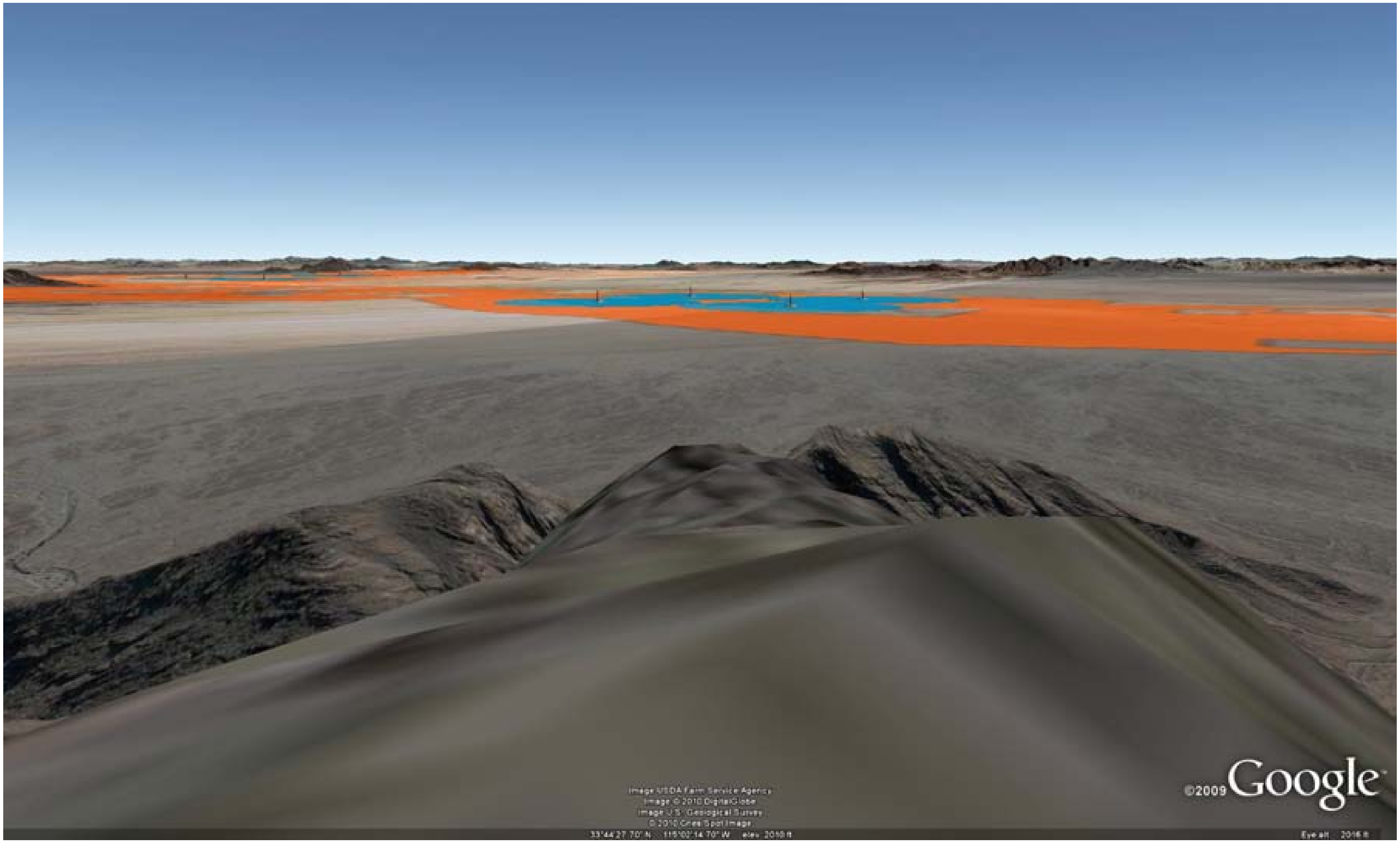

FIGURE 9.4.14.2-14 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Peak in Southern Palen-McCoy WA

could potentially be visible as well, at least for facilities in the closest portions of the SEZ. The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because the viewpoint is elevated and relatively close to the SEZ, the SEZ would occupy much of the field of view. Under the 80% development scenario analyzed in this PEIS, there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, such as transmission towers and lines, substations, power block components, and roads. The resulting visually complex landscape could potentially dominate the view from this location. Under the 80% development scenario, solar facilities within the SEZ would be expected to create strong visual contrasts as viewed from this location within the WA.

Figure 9.4.14.2-15 is a Google Earth visualization of the SEZ as seen from an unnamed peak on the western side of the Palen Mountains across from the Coxcomb Mountains, elevated roughly 2,300 ft (700 m) above the valley floor at the closest point within the SEZ, and approximately 3 mi (5 km) from the nearest point on the boundary of the SEZ. The view looks west to the Eagle and Coxcomb Mountains in Joshua Tree NP.

The visualization shows that the wilderness area extends approximately 1.5 mi (2.4 km) down the bajada to the west. The visualization also shows that from this elevated viewpoint and relatively short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. Two clusters of power tower facility models are visible; the left-most model cluster is approximately 8 mi (13 km) from the viewpoint, and the right-most model cluster is 9.5 mi (15 km) from the viewpoint (both distances to center points of model clusters). The tops of solar collector/reflector arrays in the closest parts of the SEZ would likely be visible, but the angle of view is low enough that solar collector/reflector arrays visible in the farthest part of the SEZ visible from this location would be viewed nearly edge-on, reducing their apparent size, tending to conceal their strong regular geometry, and repeating the horizontal line of the valley plain.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) likely would be visible projecting above the collector/reflector arrays, and their structural details could be evident, at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

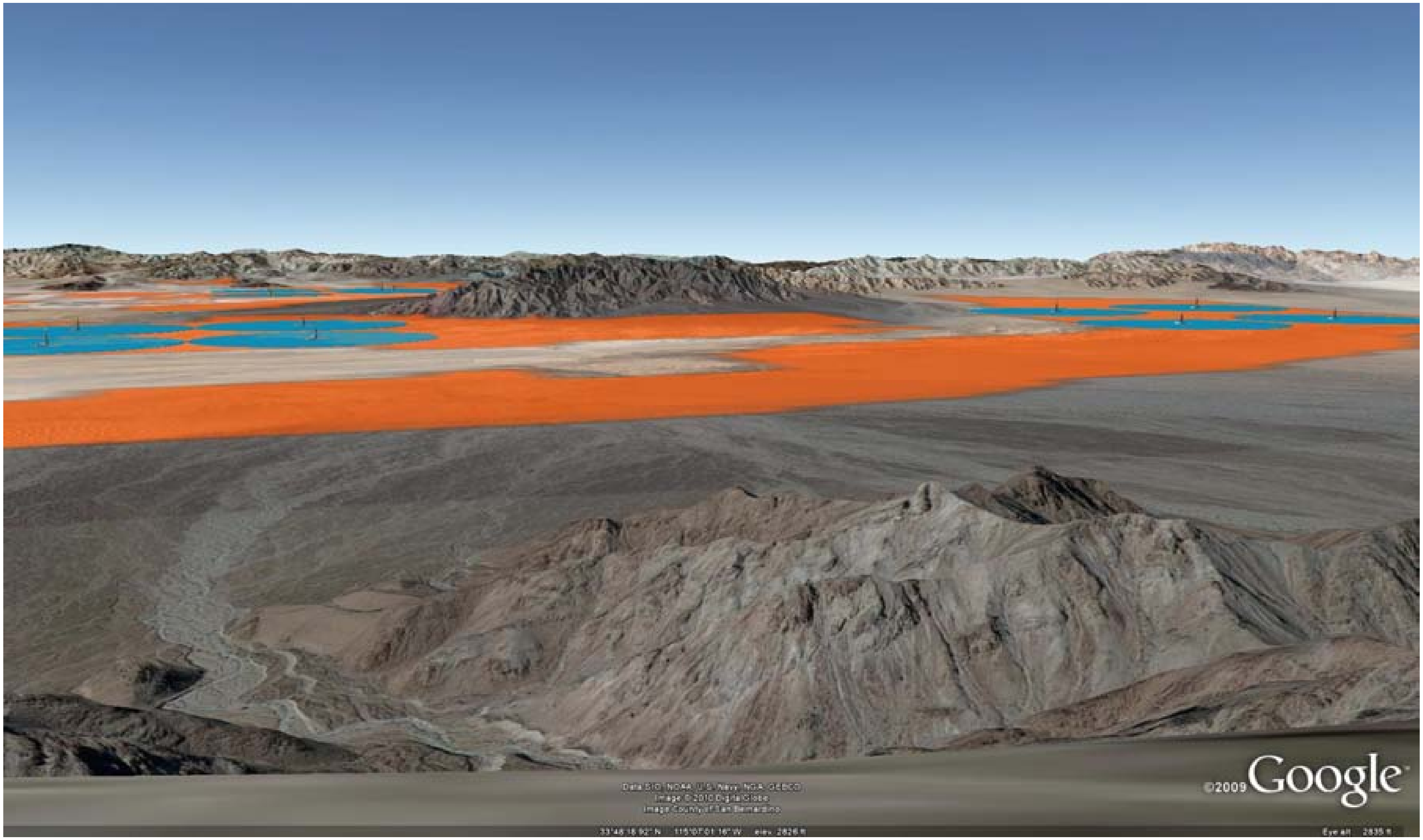

FIGURE 9.4.14.2-15 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Peak in Western Palen-McCoy WA

If power towers were present within the SEZ, at the shorter distances shown here, the receivers could appear as very bright white light sources atop clearly discernable tower structures against the backdrop of the valley floor. Power tower receivers located at the farther distances depicted here would likely appear as distant points of light against the backdrop of the valley floor or the bajadas of the Eagle Mountains.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because the viewpoint is elevated and relatively close to the SEZ, the SEZ would occupy much of the field of view. Under the 80% development scenario analyzed in this PEIS, there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, such as transmission towers and lines, substations, power block components, and roads. The resulting visually complex landscape could potentially dominate the view from this location. Under the 80% development scenario, solar facilities within the SEZ would be expected to create strong visual contrasts as viewed from this location within the wilderness area.

Figure 9.4.14.2-16 is a Google Earth visualization of the SEZ as seen from an unpaved road on the bajada in the far southeastern portion of the wilderness area. The viewpoint is elevated about 130 ft (40 m) above the valley floor at the closest point within the SEZ, and is approximately 3 mi (5 km) from the nearest point on the boundary of the SEZ. The view looks southwest to the Little Chuckwalla Mountains beyond I-10.

The SEZ in the vicinity of this viewpoint is only 3.5 (5.6 km) across, northeast to southwest, and because the elevation of the viewpoint is only minimally elevated relative to the SEZ, the SEZ and heliostat arrays depicted in the power tower model cluster appear edge-on, as a very narrow band parallel to, and repeating, the strong horizon line and thus greatly reducing their visible area and associated visual contrast. The model is approximately 5 mi (8 km) from the viewpoint. The visualization also shows that from this elevated viewpoint and relatively short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ, which would span the entire southern horizon. If power towers were present within the SEZ, at the distance shown here, the receivers could appear as very bright point light sources atop clearly

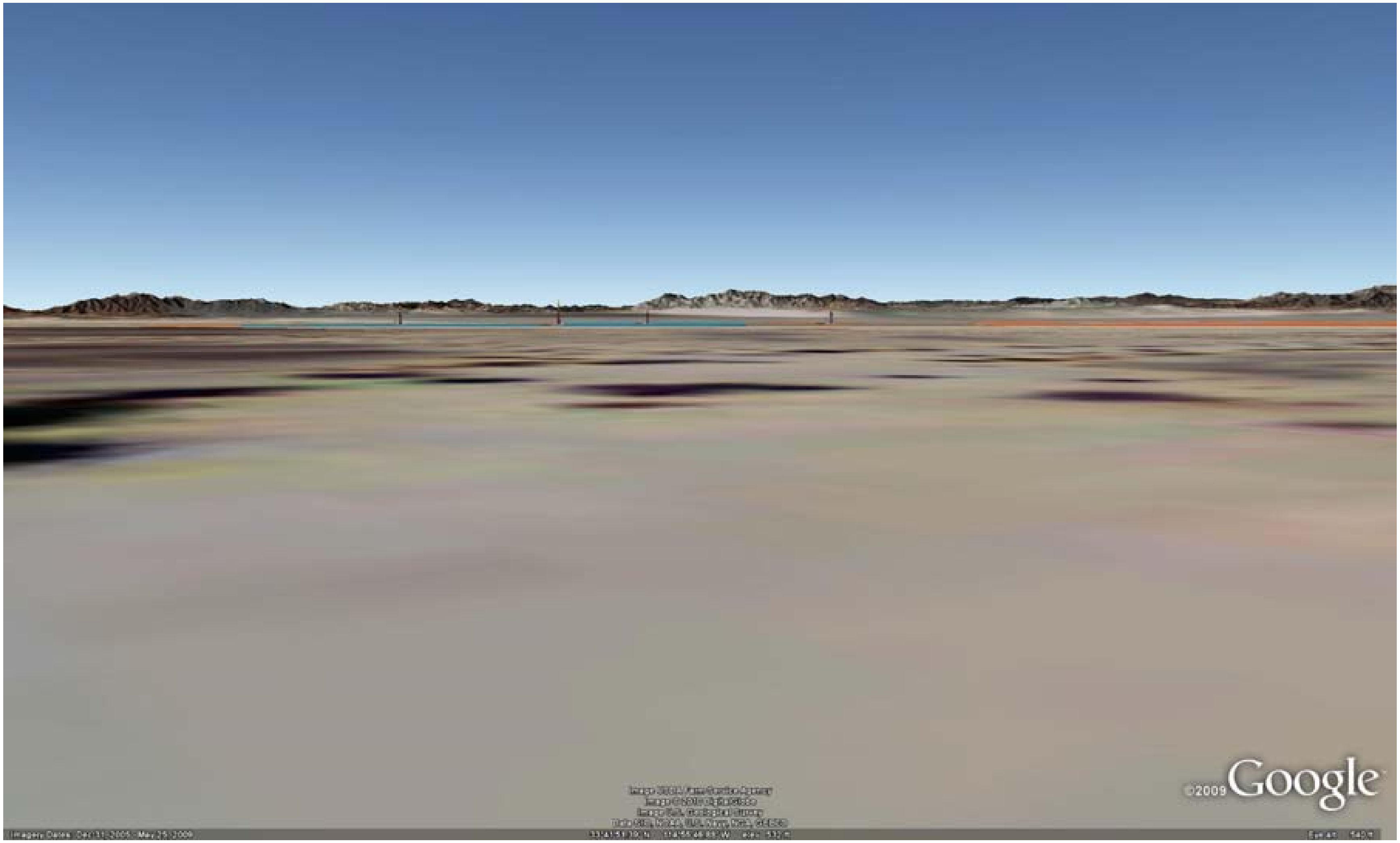

FIGURE 9.4.14.2-16 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Road on the Bajada in Palen-McCoy WA

discernable tower structures against the backdrop of the Little Chuckwalla Mountains. Transmission towers would be visible above the solar collector/reflector arrays. Plumes from CSP plants could be visible above the collector/reflector arrays, depending on lighting and atmospheric conditions, as could be the tops of ancillary buildings. Glare and glinting might be possible from the sides of collector/reflector arrays.

The potential visual contrast expected for this viewpoint would vary depending on project locations, technologies, and site designs. Under the 80% development scenario, solar facilities within the SEZ would be expected to create weak to moderate visual contrasts as viewed from this location within the wilderness area.

In summary, the Palen-McCoy WA is very large and, unlike most wilderness areas, includes much gently sloping low-elevation land beyond the mountains; this would have the effect of keeping solar facilities within the SEZ away from many of the higher elevation viewpoints in the wilderness area. Nonetheless, virtually the entire SEZ is visible from the various portions of the wilderness area, and while perceived contrast levels would depend on viewer location within the wilderness area, and on the numbers, types, sizes, and locations of solar facilities in the SEZ, as well as on other project- and site-specific factors, many higher elevation viewpoints within the wilderness area could be subject to strong visual contrasts from solar energy development within the SEZ under the 80% development scenario.

Note that some locations within the wilderness area also have partial views of the proposed Iron Mountain SEZ, in the Ward Valley north of the wilderness area. Where views of both SEZs exist, additional impacts to those described here would occur.

- *Palo Verde Mountains WA*—The 30,403-acre (123-km^2) Palo Verde Mountains WA is a congressionally designated wilderness area located 6.2 mi (10.0 km) at the point of closest approach south of the SEZ. The wilderness area includes twin buttes known as the Flat Tops, which stand out as a landmark against a range of jagged peaks. Palo Verde Peak is the high point of the range, rising to 1,800 ft (550 m).

  The southeastern portion of the SEZ is visible from higher elevations throughout all but the southwestern portion of the wilderness area. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 13,252 acres [54 km^2], or 43.6% of the total wilderness area acreage) extend from the point of closest approach to approximately 14.3 mi (23.0 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 8,715 acres (35 km^2), or 29% of the total wilderness area acreage.

Figure 9.4.14.2-17 is a Google Earth visualization of the SEZ as seen from Milpitas Wash Road, along the border of the northwestern portion of the wilderness area, approximately 8 mi (13 km) from the closest point in the SEZ, just west of the Mule Mountains. The viewpoint elevation is about 30 ft (10 m) above the elevation of the closest point in the SEZ. The visualization suggests that minor undulations in elevation between the viewpoint and the SEZ would screen portions of the SEZ from view and that the Mule Mountains would also partially screen views of the SEZ. The SEZ occupies a substantial portion of the horizontal field of view, but the angle of view is very low. Solar collector/reflector arrays within the SEZ visible from the wilderness area would be seen edge-on, reducing their apparent size and repeating the line of the horizon, which would tend to reduce visual contrast.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) could potentially be visible projecting above the collector/reflector arrays, at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays.

Power towers within the SEZ could be visible as points of light on the northeast horizon, against the backdrop of the Big Maria Mountains. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from the wilderness area and could be conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

Figure 9.4.14.2-18 is a Google Earth visualization of the SEZ as seen from Palo Verde Peak, in the far southeastern portion of the wilderness area, approximately 13 mi (21 km) from the far southeastern corner of the SEZ, just east of the Mule Mountains. At 1,800 ft (550 m), the viewpoint elevation is about 1,400 ft (430 m) above the elevation of the closest point in the SEZ. The visualization suggests that while the Mule and Little Chuckwalla Mountains would partially screen views of the SEZ, because of its vast size the SEZ would stretch across most of the horizontal field of view. Despite the height of the viewpoint, the angle of view is very low, because the distance to the SEZ exceeds 13 mi (21 km). Solar collector/reflector arrays within the SEZ visible from this viewpoint would be seen edge-on, reducing their apparent size and repeating the line of the horizon, which would tend to reduce visual contrast. Power towers within the SEZ could be visible as distant points of light on the northern and northwestern horizon, against the backdrop of the Big Maria Mountains and the other ranges north of the SEZ. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be visible from this viewpoint.

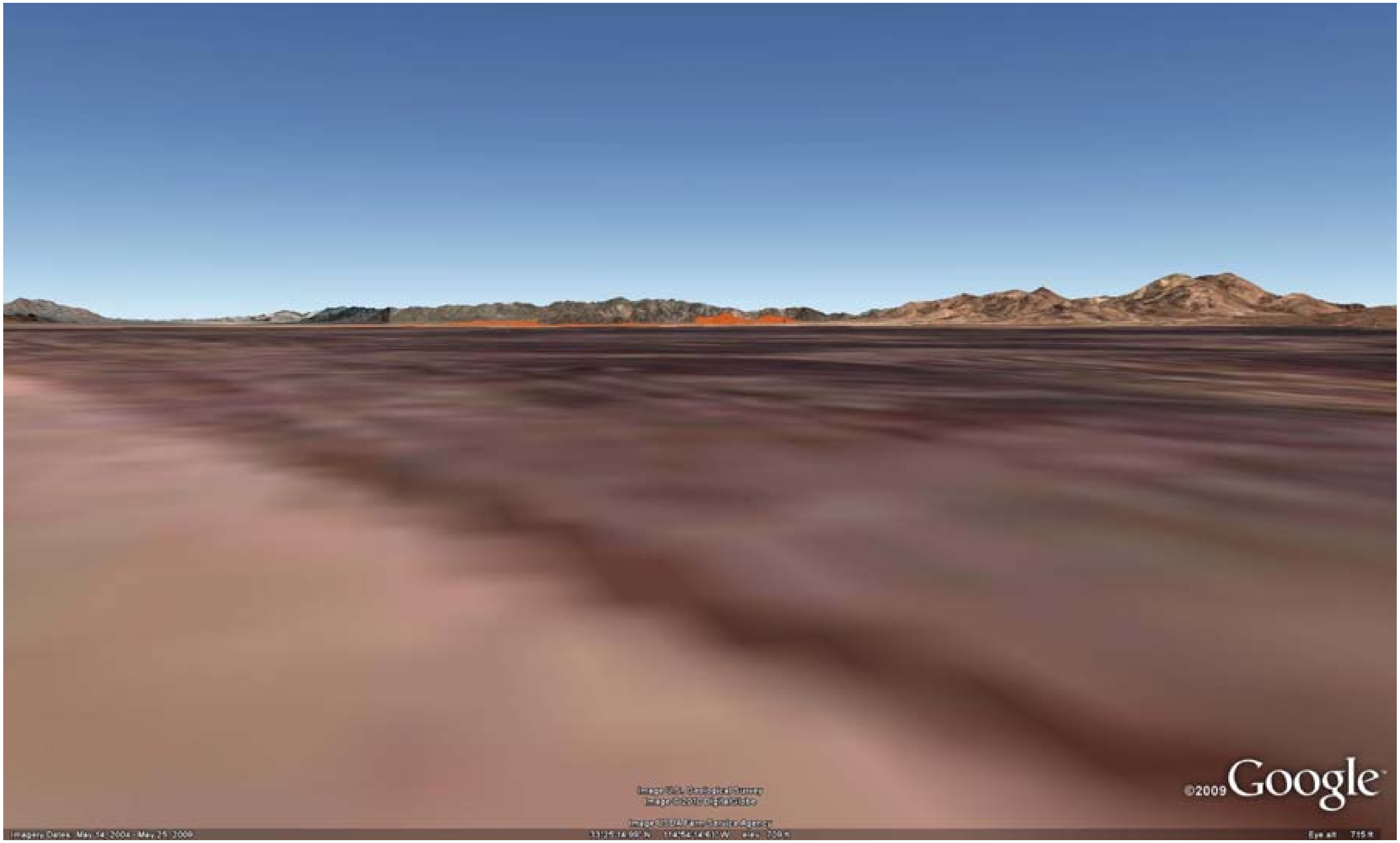

FIGURE 9.4.14.2-17 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Milpitas Wash Road in the Palo Verde Mountains WA

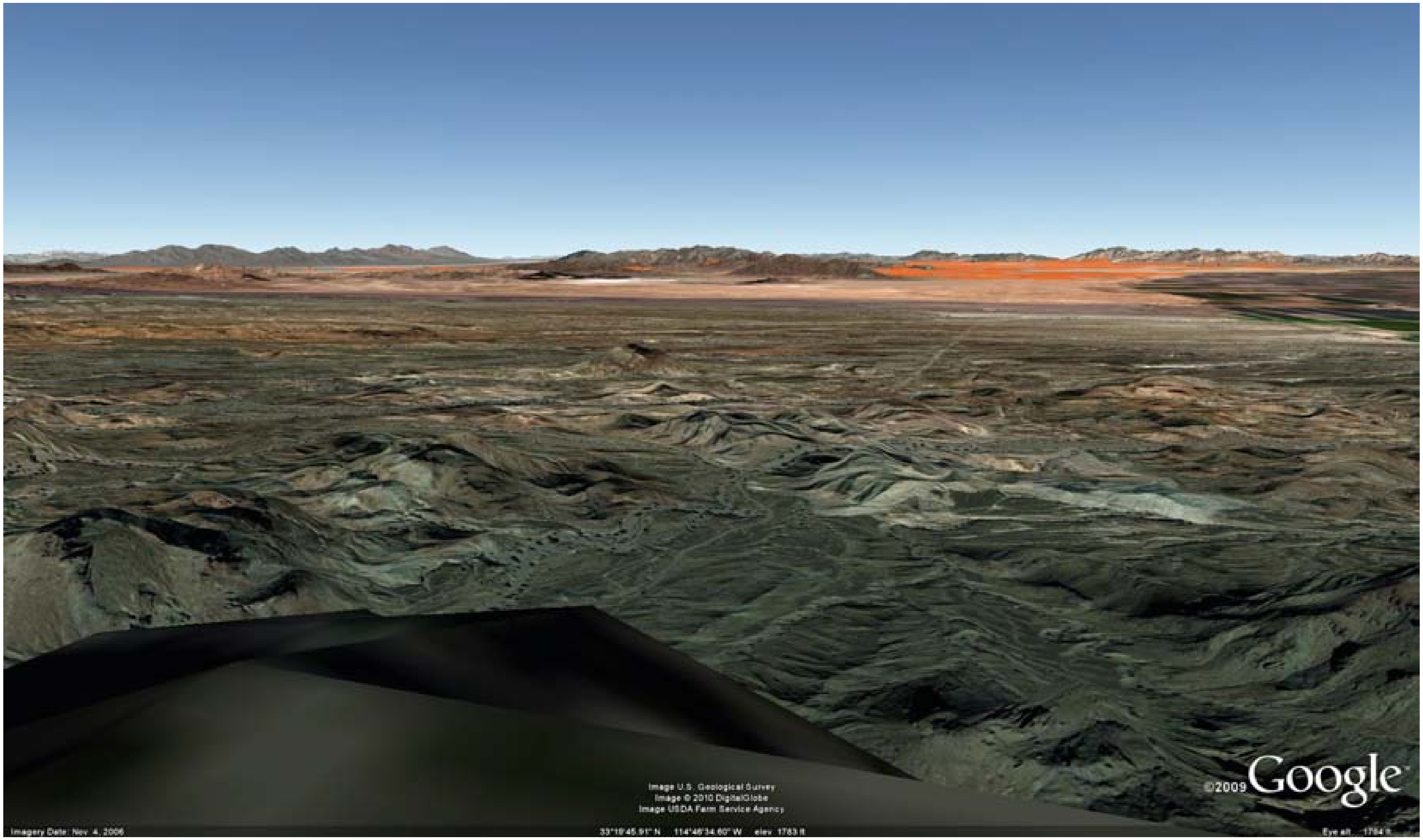

FIGURE 9.4.14.2-18 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from Palo Verde Peak in the Palo Verde Mountains WA

Visual contrasts associated with solar energy development within the SEZ would depend on viewer location within the wilderness area; on the numbers, types, sizes and locations of solar facilities in the SEZ; and on other project- and site-specific factors. At lower elevations, where there is a clear view of the SEZ, under the 80% development scenario analyzed in this PEIS, weak levels of visual contrast would be expected. Moderate levels of visual contrast might be observed from the highest elevations within the WA, such as Thumb Peak, the Flat Tops, and Palo Verde Peak.

- *Rice Valley WA*—The 43,412-acre (176-km^2) Rice Valley is a congressionally designated wilderness area located 0.5 mi (0.8 km) at the point of closest approach north of the SEZ. The WA includes a portion of the broad, flat plains of Rice Valley, the northwestern tip of the Big Maria Mountains, and a system of small dunes rising 30 to 40 feet above the valley floor. The valley is part of a massive sand sheet that extends from Cadiz Valley through Ward Valley. Camping, hiking, backpacking, hunting, and wildlife viewing are recreational activities in the wilderness area. According to BLM's 1990 Wilderness Report, the wilderness area provides expansive vistas, imparting to the visitor a sense of vastness and desolation. The flatness of most of the area provides miles of unrestricted views in all directions (BLM 1990).

  Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 35,792 acres [145 km^2], or 82% of the total wilderness area acreage) extend from the point of closest approach to approximately 9.9 mi (15.9 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 871 acres (4 km^2), or 2% of the total wilderness area acreage. As noted above, the wilderness area includes a portion of the Big Maria Mountains, and the range forms the southern boundary of the wilderness area. The large difference in visible area within the wilderness area between the 650-ft (198.1-m) and the 24.6-ft (7.5-m) viewsheds is due to inclusion in the SEZ of two hills located in the far northeastern portion of the SEZ south of the wilderness area and the Big Maria Mountains. If 650-ft (198.1-m) power towers were located at the peaks of these hills, the upper portions of the power tower would project above the bottoms of two gaps in the Big Maria Mountains such that they would be visible from much of the Rice Valley WA. However, due to the steep slope of the hills, it is extremely unlikely that power towers would ever be erected on the peaks of these hills. If power towers were located away from the peaks of these hills, they would not be visible from points in the wilderness area north of the Big Maria Mountains. The rest of the analysis assumes that visibility of solar facilities within the SEZ is limited to the southern slopes of the Big Maria Mountains within the wilderness area.

  With this assumption, solar energy facilities within the SEZ could potentially be visible from a small area in the far southern portion of the wilderness area, including peaks and south-facing slopes of certain mountains in the Big Maria range.

Figure 9.4.14.2-19 is a Google Earth visualization of the SEZ (highlighted in orange) as seen from a peak in the Big Maria Mountains in the far southern portion of the wilderness area. The viewpoint is approximately 1.4 mi (2.3 km) from the northern border of the SEZ and elevated approximately 1,750 ft (533 m) above the valley floor at the closest point in the SEZ. The view looks southward down the length of the eastern portion of the SEZ toward the distant McCoy and Mule Mountains.

The visualization suggests that from this elevated viewpoint and relatively short distance to the SEZ, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole visible portion of the SEZ. Four clusters of power tower facility models are visible; the closest model cluster is 4.2mi (6.8 km) from the viewpoint, and the farthest model cluster is 14 mi (23 km) from the viewpoint (both distances to center points of model clusters). The tops of solar collector/reflector arrays in the closest parts of the SEZ would be visible, but the angle of view is low enough that farther facilities would likely repeat the horizontal line of the valley plain.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) would likely be visible projecting above the collector/reflector arrays, and their structural details could be evident, at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power towers were present within the SEZ, at short distances the receivers would likely appear as very bright nonpoint sources of light atop clearly discernable tower structures against the backdrop of the valley floor, while at the longest distances visible here they would likely appear as distant points of light below the southern horizon against the backdrop of the valley floor.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from the WA, and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other

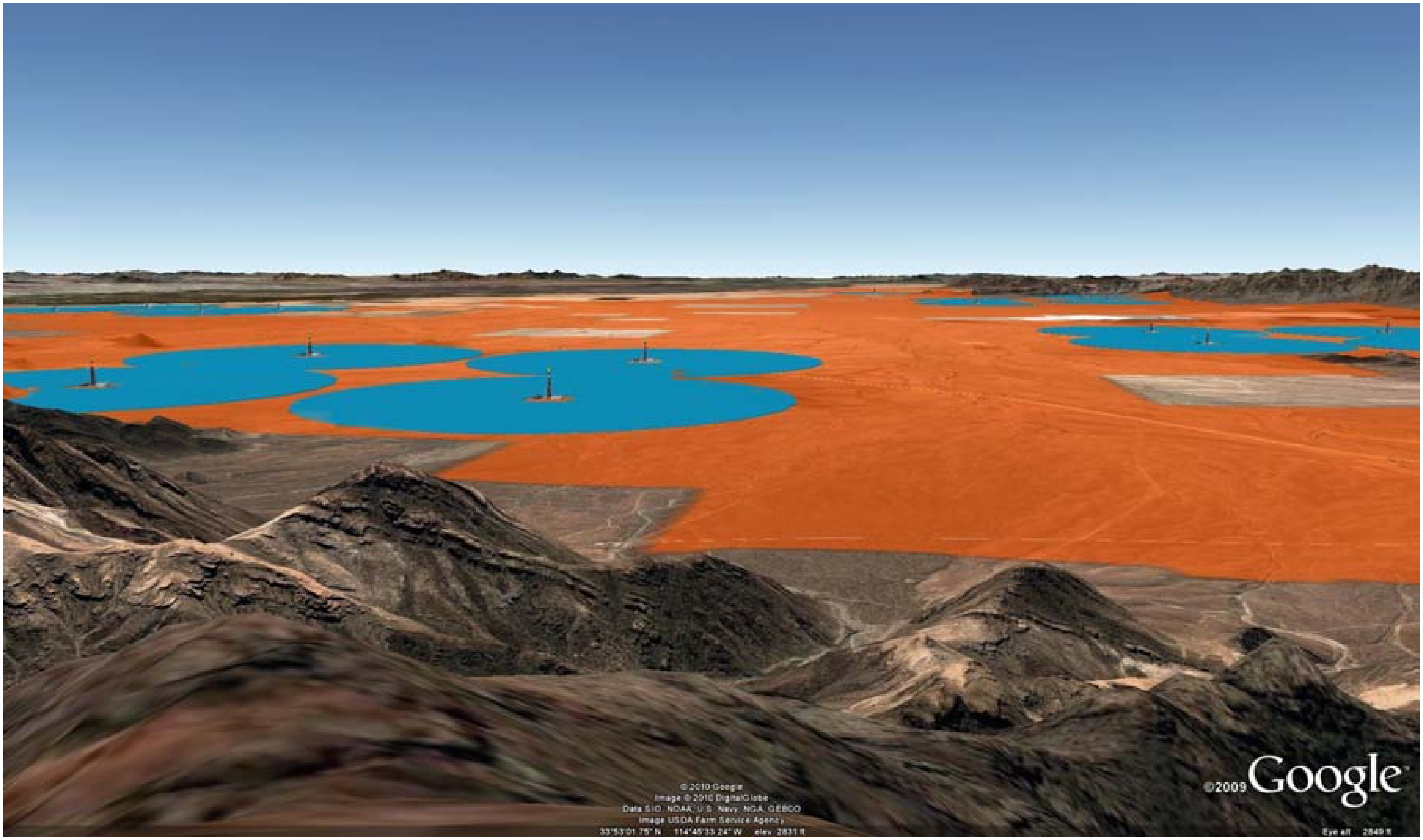

FIGURE 9.4.14.2-19 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Viewpoint in the Big Maria Mountains within the Rice Valley WA

project- and site-specific factors, but because the viewpoint is elevated and relatively close to the SEZ, the SEZ would fill up much of the field of view. While one or a few solar facilities within the SEZ might only give rise to moderate levels of visual contrast, under the 80% development scenario analyzed in this PEIS, there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, such as transmission towers and lines, substations, power block components, and roads. The lack of uniformity in facility components could result in a visually complex landscape, vast in scope but with low visual unity. This essentially industrial-appearing landscape would contrast greatly with the surrounding natural-appearing lands and would likely dominate the view from this location. Under the 80% development scenario, solar facilities within the SEZ would be expected to create strong visual contrasts as viewed from this and similar locations on the slopes or peaks of the Big Maria Mountains within the wilderness area.

Note that some locations within the Big Maria Mountains and within the wilderness area also have partial views of the more distant proposed Iron Mountain SEZ. Overall, under the 80% development scenario analyzed in this PEIS, solar energy development in the Iron Mountain SEZ would be expected to result in much weaker visual impacts on the wilderness area than those expected from development in the Riverside East SEZ, but where views of both SEZs existed, additional impacts to those described here would occur.

- *Sheephole Valley WA*—The 195,002-acre (789-km^2) Sheephole Valley is a congressionally designated wilderness area located 12.3 mi (19.8 km) at the point of closest approach northwest of the SEZ. The wilderness area includes the Sheephole Mountains, the Calumet Mountains, and the Sheephole Valley. The Sheepholes are a steep, boulder-strewn mountain range; the Calumets are similar but much lower. Camping, hiking, backpacking, hunting, and wildlife viewing are recreational activities in the wilderness area.

  The SEZ is visible from higher elevations in both the Sheephole and Calumet Mountains. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 2,733 acres [11 km^2], or 1.4% of the total wilderness area acreage) extend from 14.4 mi (23.2 km) to approximately 22.6 mi (36.4 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 625 acres (3 km^2) or 0.3% of the total wilderness area acreage.

  From the Sheephole Mountains, the far northwest portion of the SEZ is visible beyond the Pinto Basin to the west of the Coxcomb Mountains. The Coxcomb Mountains partially screen the view of the SEZ from the Sheephole Mountains, and because the distance to the SEZ exceeds 15 mi (24 km), the angle of view is low, so that the visible portion of the SEZ occupies a very small portion of the field of view. Solar collector/reflector arrays within the

SEZ visible from the Sheephole Mountains within the wilderness area would be seen edge-on, reducing their apparent size and repeating the line of the horizon, which would tend to reduce visual contrast. Power towers within the SEZ could be visible as distant points of light on the southeast horizon, against the backdrop of the Chuckwalla Valley floor. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could potentially be visible from this location. Expected visual contrasts would be weak.

From the Calumet Mountains, sufficiently tall power towers in the northwest portion of the SEZ east of the Coxcomb Mountains might just be visible over the bajada of the Coxcomb Mountains. The mountains screen the view of the SEZ from the Calumet Mountains, and because the distance to the SEZ exceeds 19 mi (31 km), the angle of view is very low, so only the upper portions of tall power towers might be seen. Power towers within the SEZ could be visible as distant points of light on the southeast horizon, appearing just above the bajada east of the Coxcomb Mountains. Expected visual contrasts would be minimal.

- *Trigo Mountains WA*—The 30,046-acre (122-km^2) Trigo Mountains is a congressionally designated wilderness area located in Arizona, 17.4 mi (28.0 km) at the point of closest approach southeast of the SEZ. The wilderness is characterized by sawtooth ridges and steep-sided canyons and is heavily dissected by washes. Recreation such as extended horseback riding and backpacking trips, sightseeing, hiking, and rock climbing are enhanced by the topographic diversity, scenic character, as well as botanical, wildlife, and cultural values (BLM 2010a).

  The Riverside East SEZ is visible from higher elevations throughout the Trigo wilderness area. Although the closest points in the wilderness area are father than 17 mi (27 km) from the SEZ, there are no intervening mountains to screen views. Portions of the wilderness area within the 650-ft (198.1-m) SEZ viewshed (approximately 3,512 acres [14.2 km^2], or 12% of the total wilderness area acreage) extend from the point of nearest approach to beyond 25 mi (41 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 2,517 acres (10 km^2), or 8% of the total wilderness area acreage.

  Figure 9.4.14.2-20 is a Google Earth visualization of the SEZ as seen from an unnamed peak in the northwestern portion of the wilderness area, approximately 19 mi (31 km) from the far southeastern portion of the SEZ. The visualization illustrates that despite the relatively long distance to the SEZ from the Trigo Mountains WA, because of the open view and its large size, the SEZ occupies a substantial portion of the horizontal field of view. Because of the long distance, however, the angle of view is very low. Solar collector/reflector arrays within the SEZ visible from the wilderness area

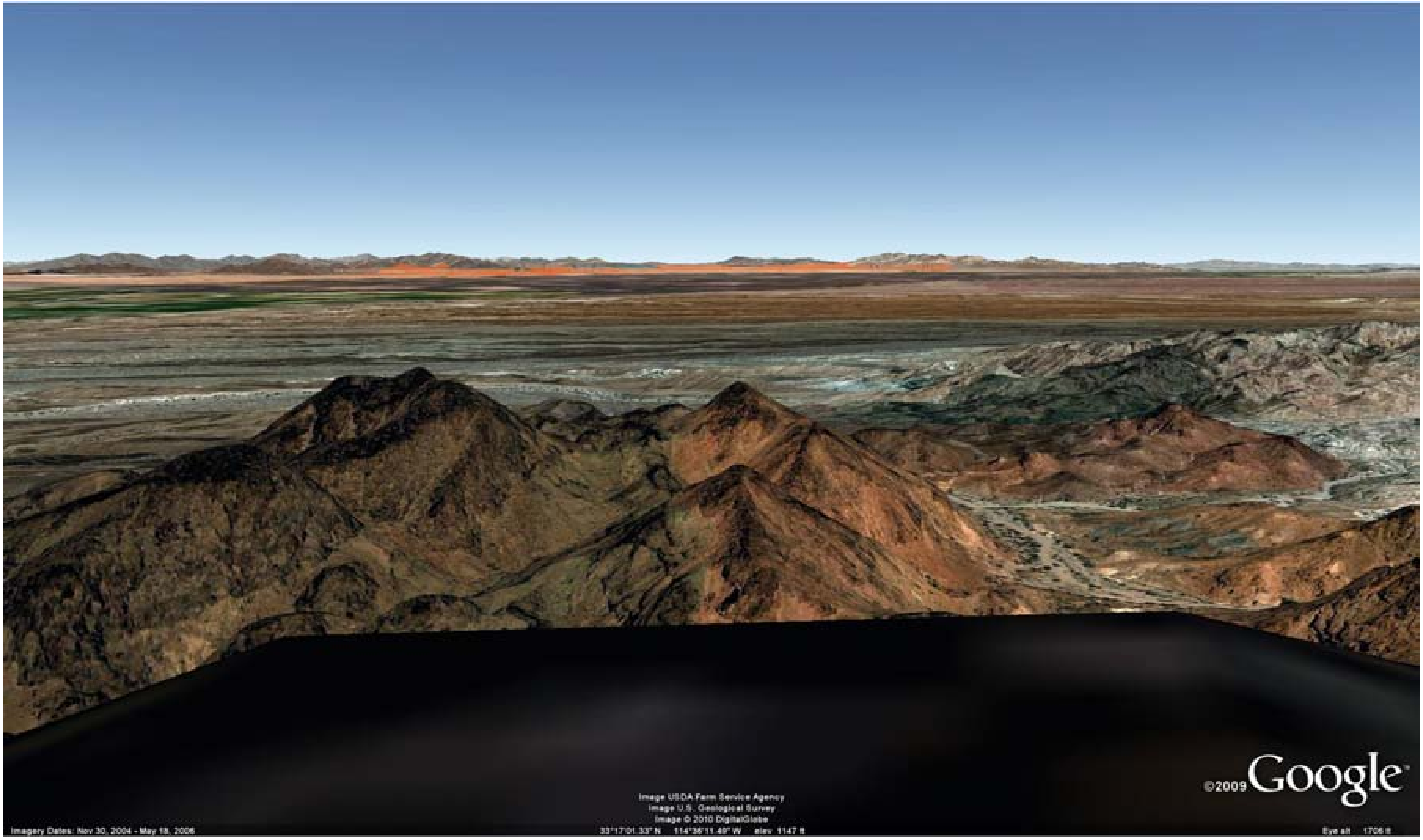

FIGURE 9.4.14.2-20 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Viewpoint in the Trigo Mountains within the Trigo Mountains WA

would be seen edge-on, reducing their apparent size and repeating the line of the horizon, which would tend to reduce visual contrast. Power towers within the SEZ could be visible as distant points of light on the northwest horizon, against the backdrop of the Chuckwalla Valley floor or the mountain ranges north of the valley. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be visible from the WA.

Visual contrasts associated with solar energy development within the SEZ would depend on the numbers, types, sizes and locations of solar facilities in the SEZ, and other project- and site-specific factors.. Where there was a clear view of the SEZ, under the 80% development scenario analyzed in this PEIS, weak levels of visual contrast would be expected. The highest contrast levels would be expected for peaks in the northern part of the WA, with lower contrasts expected for lower elevations and viewpoints in the southern part of the WA.

- *Turtle Mountains WA*—The 182,610-acre (739-km^2) Turtle Mountains is a congressionally designated wilderness area located 17.0 mi (27.4 km) at the point of closest approach north of the SEZ. Above broad, open bajadas, the wilderness area's eroded volcanic peaks, spires, and cliffs in a range of colors constitute a diverse, scenic landscape, which includes the Turtle Mountains scenic ACEC and the Turtle Mountains National Natural Landmark. The wilderness area contains numerous trails. The wilderness area contains the Mopah Peaks, which are rhyodactic or volcanic plugs, and the northernmost peak in the wilderness area is a landmark known as Mexican Hat. Hiking, horseback riding, hunting, camping, rock hounding, photography, and backpacking are popular recreation activities in the wilderness area. Coffin, Mopah, and Mohawk Springs are popular hiking destinations. The Turtle Mountains WA includes most of the Turtle Mountains range, and a large portion of the Ward Valley floor to the northwest of the Turtle Mountains.

  Small areas of the northeast section of the SEZ are visible from the south-facing slopes and peaks in the southern portion of the wilderness area beyond Rice Valley through two gaps, one in the Big Maria Mountains and one between the Big Maria and Little Maria Mountains. Portions of the wilderness area within the 650-ft (198.1-m) viewshed (approximately 13,827 acres [56 km^2], or 8% of the total wilderness area acreage) extend from the point of nearest approach to beyond 25 mi (41 km) from the SEZ. Portions of the wilderness area within the 24.6-ft (7.5-m) viewshed encompass approximately 1,375 acres (6 km^2), or 0.8% of the total wilderness area acreage.

  The gaps through which the SEZ is visible from the wilderness area are relatively narrow, so the visible portions of the SEZ are very small, especially the eastern-most gap in the Big Maria Mountains. The distance from the SEZ to visible areas within the wilderness area exceeds 17 mi (27 km), so solar collector/reflector arrays within the SEZ visible from the wilderness area would be seen edge-on, reducing their apparent size and repeating the line of the horizon, which would tend to reduce visual contrast. Power towers within the SEZ could be visible as distant points of light within the gaps. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be visible from the wilderness area.

Visual contrasts associated with solar energy development within the SEZ would depend on viewer location within the WA; solar facility type, size, and location within the SEZ; and other visibility factors. Where there was a clear view of the SEZ, under the 80% development scenario analyzed in this PEIS, weak levels of visual contrast would be expected.

National Wildlife Refuges

- *Cibola NWR*—The 18,398-acre (75-km^2) Cibola NWR is 9.8 mi (15.8 km) south of the SEZ at the closest point of approach, in the floodplain of the lower Colorado River. The refuge is located immediately north of Imperial NWR (see below). The refuge includes backwaters, seasonally flooded croplands, two historic river meanders, and two small lakes. The refuge includes low desert ridges and washes away from the river.

  The southeastern portion of the SEZ is visible from most of the refuge. Approximately 17,121 acres (69 km^2), or 93% of the refuge, is within the 650-ft (198.1-m) viewshed of the SEZ, and 16,386 acres (66 km^2), or 89%, is within the 24.6-ft (7.5-m) viewshed. The portions of the refuge within the viewshed extend from the point of nearest approach at the northern boundary to the southern boundary of the refuge, approximately 22.1 mi (35.6 km) from the SEZ.

  The refuge is very flat, with relief in most of the refuge varying less than 20 ft (6 m), except the far southern portions. Most of the refuge is lower in elevation than the SEZ by 100 ft (30 m) or more, and the highest points in the refuge are lower than the southeastern portion of the SEZ; hence the angle of view between the refuge and the SEZ is very low. Some of the SEZ is screened from view by the Palo Verde Mountains. In addition, much of the refuge is heavily vegetated, and in some areas of the refuge, views of the SEZ are likely screened by vegetation.

  Any solar facilities within the SEZ visible from the refuge would be viewed at very low angles. Solar collector/reflector arrays would be viewed edge-on, tending to reduce apparent size and visual contrast. If power towers were visible, they would likely appear as point light sources on the northern horizon. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be visible from the refuge.

Visual contrasts associated with solar energy development within the SEZ would depend on viewer location within the NWR; solar facility type, size, and location within the SEZ; and other visibility factors. From the northern portions of the NWR, where there was a clear view of the SEZ, under the 80% development scenario analyzed in this PEIS, weak levels of visual contrast would be expected. Contrast would be weaker from viewpoints in the southern portions of the NWR, because the distance to the SEZ is greater.

- *Imperial NWR*—The 31,465-acre (127-km^2) Imperial NWR is approximately 22.1 mi (35.6 km) at the closest point of approach south of the SEZ. The refuge protects wildlife habitat along 30 mi (48.3 km) of the lower Colorado River in Arizona and California, including the last unchannelized section before the river enters Mexico. The refuge includes low, heavily vegetated land along the Colorado River as well as higher areas with less vegetation on both sides of the river.

  The far southeastern corner of the SEZ is visible from some areas within the northern portion of the refuge. Approximately 1,749 acres (7 km^2), or 6% of Imperial NWR's total acreage, is contained within the 650-ft (198.1-m) viewshed of the SEZ, and 1,381 acres (6 km^2), or 4% of the refuge's total acreage, is within the 24.6-ft (7.5-m) viewshed. The portions of the refuge within the viewshed extend from the point of nearest approach at the northern boundary of the refuge to beyond 25 mi (41 km) from the SEZ.

  Within 25 mi (41 km) of the SEZ, where vegetative screening is absent, solar facilities located in the far southeastern portions of the SEZ might be visible from the highest points within the refuge. Because of the very long distance to the SEZ and screening by the Palo Verde Mountains, visible portions of the SEZ would occupy a very small portion of the field of view. The refuge is at a slightly lower elevation than the SEZ. Any visible solar facilities within the SEZ would be viewed at very low angles. Solar collector/reflector arrays would be viewed edge-on and, at distance exceeding 22 mi (35 km), are unlikely to be distinguishable. If power towers were visible, they would likely appear as distant point light sources on the northern horizon. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could potentially be visible from the refuge. Visual impacts on the Imperial NWR from solar development within the SEZ would be expected to be minimal.

National Natural Landmarks

- *Turtle Mountains NNL*—The Turtle Mountains NNL comprises 50,057 acres (202.57 km^2) designated for outstanding scenic values, located almost entirely within the Turtle Mountains WA (see above). The Turtle Mountains NNL encompasses the same lands as the Turtle Mountain Scenic ACEC.

Visual impacts on the Turtle Mountains NNL associated with utility-scale solar energy development in the proposed Riverside East SEZ would be similar to those described for the Turtle Mountains WA (see above).

ACECs Designated for Outstanding Scenic Qualities

- *Corn Springs ACEC*—The Corn Springs ACEC is a 2,463-acre (10-km^2) BLM-designated ACEC located 4.8 mi (7.7 km) south of the SEZ at the point of closest approach. The ACEC contains land in and around a canyon in the Chuckwalla Mountains Wilderness. The ACEC was designated for its prehistoric/historic values, outstanding scenery, wildlife habitat, and vegetation, and the ACEC also contains petroglyphs. Corn Springs is also a Cahuilla Indian sacred site. The Corn Springs Campground is located in the canyon, situated by a stand of native California fan palms.

  Much of the SEZ is visible from the eastern portion of the SEZ outside Corn Springs Canyon, and a very small portion of the SEZ is visible from within the canyon. The area of the ACEC within the viewshed of the SEZ encompasses 1,080 acres (4 km^2) in the 650-ft (198.1-m) viewshed, or 44% of the total ACEC acreage. Portions of the ACEC within the 24.6-ft (7.5-m) viewshed include approximately 941 acres (4 km^2), or 38% of the total ACEC acreage. The portions of the ACEC within the viewshed extend from the point of nearest approach to approximately 5.9 mi (9.5 km) from the SEZ.

  The SEZ is largely screened from view within the canyon itself, although there is a very limited view of the SEZ almost straight east from Corn Springs Road as it crosses a slightly elevated bench in the western part of the canyon. The view of the SEZ from this location is limited by screening from the canyon walls to a very small area in the far southeastern portion of the SEZ, more than 29 mi (47 km) distant, and at such a low angle of view that visual impacts from any solar facilities visible from that location would be expected to be minimal.

  Within the ACEC, near the eastern mouth of the canyon where the canyon outwash turns northward toward the Chuckwalla Valley, views of the SEZ open up to the north and east. As Corn Springs Road crosses east of the wash, views open up even more as the Chuckwalla Mountains no longer screen views of the western portion of the SEZ.

  Figure 9.4.14.2-21 is a Google Earth visualization of the SEZ as seen from Corn Springs Road approximately 0.2 mi (0.4 km) north of the southern boundary of the ACEC and 0.4 mi (0.7 km) from the eastern boundary of the ACEC. The viewpoint is approximately 5 mi (8 km) south of the SEZ and is elevated about 600 ft (180 m) over the closest portion of the SEZ and about 850 ft (260 m) over the valley floor. The visualization suggests that from this

FIGURE 9.4.14.2-21 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from a Viewpoint on Corn Springs Road within the Corn Springs ACEC

elevated viewpoint, the SEZ would be too large to be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. The entire Chuckwalla Valley visible from this location would present a variety of solar facilities with associated transmission facilities and roads, stretching across the valley floor to the base of the bajada of the Palen Mountains and to the other mountain ranges north of the SEZ. The angle of view is low enough, however, that the valley itself appears as a band across the base of the mountains, so most of the development in the valley would be viewed from a low oblique angle that would reduce the visible surface area and associated visual impacts.

The tops of solar collector/reflector arrays in the closest parts of the SEZ would likely be visible, but the angle of view is low enough that most facilities would appear close to edge-on, appearing as a thin band that would tend to repeat the line of the horizon.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) would likely be visible projecting above the collector/reflector arrays, at least for nearby facilities, and their structural details could be evident. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power towers were present within the SEZ, closer receivers would likely appear as bright points of light atop discernable tower structures against the backdrop of the valley floor or the bajada of the Palen Mountains. The tower structures and power block facilities would likely be visible for projects close to the viewpoint, but receiver lights would be dimmer and ancillary facilities more difficult to discern for projects farther from the viewpoint, as the distance increased and the viewing angle decreased.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from this location in the ACEC and could be very conspicuous, given the dark night skies in the vicinity of the SEZ, although there would be lighting from I-10 and other sources visible as well. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would vary depending on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but under the 80% development scenario analyzed in this PEIS, solar facilities within the SEZ would be expected to create strong visual contrasts as viewed from this location within the ACEC.

In summary, visual contrasts associated with solar energy development within the SEZ would depend on viewer location within the ACEC; on solar facility type, size, and location within the SEZ; and on other visibility factors. Inside Corn Spring Canyon, visibility of solar facilities in the SEZ would be very limited; views would be at very long distances; and expected contrast levels would be minimal. Outside of the canyon at points on or along Corn Springs Road, with a clear view of the SEZ, under the 80% development scenario analyzed in this PEIS, strong levels of visual contrast would be expected.

- *Turtle Mountain ACEC*—The Turtle Mountains ACEC is a 50,057-acre (203-km^2) BLM-designated ACEC located approximately 20.8 mi (33.5 km) north of the SEZ at the point of closest approach. The ACEC encompasses the Turtle Mountains NNL. The ACEC was designated for its scenic values.

  The area of the ACEC within the 650-ft (198.1-m) viewshed of the SEZ includes 2,355 acres (10 km^2), or 5% of the total ACEC acreage. The area within the 24.6-ft (7.5-m) viewshed of the SEZ includes 856 acres (4 km^2), or 2% of the total ACEC acreage. The visible portions of the ACEC extend from the point of closest approach to beyond 25 mi (41 km) from the SEZ.

- Visual impacts on the Turtle Mountains ACEC associated with utility-scale solar energy development in the proposed Riverside East SEZ would be similar to those described for the Turtle Mountains WA (see above).

Scenic Highways/Byways

- *Bradshaw Trail*—The Bradshaw Trail is a BLM Backcountry Byway that runs parallel to the southern boundary of the SEZ. The trail traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range, with spectacular views of the Chuckwalla Bench, Orocopia Mountains, Chuckwalla Mountains and the Palo Verde Valley. It is currently unpaved, and is accessible with four-wheel drive vehicles.

  Approximately 23 mi (37.0 km) of the trail is within the calculated 650-ft (198.1-m) viewshed of the SEZ. Near the southeastern corner of the SEZ, the Bradshaw Trail passes within 1.7 mi (2.8 km) of the SEZ and parallels the SEZ at roughly that distance for a little more than 6 mi (10 km); however, views of the SEZ from the trail would be screened by the Mule Mountains for most of that distance. As the trail heads west, it veers slightly south to pass to the south of the Little Chuckwalla Mountains and after about 15 additional mi (24 km) passes out of the SEZ 650-ft (198.1-m) viewshed.

The trail climbs steadily as it runs west, from an elevation of about 240 ft (73.2 m) above mean seal level near the southeast corner of the SEZ to about 1,240 ft (378 m) above mean sea level at the point it passes out of the SEZ viewshed. For that portion of the trail closest to the SEZ, the trail is at a slightly lower elevation, which would ensure a very low angle of view to the SEZ.

Figure 9.4.14.2-22 is a Google Earth perspective visualization of the SEZ as seen from the Bradshaw Trail 1.7 mi (2.8 km) south of the southeast corner of the SEZ. The viewpoint is roughly 20 ft (6 m) lower in elevation than the SEZ in the vicinity. The view direction is north.

In the visualization, the SEZ and very distant heliostat arrays depicted in the power tower model cluster appear edge-on, as a very narrow band parallel to, and repeating, the strong horizon line. The very low angle of view would greatly reduce the visible area of solar collector/reflector arrays, conceal their strong regular geometry, and thus reduces associated visual contrast. The model cluster at center right is approximately 18 mi (29 km) from the viewpoint; however, if solar facilities were closer to the viewpoint, they would cause greater levels of visual contrast, and if they were close to the southeastern corner of the SEZ, they could potentially give rise to moderate to strong visual contrasts.

If power towers were present within the SEZ, at the distance shown here, the receivers could appear as distant point light sources against the backdrop of the Big Maria Mountains. Transmission towers could be visible above the solar collector/reflector arrays. Receivers on closer power towers could be much brighter.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from the Trail and could be very conspicuous from this viewpoint, given the dark night skies in the vicinity of the SEZ and the short distance to the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors. Under the 80% development scenario, solar facilities within the SEZ would be expected to create weak to moderate visual contrasts as viewed from this location on the trail.

On average, eastbound travelers on the Bradshaw Trail would be more likely to experience visual impacts from solar energy development in the SEZ than

FIGURE 9.4.14.2-22 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from the Bradshaw Trail near the Southeast Corner of the SEZ

westbound travelers. As eastbound travelers approached the SEZ, they would be at a higher elevation than the SEZ and so would see more of the SEZ and solar facilities within it, but they would also have more extended views of the SEZ as they descended the trail. Westbound travelers would be facing away from the SEZ as they climbed the trail behind the Little Chuckwalla Mountains.

Figure 9.4.14.2-23 is a Google Earth perspective visualization of the SEZ as it would be seen by eastbound travelers on the Bradshaw Trail 5.7 mi (9.2 km) southwest of the SEZ at the western edge of the Mule Mountains. The viewpoint is roughly 240 ft (73 m) higher in elevation than the SEZ is in the direction of travel. The view direction is northeast.

In the visualization, the SEZ and very distant heliostat arrays depicted in the power tower model cluster appear edge-on, as a very narrow band parallel to, and repeating, the strong horizon line and thus greatly reducing their visible area and associated visual contrast. The model cluster at center right is approximately 9 mi (14 km) from the viewpoint.

If power towers were present within the SEZ, at the distance shown here, the receivers could appear as bright point light sources atop discernable tower structures against the backdrop of the Big Maria Mountains or the sky. Transmission towers could be visible above the solar collector/reflector arrays.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that could be visible from this location. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for this viewpoint would depend on the numbers, types, sizes and locations of solar facilities in the SEZ, and other project- and site-specific factors. Under the 80% development scenario, solar facilities within the SEZ would be expected to create moderate visual contrasts as viewed from this location on the trail.

In summary, visual contrasts associated with solar energy development within the SEZ would depend on viewer location on the Bradshaw Trail; on solar facility type, size, and location within the SEZ; and on other visibility factors. On much of the trail, visibility of solar facilities in the SEZ would be very limited; views would be at long distances; and expected contrast levels would be minimal. However, under the 80% development scenario analyzed in this PEIS, moderate or strong levels of visual contrast would be expected for some locations with elevated viewpoints or low-elevation viewpoints very close to the SEZ. In general, because of view direction and duration, eastbound

FIGURE 9.4.14.2-23 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from the Bradshaw Trail near the Mule Mountains

travelers on the trail would be subject to higher contrast levels than westbound travelers.

Additional scenic resources exist at the national, state, and local levels, and impacts may occur on both federal and nonfederal lands, including sensitive traditional cultural properties important to Tribes. Note that in addition to the resource types and specific resources analyzed in this PEIS, future site-specific NEPA analyses would include state and local parks, recreation areas, other sensitive visual resources, and communities close enough to the proposed project to be affected by visual impacts. Selected other lands and resources are included in the discussion below.

In addition to impacts associated with the solar energy facilities themselves, sensitive visual resources could be affected by facilities that would be built and operated in conjunction with the solar facilities. With respect to visual impacts, the most important associated facilities would be access roads and transmission lines, the precise location of which cannot be determined until a specific solar energy project is proposed. Currently, a 500-kV, a 230-kV, and a 69-kV transmission line are within the proposed SEZ. For this analysis, the impacts of construction and operation of transmission lines outside of the SEZ were not assessed, assuming that the existing transmission lines might be used to connect some new solar facilities to load centers and that additional project-specific analysis would be performed for new transmission construction or line upgrades. Note that depending on project- and site-specific conditions, visual impacts associated with access roads, and particularly transmission lines, could be large. Detailed information about visual impacts associated with transmission lines is presented in Section 5.12.1. 5. A detailed site-specific NEPA analysis would be required to determine visibility and associated impacts precisely for any future solar projects, based on more precise knowledge of facility location and characteristics.

Impacts on Selected Other Lands and Resources

Interstate 10. I-10 passes through the SEZ for a distance of approximately 4.0 mi (6.4 km), abuts the southern boundary of the SEZ for an additional 1.7 mi (2.7 km), and is within 0.67 mi (1.1 km) of the SEZ for an additional 34 mi (55 km). As shown in Figure 9.4.14.2-2, approximately 79 mi (127 km) of I-10 is within the 650-ft (198.1-m) viewshed of the Riverside East SEZ. I-40 intersects the SEZ in five separate areas, ranging in length from approximately 0.04 to 3 mi (0.06 to 4.8 km). Undulations in topography as well as buildings screen views of portions of the SEZ from some locations along I-10; however, there are generally open views of the SEZ from I-10 throughout the viewshed.

For westbound travelers on I-10, solar facilities within the SEZ would likely come into view just past a pass in the Dome Rock Mountains, about 8.5 mi (13.6 km) east of Ehrenberg, about 34 mi (55 km) from the eastern boundary of the SEZ. At that distance, the SEZ would occupy a substantial portion of the horizontal field of view directly from the Interstate; however, because of the distance, visual contrasts would likely be weak. As travelers descend the foothills of the Dome Rock Mountains, the road passes through several dips that might partially conceal some facilities within the SEZ briefly, but some part of the SEZ would be in nearly continuous view, with visual contrasts due to solar facilities within the SEZ gradually increasing as the distance to the SEZ decreased and the apparent height and width of the solar facilities increased. In about 15 to 20 minutes after first coming into view, the SEZ would occupy much of the northwestern horizon north of I-10. The viewing angle would be low and would decrease as travelers approach the Colorado River Valley, so that the SEZ and associated solar development would appear as a thin band just under the Chuckwalla and McCoy Mountains.

As travelers pass through the Palo Verde Valley, their elevation would drop below that of the SEZ, and eventually, the western slope of the valley that climbs to the Palo Verde Mesa would gradually cut off views of the SEZ and associated solar facilities. By the time travelers reach State Route 78, except for a view of the far northeast corner of the SEZ straight north, the SEZ would be cut off entirely from view. Less than 1 mi (1.6 km) west of State Route78, the elevation climbs again rapidly, and the SEZ would again become visible, but much closer, with stronger contrast levels. At Blythe Airport, another ridge would cut off views of the SEZ, and after travelers cross this ridge to the Palo Verde Mesa, the SEZ would again come back into view, at this point filling the view to the west and north and likely dominating the view at 1 mi (1.6 km) from the eastern boundary of the SEZ. At night, if there were hazard navigation lights on sufficiently tall power towers, depending on their location within the SEZ, they could be visible to travelers on I-10 approaching the SEZ, gradually increasing in brightness and height above the horizon, and potentially becoming very conspicuous in the night sky as travelers approached the SEZ closely.

Figure 9.4.14.2-24 is a Google Earth perspective visualization of the SEZ as seen from I-10, approximately 7.4 mi (11.9 km) east of the intersection of I-10 and the SEZ, just west of Blythe and facing west toward the SEZ. The visualization suggests that from this location, the SEZ would occupy much of the horizontal field of view, but because the viewing angle is very low, small undulations in topography might screen views of lower height solar facilities away from the roadways, and visible facilities would be seen edge-on, which would tend to reduce visual contrasts. If power tower facilities were present within the SEZ, the receivers of power towers in the far eastern portion of the SEZ could appear as very bright points of light atop visible tower structures on the western horizon, against a sky or mountain backdrop. These bright light sources could potentially interfere with views of the distant mountains.

Figure 9.4.14.2-25 is a Google Earth perspective visualization of the SEZ as seen from I-10, approximately 0.7 mi (1 km) east of the intersection of the highway and the SEZ, facing southwest toward two power tower models just south of I-10. The closest tower is approximately 1.6 mi (2.5 km) from the viewpoint. The visualization suggests that from this location, solar facilities within the SEZ would be in full view. The SEZ would occupy more than the entire field of view, so travelers would have to turn their heads to scan across the full SEZ. Facilities located within the far eastern portion of the SEZ could strongly attract the eye and likely dominate views from I-10.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) would likely be visible projecting above the collector/reflector arrays, and their structural details could be evident, at least for nearby facilities. The ancillary facilities

FIGURE 9.4.14.2-24 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from I-10 Approximately 7.4 mi (11.9 km) East of the SEZ

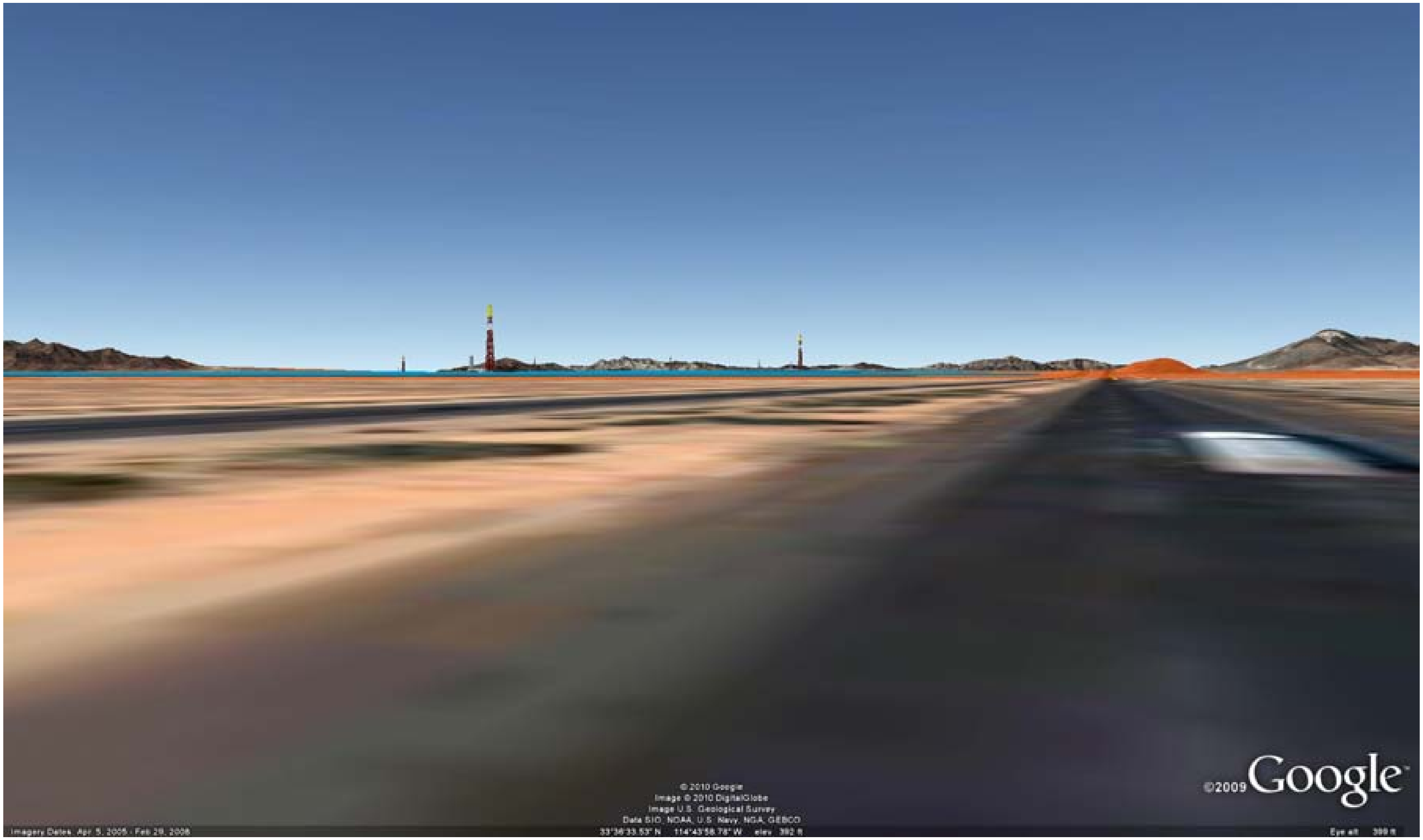

FIGURE 9.4.14.2-25 Google Earth Visualization of the Proposed Riverside East SEZ (shown in orange tint) and Surrounding Lands, with Power Tower Wireframe Models, as Seen from I-10 Approximately 0.7 mi (1 km) East of the SEZ

could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts also would be likely, but their extent would depend on the materials and surface treatments utilized in the facilities. Steam plumes, transmission towers, and other tall facility components likely would project above the mountains. From this viewpoint, solar collector/reflector arrays would be seen nearly edge-on and would repeat the horizontal line of the plain in which the SEZ is situated; this would reduce their apparent size and conceal the strong regular geometry of the arrays, tending to reduce visual contrast, but as the viewer approached the SEZ, the collector/reflector arrays could increase in apparent size until their individual forms became plainly visible, and they no longer appeared as horizontal lines against the natural-appearing backdrop.

Views of the Chuckwalla Valley and the mountain ranges on either side of the valley could be partially screened by solar facilities, depending on the layout of solar facilities within the SEZ. Because of the potentially very short distance of solar facilities from I-10, strong visual contrasts likely would result, depending on solar project characteristics and location within the SEZ.

Visual contrast would increase further after travelers on I-10 entered the SEZ. If power tower facilities were located in the SEZ, the receivers could appear as brilliant light sources on either side of the highway and would likely strongly attract views. For nearby power towers, during certain times of the day from certain angles, sunlight on dust particles in the air might result in the appearance of light streaming down from the tower(s). At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be very conspicuous from I-10. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ. Ahead, down the roadway, if solar facilities were located on both the north and south sides of I-10, the banks of solar collectors/reflectors on both sides could form a visual "tunnel," which travelers would pass through briefly. If solar facilities were located close to the roadway, given the 80% development scenario analyzed in this PEIS, they would be expected to dominate views from I-10 and would create strong visual contrasts. After travelers pass through the section of SEZ, the SEZ would still be very close to I-10 on one or the other side of the highway. Impact levels would be dependent on the presence of solar facilities in areas near the roadway and on solar facility characteristics.

Travelers heading east on I-10 would in general be subjected to the same types of visual contrasts, but the order would be reversed, and this could change the perceived impact levels. Because of differences in topography between the eastern and western approaches to the SEZ, more of the SEZ would be visible for longer distances for eastbound travelers. Solar facilities within the SEZ could be visible as far as Chiriaco Summit (18 mi [29 km] west of the SEZ), with power tower receivers appearing as distant lights on the eastern horizon at that distance.

From Chiriaco Summit eastward, except for brief periods, travelers would have continuous visibility of solar facilities within some part of the SEZ as they approach it. Solar facilities within the SEZ would gradually increase in apparent size, with the view opening up substantially (and visual contrast levels rising accordingly) as travelers approach Desert Center.

Visual dominance of the solar facilities within the SEZ would increase steadily until peaking when travelers entered and passed through the SEZ.

In summary, visual contrasts associated with solar energy development within the SEZ would depend on viewer location on I-10; on solar facility type, size, and location within the SEZ; and on other visibility factors. The SEZ would be visible at long distances on I-10 for both eastbound and westbound travelers, although westbound travelers would have intermittent visibility of the SEZ because of periodic screening. However, under the 80% development scenario analyzed in this PEIS, strong levels of visual contrast would be expected as travelers in both directions approached and passed through the SEZ.

State Route 177. State Route 177 passes through or is immediately adjacent to the SEZ for a distance of approximately 8.4 mi (13.5 km). As shown in Figure 9.4.14.2-2, approximately 27 mi (43 km) of State Route 177 is within the 650-ft (198.1-m) viewshed of the Riverside East SEZ. State Route 177 intersects the SEZ in two separate areas in lengths of approximately 3 mi (4.8 km) and 5.4 mi (8.7 km). Undulations in topography as well as buildings may screen views of portions of the SEZ from some locations along the route; however, there are generally open views of the SEZ from State Route 177 throughout the viewshed.

Moving northward on State Route 177 from Desert Center, travelers would immediately enter the SEZ, after having experienced in some degree the impacts described above for I-10. Under the 80% development scenario analyzed in this PEIS, visual contrasts from solar energy development within the SEZ could potentially cause strong visual contrasts for travelers on State Route 177 and would likely dominate the view from some locations on State Route 177.

Between Desert Center and the northern boundary of the SEZ, where State Route 177 is not actually within the SEZ itself, it is not more than 1 mi (1.6 km) from the SEZ. In these areas, visual contrasts might be somewhat lower than those experienced within the SEZ itself, but because the distance to the SEZ is so short, visual contrasts could still be strong and solar development within the SEZ could dominate views from State Route 177.

Both within and near the SEZ, for travelers on State Route 177, solar collector/reflector arrays for solar facilities within the SEZ would be seen nearly edge-on. This would reduce their apparent size, conceal their strong regular geometry, and cause them to repeat the horizontal line of the plain in which the SEZ is situated; this would tend to reduce visual contrast. However, as the viewer passes through the SEZ, the collector/reflector arrays could increase in apparent size until they no longer appear as horizontal lines against the natural-appearing backdrop.

Taller ancillary facilities, such as buildings, transmission structures, and cooling towers, and plumes (if present) likely would be visible projecting above the collector/reflector arrays, and their structural details could be evident, at least for nearby facilities. The ancillary facilities could create form and line contrasts with the strongly horizontal, regular, and repeating forms and lines of the collector/reflector arrays. Color and texture contrasts would also be likely, but their extent would depend on the materials and surface treatments utilized in the facilities.

If power tower facilities were located in the SEZ, the receivers could appear as brilliant light sources on either side of the highway. They could project above nearby mountains, be visible against a sky backdrop, and likely strongly attract views. For nearby power towers, during certain times of the day from certain angles, sunlight on dust particles in the air might result in the appearance of light streaming down from the tower(s). Steam plumes, transmission towers, and other tall facility components could also project above the mountains.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be very conspicuous from I-10. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

State Route 177 travelers heading south from the Palen Valley would in general be subjected to the same types of visual contrasts, but the order would be reversed, and this could change the perceived impact levels. The SEZ would come into view about 9 mi (14 km) north of the SEZ, shortly after crossing Granite Pass, and the SEZ (and solar development within the SEZ) would be visible for approximate 7 to 9 minutes, gradually increasing in size, until travelers enter the SEZ itself.

Communities of Blythe, East Blythe, Palo Verde, Ripley, Cibola (Arizona) and Desert Center. The viewshed analyses indicate visibility of the SEZ from the communities of Blythe (approximately 8.3 mi [13.4 km] east of the SEZ); East Blythe (approximately 9.6 mi [15.5 km] east of the SEZ); Ehrenberg (approximately 13 mi [21 km] east of the SEZ); Palo Verde (approximately 5.8 mi [9.3 km] south of the SEZ); Ripley (approximately 4.5 mi [7.2 km] east of the SEZ); Cibola, located in Arizona (approximately 15 mi [24 km] southwest of the SEZ); and Desert Center (adjacent to the southwest boundary of the SEZ).

Blythe, East Blythe, Ehrenberg, Palo Verde, Ripley, and Cibola are all communities in or very close to the Palo Verde Valley east of the SEZ. The elevations in Blythe, East Blythe, Ehrenberg, Palo Verde, Ripley, and Cibola range from 233 to 276 ft (71 to 84 m), and all these communities are more than 100 ft (30 m) lower in elevation than the eastern border the SEZ. Thus, there is a low angle of view between these communities and the SEZ; this would tend to reduce the visibility of solar facilities within the SEZ and would therefore reduce associated impacts. Desert Center is located at the far southwestern corner of the SEZ off I-10. Desert Center (approximate elevation 905 ft [276 m] above mean sea level) is at a slightly higher elevation than most portions of the SEZ immediately adjacent to it, and is several hundred feet higher than the lowest points nearby in the SEZ.

Screening by small undulations in topography, vegetation, buildings, or other structures would likely restrict or eliminate visibility of the SEZ and associated solar facilities within these communities, but a detailed future site-specific NEPA analysis is required to determine visibility precisely. However, note that even with existing screening, solar power towers, cooling towers, plumes, transmission lines and towers, or other tall structures associated with the development could potentially be tall enough to exceed the height of screening in some areas and could therefore cause visual impacts on these communities.

The western-most portions of Blythe are slightly less than 5 mi (8 km) from the closest point on the eastern boundary of the SEZ. In general, absent screening by nearby structures or vegetation, Blythe and East Blythe have unobstructed views of the SEZ, which would occupy much of the western horizon visible from these communities. However, the angle of view is low, so that if solar facilities were visible within the SEZ, they would be viewed edge-on and would repeat the line of the horizon, tending to reduce visual contrast. The light from power tower receivers within the eastern-most portions of the SEZ would likely appear as very bright nonpoint (i.e., having a visible cylindrical or rectangular surface) sources of light atop discernable tower structures on the western horizon.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from these communities and could be conspicuous from some location, given the dark night skies in the vicinity of the SEZ. Other lighting associated with solar facilities in the SEZ could potentially be visible from some locations as well, at least for facilities in the closest portions of the SEZ.

Visual contrasts associated with solar facilities within the SEZ would vary greatly, depending on the presence of screening by nearby structures and vegetation and on project locations, technologies, and site designs within the SEZ, but where there were unobstructed views, these contrasts would be expected to be moderate to strong. In general, contrasts would be expected to be greatest for locations on the western side of Blythe, with lesser contrast levels in eastern Blythe and the community of East Blythe.

The community of Ehrenberg is located approximately 4 mi (6 km) east of Blythe, at the same elevation as Blythe. Ehrenberg would have essentially the same view of solar development within the SEZ as Blythe, but lower visual contrast levels would be expected in Ehrenberg because of the increased distance to the SEZ. Where there were unobstructed views, contrast levels would be expected to be weak to moderate.

The community of Ripley is located approximately 7 mi (11 km) southwest of Blythe, and between 4 to 5 mi (6 to 8 km) from the far southeastern boundary of the SEZ. In general, absent screening by nearby structures or vegetation, Ripley has unobstructed views of the SEZ, which would occupy much of the northwestern horizon visible from Ripley. However, the angle of view is low, so that if solar facilities were visible within the SEZ, they would be viewed edge-on and would repeat the line of the horizon, tending to reduce visual contrast. The light from power tower receivers within the far southeastern portion of the SEZ would likely appear as very bright nonpoint sources of light to the northwest and could appear silhouetted against the sky looking west down the Chuckwalla Valley. At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that likely would be visible from Ripley and could be conspicuous. Other lighting associated with solar facilities in the SEZ could potentially be visible from some locations as well, at least for facilities in the closest portions of the SEZ.

Visual contrasts associated with solar facilities within the SEZ would vary greatly depending on the presence of screening by nearby structures and vegetation and on project locations, technologies, and site designs within the SEZ, but where there were unobstructed views, contrasts would be expected to be moderate to strong.

The community of Palo Verde is approximately 6 mi (10 km) south of the far southeastern corner of the SEZ. The Mule and Little Chuckwalla Mountains screen views of most of the western parts of the SEZ from Palo Verde; however, much of the southeastern portion of the SEZ would be visible on the northern horizon. The angle of view is low, so that if solar facilities were visible within the SEZ, they would be viewed edge-on and would repeat the line of the horizon, tending to reduce visual contrast. The light from power tower receivers within the far southeastern portions of the SEZ could appear as bright point or nonpoint sources of light on the northern horizon. Power towers with hazard lighting could be visible at night and could be conspicuous depending on project location and other visibility factors. Visual contrasts associated with solar facilities within the SEZ would vary greatly depending on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but where there were unobstructed views, contrasts would be expected to be weak to moderate.

The community of Cibola in Arizona is approximately 21 mi (34 km) south of Blythe and approximately 15 mi (24 km) from the far southeastern corner of the SEZ. The Mule and Little Chuckwalla Mountains screen views of most of the western parts of the SEZ from Cibola; however, portions of the southeastern portion of the SEZ would be visible on the northern horizon. The angle of view is low, so that if solar facilities were visible within the SEZ, they would be viewed edge-on and would repeat the line of the horizon, tending to reduce visual contrast. The light from power tower receivers within the far southeastern portion of the SEZ would likely appear as very distant point sources of light on the northern horizon. Visual contrasts associated with solar facilities within the SEZ would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but where there were unobstructed views, contrasts would be expected to be weak.

The community of Desert Center and the Lake Tamarisk housing development are located immediately adjacent to the far southwest corner of the SEZ. Desert Center is located at the Rice Rd (State Route 177) interchange on I-10, and Lake Tamarisk is less than 2 mi (3 km) north of Desert Center. In general, absent screening by nearby structures or vegetation, Desert Center and Lake Tamarisk have unobstructed views of the SEZ, which in the case of Desert Center would surround the community in all directions except south (across I-10) and in the case of Lake Tamarisk would surround the community in all directions except west.

From Desert Center and Lake Tamarisk, the SEZ could not be encompassed in one view, and viewers would need to turn their heads to scan across the whole SEZ. Solar facility collector/reflector arrays would be viewed nearly edge-on, reducing the visible area for each facility and presenting a banded appearance that would repeat the line of the horizon, tending to reduce visual contrast. If nearby facilities used PV systems and low-profile ancillary facilities, the visual impacts would be lessened, but for facilities utilizing STGs, taller structures projecting above the collector/reflector arrays would be visible, and in some conditions steam plumes could be present that would add significantly to visual contrasts. These taller elements would add vertical line and form contrasts, and likely color contrasts as well; steam plumes would add color and possibly line or form contrasts, depending on conditions. Depending on height, these ancillary facilities could add significantly to visual contrasts for some facilities. For all projects, transmission towers, lines, and substations might be visible, which could add substantially to form and line contrasts. Structural details of collectors and ancillary facilities (buildings, STGs, substations, and so on) could be visible within nearby facilities. The tops of solar collector/reflector arrays in the closest parts of the SEZ would not likely be visible, but because the ground slopes downward to the east and north of Desert Center and Lake Tamarisk, the tops of collector/reflector arrays could be visible for facilities farther way, and this would increase chances of reflections from collector/reflector arrays, thermal tubes, and other facilities, depending on facility design, location, distance, and other visibility factors. If power towers were present within the SEZ, nearby receivers would likely appear as brilliant nonpoint (i.e., having visible cylindrical or rectangular surfaces) light sources atop clearly discernable tower structures against the backdrop of the sky above the surrounding mountains or against the mountain slopes, which could potentially cause discomfort when looked at directly. More distant receivers would likely appear as points of light against the sky, against the backdrop of the valley floor, or against the bajadas and slopes of the nearby mountains.

At night, if sufficiently tall, the power towers could have red or white flashing hazard navigation lights that would likely be visible from Desert Center and Lake Tamarisk and could be very conspicuous from these communities, given the dark night skies in the vicinity of the SEZ, although other lights would be visible in the vicinity. Other lighting associated with solar facilities in the SEZ could potentially be visible as well, at least for facilities in the closest portions of the SEZ.

The potential visual contrast expected for these communities would depend on the numbers, types, sizes, and locations of solar facilities in the SEZ and on other project- and site-specific factors, but because Desert Center and Lake Tamarisk are adjacent to the SEZ, the SEZ would be seen in close proximity in most directions, and under the 80% development scenario analyzed in this PEIS, solar facilities within the SEZ would likely dominate views from these communities. Because there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, a visually complex, man-made appearing industrial landscape could result. This essentially industrial-appearing landscape would contrast greatly with the surrounding natural-appearing lands and would be expected to create strong visual contrasts as viewed from Desert Center and Lake Tamarisk.

Regardless of visibility from within these communities, residents, workers, and visitors to the area would be likely to experience visual impacts from solar energy facilities located within the SEZ (as well as any associated access roads and transmission lines) as they travel area roads, including I-10 and State Route 177.

Nearby Residents. As noted above, there are scattered ranches and other residences on private lands immediately adjacent or close to the SEZ and elsewhere within the SEZ viewshed. Depending on technology- and project-specific factors, because of the proximity and large size of likely facilities, these residents could be subjected to large visual impacts from solar energy development within the SEZ. These impacts would be determined in the course of a site-specific environmental impact analysis.

9.4.14.2.3 Summary of Visual Resource Impacts for the Proposed Riverside East SEZ

Because there could be numerous solar facilities within the SEZ, a variety of technologies employed, and a range of supporting facilities that would contribute to visual impacts, a visually complex, man-made appearing industrial landscape could result. This essentially industrial-appearing landscape would contrast greatly with the surrounding generally natural-appearing lands. Large visual impacts on the SEZ and surrounding lands within the SEZ viewshed would be associated with solar energy development due to major modification of the character of the existing landscape. There is the potential for additional impacts from construction and operation of transmission lines and access roads within the SEZ.

Residents, workers, and visitors to the area may experience visual impacts from solar energy facilities located within the SEZ (as well as any associated access roads and transmission lines) as they travel area roads. Nearby residents could be subjected to strong visual contrasts from solar energy development within the SEZ. The communities of Blythe, East Blythe, Ehrenberg, Palo Verde, Ripley, Cibola (Arizona), and Desert Center (including the Lake Tamarisk development) are located within the viewshed of the SEZ, although slight variations in topography and vegetation provide some screening. Strong visual contrasts may be observed within Desert Center and Lake Tamarisk. Moderate to strong visual contrasts may be observed within Blythe, East Blythe, and Ripley. Weak to moderate visual contrasts may be observed within Ehrenberg and Palo Verde.

Utility-scale solar energy development within the proposed Riverside East SEZ is likely to cause moderate to strong visual impacts on highly sensitive visual resource areas, including Joshua Tree NP and WA, the Big Maria Mountains WA, Chuckwalla Mountains WA, Little Chuckwalla Mountains WA, Palen-McCoy WA, Palo Verde Mountains WA, Rice Valley WA, Corn Springs Scenic ACEC, and the Bradshaw Trail BLM Backcountry Byway.

9.4.14.3 SEZ-Specific Design Features and Design Feature Effectiveness

As noted in Section 5.12, the presence and operation of large-scale solar energy facilities and equipment would introduce major visual changes into non-industrialized landscapes and could create strong visual contrasts in line, form, color, and texture that could not easily be mitigated substantially. Implementation of the programmatic design features presented in Appendix A, Section A.2.2, would be expected to reduce the magnitude of visual impacts experienced: however, 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 typical lack of screening vegetation and landforms within the SEZ viewsheds, siting the facilities away from sensitive visual resource areas and other sensitive viewing areas is the primary means of mitigating visual impacts. The effectiveness of other visual impact mitigation measures would generally be limited.

While the applicability and appropriateness of some mitigation measures would depend on site- and project- specific information that would be available only after a specific solar energy project had been proposed, the following SEZ-specific design features can be identified for the Riverside East SEZ at this time:

- Within the SEZ, in areas west of the northwest corner of Section 6 of Township 006S Range 017E and in areas north and west of the northwest corner of Section 30 of Township 005S Range 018E, visual impacts associated with solar energy development in the SEZ should be consistent with VRM Class II management objectives (see Table 9.4.14.3-1), as experienced from KOPs (to be determined by the BLM) within Joshua Tree NP and the Palen-McCoy WA. The VRM Class II impact level consistency mitigation would affect approximately 67,704 acres (273.99 km^2) within the western portion of the SEZ.

- Within the SEZ, in areas visible from and within 3 mi (4.8 km) of the Rice Valley or Big Maria Mountains WAs, visual impacts associated with solar energy project operation should be consistent with VRM Class II management objectives, as experienced from KOPs (to be determined by BLM) within the WAs, and in areas visible from between 3 and 5 mi (4.8 and 8.0 km), visual impacts should be consistent with VRM Class III management objectives. The VRM Class II impact level consistency mitigation would affect approximately 11,926 acres (48.263 km^2) within the northeastern portion of the SEZ. The VRM Class III impact level consistency mitigation would affect approximately 19,676 additional acres (79.626 km^2).

Areas within the SEZ affected by these design features are shown in Figure 9.4.14.3-1.

Application of the SEZ-specific design features above would substantially reduce visual impacts associated with solar energy development within the SEZ.

Application of the distance-based mitigation to restrict allowable visual impacts associated with solar energy project in areas west of the northwest corner of Section 6 of Township 006S Range 017E and in areas north and west of the northwest corner of Section 30 of Township 005S Range 018E would substantially reduce potential visual impacts on Joshua Tree NP, the Palen-McCoy WA, the Chuckwalla Mountains WA, Corn Springs Scenic ACEC, I-10, State Route 177, and the communities of Desert Center and Lake Tamarisk, by limiting impacts within the BLM-defined and foreground–middleground distance of the viewsheds of these areas, where potential visual impacts would be greatest.

Application of the distance-based mitigation to restrict allowable visual impacts associated with solar energy project operations within 5 mi (8 km) of the Rice Valley and Big Maria Mountains WAs would substantially reduce potential visual impacts on the WAs by limiting impacts within the BLM-defined foreground of the viewshed of these areas, where potential visual impacts would be greatest. Impacts would also be reduced on I-10 and the communities within the Palo Verde Valley.

TABLE 9.4.14.3-1 VRM Management Class Objectives

	VRM Management Class Objectives
Class I Objective	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II Objective	The objective to this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III Objective	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV Objective	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM 1986b.

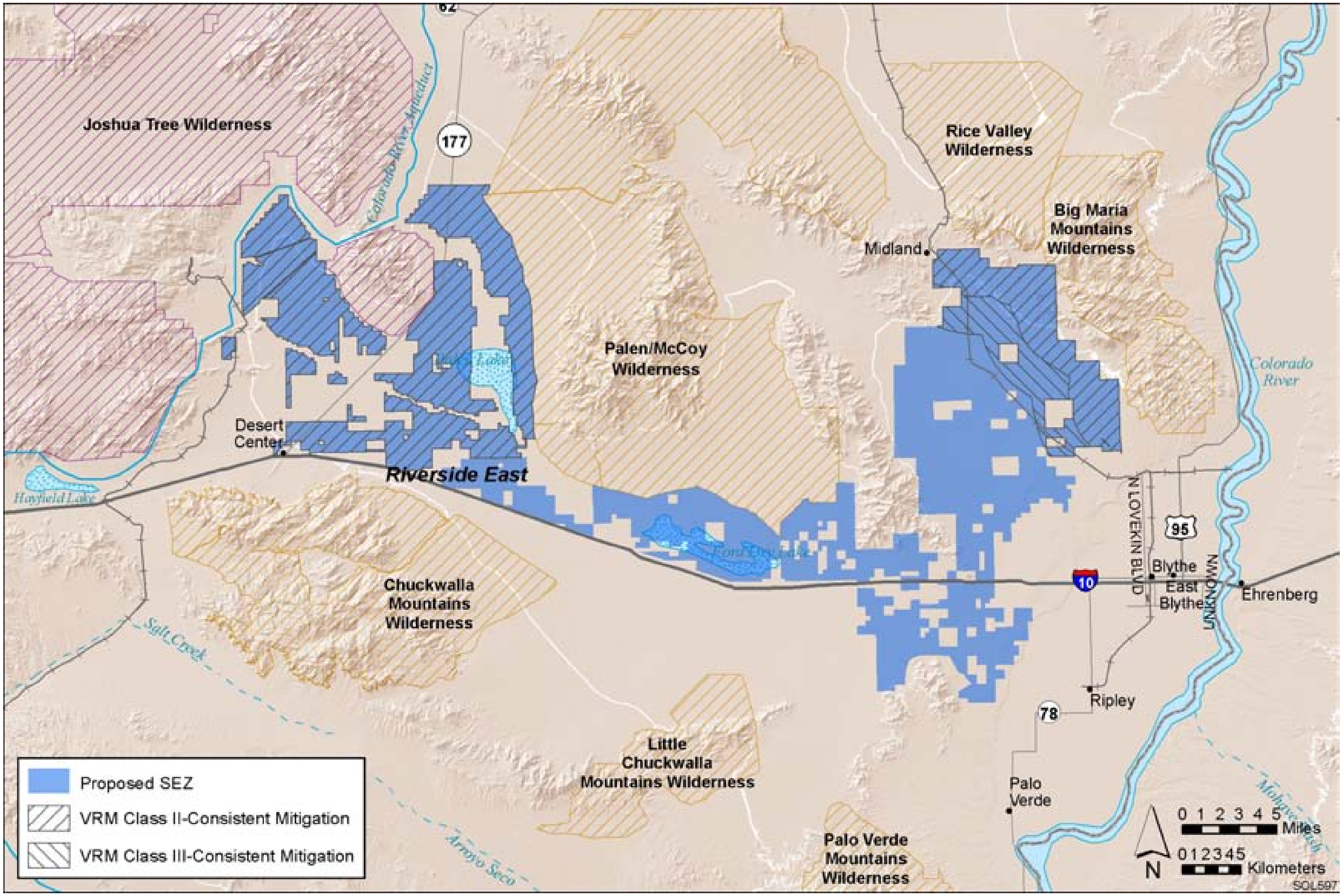

FIGURE 9.4.14.3-1 Areas within the Proposed Riverside East SEZ Affected by SEZ-Specific Distance-Based Visual Impact Design Features

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9.4.15 Acoustic Environment

9.4.15.1 Affected Environment

The proposed Riverside East SEZ is in the eastern portion of Riverside County in southeastern California. Riverside County has established noise standards based on affected land use and time of day (County of Riverside 2010). Noise standards applicable to solar energy development in the Riverside East SEZ are those established for rural environments: 45 dBA L_{eq} for both daytime and nighttime. In Riverside County, construction noise sources located within 0.25 mi (0.4 km) from an inhabited dwelling are exempt if construction does not occur between 6 p.m. and 6 a.m. from June through September and between 6 p.m. and 7 a.m. from October through May.

I-10 runs east-west along the southern edge of the western and central portions of the SEZ and passes through the eastern portion of the SEZ, while State Route 177 passes southwest–northeast through the western portion of the SEZ. The Arizona and California Railroad passes north–south through the eastern portion of the SEZ and another railroad runs north–south to the west of the western SEZ boundary. That railroad starts from the now-defunct Eagle Mountain iron mine and connects to the UP Railroad near the Salton Sea. There are three airports around the SEZ: Desert Center Airport, surrounded by the western parcels of the SEZ; Blythe Airport, located about 1.5 mi (2.4 km) east of the easternmost SEZ boundary; and the privately owned W R Byron Airport (about 6 mi [10 km] northeast of Blythe Airport), located about 1.5 mi (2.4 km) east of the easternmost SEZ boundary. Because tourism is a major industry in the area, other industrial activities are relatively minimal. Irrigated agricultural activities are scattered over the western portion of the SEZ, and high-density/large-scale agricultural activities exist to the east in Blythe. Many sensitive receptors are located within a short distance of the proposed Riverside East SEZ. Sensitive receptors such as schools or churches exist around the southwestern SEZ in Lake Tamarisk, and a hospital is located within 2 mi (3 km) east of the easternmost SEZ boundary. Many residences (mostly farms) are scattered along the western and eastern SEZ boundary. A cluster of employee residences at Eagle Mountain Pumping Station is located about 0.6 mi [1 km] west of the western SEZ boundary, and residences in Lake Tamarisk are adjacent to the southwestern SEZ boundary. Population centers with schools include Desert Center, which is located at the southwestern edge of the SEZ, and Blythe, located about 5 mi (8 km) east of the eastern SEZ boundary. Therefore, noise sources around the SEZ include road traffic, railroad traffic, aircraft flyover, agricultural activities, and activities and events at nearby residences. Background noise levels would be relatively high along I-10 and State Route 177 and around airports, while noise levels are similar to wilderness natural background levels at portions of the SEZ far from roads, airports, and agricultural activities, mostly the northern portions of the SEZ. To date, no environmental noise survey has been conducted around the Riverside East SEZ. On the basis of the population density, the day-night average sound level (L_{dn} or DNL) is estimated to be 45 dBA for Riverside County, which is on the high end for a rural area[12] (Eldred 1982; Miller 2002).

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[12] Rural and undeveloped areas have sound levels in the range of 33 to 47 dBA L_{dn} (Eldred 1982). Typically, the nighttime level is 10 dBA lower than the daytime level, and it can be interpreted as 33 to 47 dBA (mean 40 dBA) during daytime hours and 23 to 37 dBA (mean 30 dBA) during nighttime hours.

9.4.15.2 Impacts

Potential noise impacts associated with solar projects in the Riverside East SEZ would occur during all phases of the projects. During the construction phase, potential noise impacts associated with operation of heavy equipment and vehicular traffic on several nearby residences (adjacent to the western SEZ boundary) would be anticipated, albeit of short duration. During the operations phase, potential impacts on nearby residences would be anticipated, depending on the solar technologies employed. Noise impacts shared by all solar technologies are discussed in detail in Section 5.13.1, and technology-specific impacts are presented in Section 5.13.2. Impacts specific to the Riverside East SEZ are presented in this section. Any such impacts would be minimized through the implementation of required programmatic design features described in Appendix A, Section A.2.2, and through the application of any additional SEZ-specific design features (see Section 9.4.15.3 below). This section primarily addresses potential noise impacts on humans, although potential impacts on wildlife at nearby sensitive areas are discussed. Additional discussion on potential noise impacts on wildlife is presented in Section 5.10.2.

9.4.15.2.1 Construction

The proposed Riverside East SEZ has a relatively flat terrain; thus, minimal site preparation activities would be required, and associated noise levels would be lower than those during general construction (e.g., erecting building structures and installing equipment, piping, and electrical). Solar array construction would also generate noise, but it would be spread over a wide area.

For the parabolic trough and power tower technologies, the highest construction noise levels would occur at the power block area; a maximum of 95 dBA at a distance of 50 ft (15 m) is assumed, if impact equipment such as pile drivers or rock drills is not being used. Typically, the power block area is located in the center of the solar facility, at a distance of more than 0.5 mi (0.8 km) to the facility boundary. Noise levels from construction of the solar array would be lower than 95 dBA. When geometric spreading and ground effects are considered, as explained in Section 4.13.1, noise levels would attenuate to about 40 dBA at a distance of 1.2 mi (1.9 km) from the power block area. This noise level is typical of daytime mean rural background level. In addition, mid- and high-frequency noise from construction activities is significantly attenuated by atmospheric absorption under the low-humidity conditions typical of an arid desert environment and by temperature lapse conditions typical of daytime hours; thus noise attenuation to background levels would occur at distances somewhat shorter than 1.2 mi (1.9 km). If a 10-hour daytime work schedule is considered, the EPA guideline level of 55 dBA L_{dn} for residential areas (EPA 1974) would occur at about 1,200 ft (370 m) from the power block area, which would be well within the facility boundary. For construction activities occurring near the residences adjacent to western SEZ boundary, estimated noise levels at the nearest residences would be about 74 dBA,[13] which is well above the Riverside County standard of 45 dBA

[13] Typically, the heavy equipment operators would not allow public access any closer than 330 ft (100 m) for safety reasons. In other words, construction and solar facility would not occur within this distance from the nearest residence.

daytime L_{eq} for rural environments. In addition, an estimated 70 dBA L_{dn}[14] at this receptor is well above the EPA guideline of 55 dBA for residential areas.

It is assumed that a maximum of three projects at any one time would be developed for SEZs larger than 30,000 acres (121.4 km^2) such as the Riverside East SEZ. If all three projects were to be built within the SEZ near the residences in the western SEZ boundary, noise levels would be only a little higher than the above-mentioned values, because the second and third construction sites would be far from the first construction site due to the irregular shape of the SEZ. Under this construction scenario assumption, combined noise levels would be less than a noticeable increase of about 3 dBA over those for a single project.

In addition, noise levels were estimated at the specially designated areas within 5-mi (8-km) from the Riverside East SEZ, which is the farthest distance that noise except extremely loud noise can be discernable. There are several specially designated areas within the range where noise might be an issue: Joshua Tree WA, Palen/McCoy WA, Rice Valley WA, Big Maria Mountains WA, Mule Mountains ACEC, Chuckwalla DWMA, and Alligator Rock ACEC. These areas abut the Riverside East SEZ, except Rice Valley WA and Alligator Rock ACEC, which are located about 0.5 mi (0.8 km) north of the eastern SEZ and 500 ft (150 m) south of the western SEZ, respectively. For construction activities occurring near these specially designated areas, noise levels are estimated to be about 74 dBA at the locations abutting the SEZ, higher than the typical daytime mean rural background level of 40 dBA. Thus, if construction would occur near the specially designated areas, portions of those areas close to the SEZ (within approximately 1 mi [1.6 km]) could be disturbed by construction noise from the SEZ. However, sound levels above 90 dB are likely to adversely affect wildlife (Manci et al. 1988). Thus, construction noise from the SEZ is not likely to adversely affect wildlife in nearby specially designated areas, except in areas directly adjacent to the construction site.

Depending on soil conditions, pile driving might be required for installation of solar dish engines. However, the pile drivers used would be relatively small and quiet, such as vibratory or sonic drivers, rather than the impulsive impact pile drivers frequently seen at large-scale construction sites. Potential impacts on neighboring residences (just next to the western SEZ boundary) would be anticipated to be minor, except when pile driving occurs near the residences.

It is assumed that most construction activities would occur during the day, when noise is better tolerated, than at night, because of the masking effects of background noise. In addition, construction activities for a utility-scale facility are temporary in nature (typically a few years). Construction would cause some unavoidable but localized short-term noise impacts on neighboring communities, particularly for activities occurring near the western and eastern proposed SEZ boundary, close to the nearby residences.

Construction activities could result in various degrees of ground vibration, depending on the equipment used and construction methods employed. All construction equipment causes ground vibration to some degree, but activities that typically generate the most severe vibrations

[14] For this analysis, background levels of 40 and 30 dBA for daytime and nighttime hours, respectively, are assumed, which result in a day-night average noise level (L_{dn}) of 40 dBA.

are high-explosive detonations and impact pile driving. As is the case for noise, vibration would diminish in strength with distance. For example, vibration levels at receptors beyond 140 ft (43 m) from a large bulldozer (87 VdB at 25 ft [7.6 m]) would diminish below the threshold of perception for humans, which is about 65 VdB (Hanson et al. 2006). During the construction phase, no major construction equipment that can cause ground vibration would be used, and no residences or sensitive structures are located in close proximity. Therefore, no adverse vibration impacts are anticipated from construction activities, including from pile driving for dish engines.

For this analysis, the impacts of construction and operation of transmission lines outside of the SEZ were not assessed, assuming that the one or more of the existing transmission lines (ranging from 115 kV to 500 kV) located within the SEZ might be used to connect new solar facilities to the regional grid and that additional project-specific analysis would be conducted for new transmission construction or line upgrades. However, some construction of transmission lines could occur within the SEZ. Potential noise impacts on nearby residences would be a minor component of construction impacts in comparison with solar facility construction and would be temporary in nature.

9.4.15.2.2 Operations

Noise sources common to all or most types of solar technologies include equipment motion from solar tracking; maintenance and repair activities (e.g., washing mirrors or replacing broken mirrors) at the solar array area; commuter/visitor/support/delivery traffic within and around the solar facility; and control/administrative buildings, warehouses, and other auxiliary buildings/structures. Diesel-fired emergency power generators and fire water pump engines would be additional sources of noise, but their operations would be limited to several hours per month (for preventive maintenance testing).

With respect to the main solar energy technologies, noise-generating activities in the PV solar array area would be minimal, related mainly to solar tracking, if used. Dish engine technology, which employs collector and converter devices in a single unit, on the other hand, generally has the strongest noise sources.

For the parabolic trough and power tower technologies, most noise sources during operations would be in the power block area, including the turbine generator (typically in an enclosure), pumps, boilers, and dry- or wet-cooling systems. The power block is typically located in the center of the facility. On the basis of a 250-MW parabolic trough facility with a cooling tower (Beacon Solar, LLC 2008), simple noise modeling indicates that noise levels would be more than 85 dBA around the power block, but about 51 dBA at the facility boundary, about 0.5 mi (0.8 km) from the power block area. For a facility located near the southwestern corner of the SEZ (in Lake Tamarisk), the predicted noise level would be about 51 dBA at the nearest residence just next to the SEZ boundary, which is higher than the Riverside County standard of 45 dBA daytime L_{eq}. If thermal energy storage (TES) were not used (i.e., if the operation were limited to daytime, 12 hours only[15]), the EPA guideline level of 55 dBA (as L_{dn}

[15] Maximum possible operating hours at the summer solstice, but limited to 7 to 8 hours at the winter solstice.

for residential areas) would occur at about 1,370 ft (420 m) from the power block area and thus would not be exceeded outside of the proposed SEZ boundary. At the nearest residences, noise levels of about 49 dBA L_{dn} would be estimated, which is below the EPA guideline. As for construction, if three parabolic trough and/or power tower facilities were operating around the residences in the western portion of the SEZ, combined noise levels would be a little higher than the above-mentioned values, below a just-noticeable increase of about 3 dBA over a single facility. However, day-night average sound levels higher than those estimated above by using the simple noise modeling would be anticipated if TES were used during nighttime hours, as explained below and in Section 4.13.1.

On a calm, clear night typical of the proposed Riverside East SEZ setting, the air temperature would likely increase with height (temperature inversion) because of strong radiative cooling. Such a temperature profile tends to focus noise downward toward the ground. There would be little, if any, shadow zone[16] within 1 or 2 mi (2 or 3 km) of the noise source in the presence of a strong temperature inversion (Beranek 1988). In particular, such conditions add to the effect of noise being more discernable during nighttime hours, when the background levels are the lowest. To estimate day-night average sound levels (L_{dn}), 6-hour nighttime generation with TES is assumed after 12-hour daytime generation. For nighttime hours under temperature inversion, 10 dBA is added to sound levels estimated from the uniform atmosphere (see Section 4.13.1). On the basis of these assumptions, the estimated nighttime noise level at the nearest residences (about 0.5 mi [0.8 km]) from the power block area for a solar facility located near the southwestern SEZ boundary) would be 61 dBA L_{eq}, which is much higher than Riverside County regulation of 45 dBA nighttime L_{eq}. The day-night average noise level is estimated to be about 63 dBA L_{dn}, which is higher than the EPA guideline of 55 dBA for residential areas. The assumptions are conservative in terms of operating hours, and no credit was given to other attenuation mechanisms, so it is likely that sound levels would be lower than 63 dBA at the nearby residences in Lake Tamarisk, even if TES is used at a solar facility. If three parabolic trough and/or power tower facilities are operating around the nearby residences in the southwestern portion of the SEZ, combined noise levels would be a little higher than these values, as explained above, but lower than a just-noticeable increase of about 3 dBA over a single facility. Consequently, operating parabolic trough or power tower facilities with TES and located near the southwestern SEZ boundary could result in sound levels above the noise standard or guideline, and adverse noise impacts could occur at the nearest residences. In the permitting process, refined noise propagation modeling would be warranted along with measurement of background sound levels.

Associated with operation of a parabolic trough or power tower solar facility occurring near the specially designated areas, the estimated daytime level of 51 dBA at the boundary of these areas is higher than the typical daytime mean rural background level of 40 dBA, while the estimated nighttime level of 61 dBA is much higher than the typical nighttime mean rural background level of 30 dBA. However, operation noise from a parabolic trough or power tower solar facility with TES is not likely to adversely affect wildlife at the nearby specially designated areas (Manci et al. 1988).

[16] A shadow zone is defined as the region in which direct sound does not penetrate because of upward diffraction.

The solar dish engine is unique among concentrating solar power (CSP) technologies, because it generates electricity directly and does not require a power block. A single, large solar dish engine has relatively low noise levels, but a solar facility might employ tens of thousands of dish engines, which would cause high noise levels around such a facility. For example, the proposed 750-MW SES Solar Two dish engine facility in California would employ as many as 30,000 dish engines (SES Solar Two, LLC 2008). At the Riverside East SEZ, on the basis of the assumption of dish engine facilities of up to 18,035-MW total capacity (covering 80% of the total area, or 162,317 acres [657 km^2]), up to 721,400 25-kW dish engines could be employed. Also for a large dish engine facility, several thousand step-up transformers would be embedded in the dish engine solar field, along with several substations; however, the noise from these sources would be masked by dish engine noise.

The composite noise level of a single dish engine would be about 89 dBA at a distance of 3 ft (0.9 m) (SES Solar Two, LLC 2008). This noise level would be attenuated to about 40 dBA (typical of the mean rural daytime environment) within 340 ft (105 m). However, the combined noise level from hundreds of thousands of dish engines operating simultaneously would be high in the immediate vicinity of the facility, for example, about 54 dBA at 1.0 mi (1.6 km) and 51 dBA at 2 mi (3 km) from the boundary of the square-shaped dish engine solar field, both of which are higher than the Riverside County standard of 45 dBA daytime L_{eq} for rural environments. However, these levels would occur at somewhat shorter distances than the aforementioned distances, considering noise attenuation by atmospheric absorption and temperature lapse during daytime hours. To estimate noise levels at nearby residences, it was assumed dish engines were placed all over the Riverside East SEZ at intervals of 98 ft (30 m). On the basis of this assumption, the estimated noise levels at all nearby receptors within a 2-mi (3-km) distance of the SEZ boundary would be higher than the Riverside County standard of 45 dBA daytime L_{eq} for rural environments. The noise level would decrease to the level of the Riverside County standard of 45 dBA daytime L_{eq} for rural environments at about 3 mi (5 km) from the SEZ boundary. The highest noise levels of about 59 dBA L_{eq} would be estimated for a receptor near the east central SEZ boundary. On the basis of 12-hr daytime operation, the estimated 56 dBA L_{dn} for this receptor is a little higher than the EPA guideline of 55 dBA L_{dn} for residential areas. At other receptors, 55 dBA or less L_{dn} was estimated. While this upper-limit estimate for operation of dish engines over the entire Riverside East SEZ is highly unlikely to be attained, noise levels from, for example, a single 1,000-MW facility located at the SEZ boundary would not be much lower, only about several decibels lower, because contributions to levels from dish engines at further distances would be minor. A dish engine facility near the western or eastern SEZ boundary close to the nearby residences could result in noise levels above Riverside County standard and EPA guideline levels, and could have corresponding adverse noise impacts on residents there. Noise from dish engines might be masked by background noise if a receptor is located near noisy background sources, such as highways or airports. However, noise from dish engines would have considerable impacts on receptors with low background noise levels.

For dish engines placed throughout the SEZ, the estimated highest noise level at the SEZ boundary would be about 62 dBA, which is higher than the typical daytime mean rural background level of 40 dBA. However, dish engine noise from the SEZ is not likely to adversely affect the nearby specially designated areas (Manci et al. 1988).

Consideration of minimizing noise impacts is very important during siting for dish engine facilities. Direct mitigation of dish engine noise through noise control engineering could also be considered.

During operations, no major ground-vibrating equipment would be used. In addition, no sensitive structures are located close enough to the Riverside East SEZ to experience physical damage. Therefore, potential vibration impacts on surrounding communities and vibration-sensitive structures during operation of any solar facility would be minimal.

Transformer-generated humming noise and switchyard impulsive noises would be generated during the operation of solar facilities. These noise sources would be located near the power block area, typically near the center of a solar facility. Noise from these sources would generally be limited to within the facility boundary and rarely be heard at nearby residences, assuming a 0.5-mi (0.8-km) distance (at least 0.5 mi [0.8 km] to the facility boundary and to the nearby residences). Accordingly, potential impacts of these noise sources on nearby residences would be minimal.

For impacts from transmission line corona discharge noise during rainfall events (Section 5.13.1.5), the noise level at 50 ft (15 m) and 300 ft (91 m) from the center of a 230-kV transmission line tower would be about 39 and 31 dBA (Lee et al. 1996), respectively, typical of daytime and nighttime mean background noise levels in rural environments. The noise levels at 65 ft (20 m) and 300 ft (91 m) from the center of 500-kV transmission line towers would be about 49 and 42 dBA, typical of high-end and mean daytime background noise levels, respectively, in rural environments. Corona noise includes high-frequency components, which may be judged to be more annoying than other environmental noises. However, corona noise likely would not cause impacts, unless a residence was located close to the source (e.g., within 500 ft [152 m[of a 230-kV transmission line and 0.5 mi [0.8 km[of a 500-kV transmission line). The proposed Riverside East SEZ is located in an arid desert environment, and incidents of corona discharge would be infrequent. Therefore, potential impacts on nearby residents along the transmission line ROW would be negligible.

9.4.15.2.3 Decommissioning/Reclamation

Decommissioning/reclamation requires many of the same procedures and equipment used in traditional construction. Decommissioning/reclamation would include dismantling of solar facilities and support facilities such as buildings/structures and mechanical/electrical installations; disposal of debris; grading; and revegetation as needed. Activities for decommissioning would be similar to those used for construction but on a more limited scale. Potential noise impacts on surrounding communities would be correspondingly lower than those for construction activities. Decommissioning activities would be of short duration, and their potential impacts would be moderate and temporary in nature. The same mitigation measures adopted during the construction phase could also be implemented during the decommissioning phase.

Similarly, potential vibration impacts on surrounding communities and vibration-sensitive structures during decommissioning of any solar facility would be lower than those during construction and thus minimal.

9.4.15.3 SEZ-Specific Design Features and Design Feature Effectiveness

The implementation of required programmatic design features described in Appendix A, Section A.2.2, would greatly reduce or eliminate the potential for noise impacts from development and operation of solar energy facilities. While some SEZ-specific design features are best established when project details are being considered, measures that can be identified at this time include the following:

- Noise levels from cooling systems equipped with TES should be managed so that levels at the nearby residences to the west and to the east of the SEZ are kept within applicable guidelines. This could be accomplished in several ways, for example, through placing the power block approximately 1 to 2 mi (1.6 to 3 km) or more from residences, limiting operations to a few hours after sunset, and/or installing fan silencers.

- Dish engine facilities within the Riverside East SEZ should be located more than 1 to 2 mi (2 to 3 km) from the nearby residences to the west and the east of the SEZ (i.e., the facilities should be located in other portions of the proposed SEZ). Direct noise control measures applied to individual dish engine systems also could be used to reduce noise impacts at the nearest residences.

9.4.16 Paleontological Resources

9.4.16.1 Affected Environment

The proposed Riverside East SEZ is covered predominantly by Quaternary/Tertiary deposits of varying types. The eastern half and southwestern portions are mostly composed of thick alluvial deposits (more than 100 ft [30.5 m] thick), ranging in age from the Holocene to the Pliocene. The total acreage of the alluvial deposits within the SEZ is 147,295 acres (596 km^2), or about 73% of the SEZ. The northwest and central sections are mostly composed of eolian (dune sand) and playa sediments. The total area of eolian sediments within the SEZ is 50,927 acres (206 km^2), or 25% of the SEZ, and the total area of playa sediments is 3,081 acres (12 km^2), or 2% of the SEZ. Peripheral sections of the SEZ are composed of residual materials developed in igneous and metamorphic rocks, sedimentary rocks, or carbonate rocks. These discontinuous residual deposits account for 1,788 acres (7.2 km^2), or less than 1% of the SEZ. In the absence of a PFYC map for the California Desert District, a preliminary classification of PFYC Class 3b is assumed for the alluvial, eolian, playa, and residual deposits. Class 3b indicates that the potential for the occurrence of significant fossil materials is unknown and needs to be investigated further (see Section 4.8 for a discussion of the PFYC system). On the basis of some paleontological survey work conducted within the SEZ for existing solar applications, several areas within the SEZ could be classified as PFYC Class 1. Other areas could be classified as PFYC Class 4/5, such as near Quaternary lake bed deposits. The Bouse Formation is likely to be present within the SEZ and has the potential to contain marine, brackish, and freshwater fossils, including a species of barnacle, a foraminifer, mollusks, gastropods, ostracodes, and charophytes. Well tests within the Riverside East SEZ hit the Bouse Formation at a depth of about 60 ft (18 m).

Pedestrian surveys to look for surface fossils and exposures of potential fossil-bearing geologic units were conducted for the Palen and Blythe Solar Power Projects in 2009. Five nonsignificant fossil occurrences or points were recorded for the Palen project, predominantly consisting of petrified wood and one possible mammal jaw fragment from the surface of Quaternary deposits. In addition to the field reconnaissance, a records search indicated that the potential for subsurface deposits of paleontological material ranged from low to high, increasing with depth. A portion of the Palen project was identified as having a high sensitivity for containing significant paleontological resources in areas of Quaternary lakebed deposits. The recommendation of the report is to monitor ground disturbances in Quaternary lakebed deposits, due to their sensitivity, on a full-time basis and to prepare a Paleontological Resource Monitoring and Mitigation Plan for the project.

For the Blythe project, 37 nonsignificant fossil occurrences of petrified wood were recorded, in addition to 64 nonsignificant fossil points of turtle shell fragments, vertebrate fragments, and invertebrate specimens. Several portions of the Blythe project area, including areas of alluvial deposits in the McCoy Wash and Palo Verde Mesa areas and older alluvial fan and alluvial valley deposits, have been identified as having high sensitivity for containing possible significant subsurface paleontological resources. Quaternary alluvium deposits of modern washes range in sensitivity from low to high, increasing sensitivity with depth. The recommendation of the report is to prepare a Paleontological Resource Monitoring and

Mitigation Plan for the project and monitor ground disturbance in all areas of high sensitivity, including areas of low to high sensitivity when ground disturbances equal or exceed 5 ft (1.5 m) in depth.

9.4.16.2 Impacts

The potential for impacts on significant paleontological resources at the Riverside East SEZ is relatively unknown, but the potential is high in some areas. A more detailed investigation of the local geological deposits of the SEZ and their potential depth is needed prior to project approval. Once a project area has been chosen, a paleontological survey will likely be needed following consultation with the BLM. The appropriate course of action would be determined as established in BLM IM2008-009 and IM2009-011 (BLM 2007b, 2008a). Section 5.14 discusses the types of impacts that could occur on any significant paleontological resources found to be present within the Riverside East SEZ. Impacts will be minimized by implementing applicable general mitigation measures from Section 5.14, such as paleontological monitoring and development of a management/mitigation plan, and required programmatic design features described in Appendix A, Section A.2.2.

Indirect impacts on paleontological resources outside of the SEZ, such as through looting or vandalism, are unknown but unlikely because any such resources would be below the surface and not readily accessed. Programmatic design features for controlling water runoff and sedimentation would prevent erosion-related impacts on buried deposits outside of the SEZ.

No new roads or transmission lines have been assessed for the proposed Riverside East SEZ, assuming existing corridors would be used; impacts on paleontological resources related to the creation of new corridors would be evaluated at the project-specific level if new road or transmission construction or line upgrades are to occur.

A programmatic design feature requiring a stop work order in the event of an inadvertent discovery of paleontological resources would reduce impacts by preserving some information and allowing possible excavation of the resource, if warranted. Depending on the significance of the find, it could also result in some modification to the project footprint. Since the SEZ is located in an area preliminarily classified as PFYC Class 3b or greater, a stipulation would be included in permitting documents to alert solar energy developers of the possibility of a delay if paleontological resources were uncovered during surface-disturbing activities.

9.4.16.3 SEZ-Specific Design Features and Design Feature Effectiveness

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 Appendix A, Section A.2.2. The need for and the nature of any SEZ-specific design features would depend on findings of paleontological surveys.

9.4.17 Cultural Resources

9.4.17.1 Affected Environment

9.4.17.1.1 Prehistory

The proposed Riverside East SEZ is located in a transitional area between the Colorado Desert to the south and the Mojave Desert to the north. The earliest human use of the Colorado and Mojave Deserts was likely during the Paleoindian Period, sometime between 12,000 and 10,000 B.P. Although no Paleoindian sites have been documented in the Colorado Desert, several sites have been documented in the Mojave Desert, and in coastal sites to the west. These known sites are predominantly located near inland pluvial lakes (now mostly dry), and on desert terraces, suggesting that subsistence during this time period focused on mega-fauna and on the local lake and marsh habitats. This hunting-intensive period came to an end around 7,000 to 8,000 B.P., when the mega-fauna became extinct, likely due to intensive hunting and a warming climate; this warming climate consequently led to the shrinking of ancient pluvial lakes. These early sites are characterized by the Clovis complex of fluted points, and later the San Dieguito complex, characterized by core and flaked-based tools, crescents, choppers, planes and scrapers, and some leaf-projectile points (Rogers 1939; Jones and Klar 2007).

The Archaic Period in the Colorado Desert lasted from approximately 8,000 to 1,500 B.P., defined mainly by the Pinto Cultural Complex. The paucity of evidence during the Archaic time period in the Colorado Desert makes it difficult to establish secure chronological sequences, making the Archaic period of the Colorado Desert an important source for regional research questions. The sites during this time period are generally identified by the material culture, distinctive projectile points, and ground stone tools used for processing plant resources. However, some of the Late Archaic sites in the region, mainly found on the margins of the Colorado Desert or around ancient Lake Cahuilla to the southeast of the SEZ, have been identified by buried midden deposits with clay-lined features, cremations, thermal features (such as fire-affected rock and hearths), and perishable items such as basketry, nets, traps, and split-twig figurines (Love and Dahdul 2002; Jones and Klar 2007).

The Late Prehistoric/Protohistoric Period began about 1500 B.P. and extended until contact with European explorers and colonization of the area. The archaeological Patayan complex is thought to be ancestral to the later Yuman cultural groups discussed in Section 9.4.17.1.2. The Late Prehistoric period likely saw a change in subsistence patterns from the preceding Archaic period as Lake Cahuilla recessed, forcing groups to rely on floodplain agriculture and the seasonal flooding of the Colorado River. While agriculture played a large role in their diet, these groups likely maintained some of their hunting and gathering subsistence practices, practicing a mix of horticultural and hunter-gatherer subsistence strategies. The Late Prehistoric period also saw the introduction of pottery, buff and brown ware ceramics, and paddle and anvil pottery, likely introduced from Mexico. Archaeological assemblages of the period are also characterized by bow-and-arrow technology, evidenced by smaller Cottonwood and Desert side-notched points; a shift in burial practices from inhumation to cremation techniques; rock art and intaglios; bedrock milling features; and an extensive system of trails, along which "pot-drops," lithic debitage, and shrines are found.

9.4.17.1.2 Ethnohistory

Although of diverse linguistic stock, the Native Americans that inhabited the southeastern California deserts when Euro-Americans first arrived shared similar ways of life and broadly similar beliefs, norms, and values (Halmo 2003). The mountains and valleys of their shared environment provided a variety of seasonally available resources. Native American groups harvested these resources following a regular seasonal pattern. They lived in kin-based groups, or lineages, that would join together or split apart depending on the type and the abundance of the resources available. A pattern of seasonal camps combined with permanent villages emerged. Lineages tended to consider specific highly productive areas, such as dense stands of mesquite, as their own, while the areas between were shared not only with other lineages, but also with other Tribes (Lightfoot and Parish 2009). Even when they grew wild, plant resources were often managed; stands of plant resources might be pruned, watered, or burned to encourage growth. The pattern of seasonal migration to exploit particular resources allowed the groups to adapt to changes in their subsistence base with the arrival of new cultural impulses and populations. Floodplain horticulture, adopted from the Southwest, allowed for the establishment of permanent, often multi-ethnic villages along the Colorado River (Halmo 2003). These became part of the migratory pattern which continued to take some ethnic groups into the highlands to harvest resources available there. Similarly, with the discovery of gold in the 19th century and the influx of Euro-American populations in the 20th century, Native Americans added wage labor in mines and on large irrigated farms to their seasonal rounds (Bean et al. 1978).

The various Native American ethnic groups that inhabited the southeastern California deserts each had an area that they considered their homeland, but the boundaries between these areas were not sharply drawn. Travel to hunt, trade, or just visit neighboring groups was common (Kelly and Fowler 1986). The territorial claims of the different ethnic groups who occupied the Mojave and Colorado Deserts overlap each other. The boundaries between ethnic groups appear to have changed from one time period to another, and groups would sometimes share territory, or a group would invite its neighbors to share an abundant resource (CSRI 2002). In addition, many of the ethnic groups that inhabited the Colorado Desert shared a considerable amount of ritual and worldview, including an important religious song cycle sung in the language of the Mohave. This song cycle was associated with a network of trails, the most important of which are the *Xam Kwatcan* Trail (Johnson 2003) and the Salt Song Trail (Halmo 2003). These trails are both physical and spiritual paths, connecting sacred natural features thought to be imbued with power. Following the trails physically or in spirit was particularly important as part of a mortuary ritual to aid the departed in their journey to the afterlife. Points along the trail are often marked with cairns, sometimes covering burials, cleared sleeping circles, panels of petroglyphs, and in some areas geoglyphs or intaglios. Campsites along the trails are most often associated with springs (CSRI 1987). Other trails were of secular importance, reflecting a web of social and trade links that stretched from the Pacific coast to the Great Plains. As discussed in Section 9.4.18.1, the Native Americans living in southeastern California tend to view the landscape they inhabit holistically, each part intrinsically and inextricably connected to the whole. In some sense, the network of trails tied the landscape together.

The proposed Riverside East SEZ lies in an area of intermittent joint use. It provided seasonal resources to surrounding groups and included important trails that connected them (Knack 1981). The Takic-speaking Serrano were centered in the mountains to the west; the closely related Cahuilla in the Coachella Valley; the Yuman-speaking Quechan at the confluence of the Colorado River and the Gila; their allies, the Mohave, along the river from Blythe to Black Canyon; and the Numic-speaking Chemhuevi in the Chemehuevi Valley and parts of the Mojave Desert. Before the early 19th century, the Halchidhoma lived along the river around what is now Blythe.

Serrano

The precise sociopolitical boundaries of the Serrano are difficult to define (Kroeber 1925; Strong 1929). Their name is derived from a Spanish term meaning “highlander” or “mountaineer.” Most researchers place the Serrano homeland in the San Bernardino Mountains east of the Cajon Pass, and in the Mojave River drainage north of Victorville. They themselves place their traditional center of origin at Twentynine Palms (CSRI 2002).

The Serrano were a collection of localized lineages speaking the same language and sharing the same culture, but with little or no overarching political structure. They had cultural ties to the Vanyume on the north and Cahuilla on the south. The Serrano appear to have been primarily gatherers, supplementing their plant-based diet with hunting and fishing. There is considerable variation in altitude within their traditional range, and as with neighboring groups, resources were collected from a number of environments. Most villages were found in the foothills, but some occurred on the desert floor in locations where good water was available. At higher elevations they gathered piñon nuts and acorns, and at lower elevations mesquite pods and yucca heads. The harvests were stored, and excess traded. Where the resource was abundant, lineages might gather to harvest or to communally hunt rabbits or deer (Bean and Smith 1978).

Limited by water supply, villages were small, consisting of clusters of tule-thatched, domed, circular huts. Most often they also included a larger ceremonial structure where the lineage leader lived. Their material culture included decorated baskets, pottery, hide blankets, stone pipes, yucca fiber cordage, and an assortment of musical instruments of wood, bone, and shell, similar to the material culture of the Cahuilla (Farmer et al 2009).

The Serrano had little contact with the Spanish until 1819 when an *asistencia*, or mission outpost, was established near Redlands. Thereafter, native ways of life rapidly faded as the majority of the population was moved to the missions. By the latter part of the 20th century, most Serrano lived on the Morongo and San Manuel reservations, where they mixed with the Cahuilla and other ethnic groups (Bean and Smith 1978).

Cahuilla

Closely related to and associated with the Serrano, the Cahuilla occupied the Coachella Valley. Like the Serrano, their society was composed of lineage-based groups with hereditary leaders, but with no overarching sociopolitical organization. They are believed to have entered the Colorado Desert from the Great Basin sometime between 500 BC and AD 500. They were hunters and gatherers who lived in permanent villages near reliable water. They appear to have first settled on the shores of Lake Cahuilla,[17] and then moved to the mountains as the lake dried. The Cahuilla tended toward larger groups that consisted of multiple lineages (Lightfoot and Parish 2009). Preferred settlement sites were near mesquite stands or palm oases. They considered the latter to be sacred (Bean et al 1978). While villages were occupied year-round, small groups would move seasonally to temporary camps to collect localized plant resources or to hunt. Larger groups would travel to the mountains together with mountain allies to harvest piñon nuts and acorns. These would be brought to the permanent villages for storage. Species important to the Cahuilla are discussed in Section 9.4.18.

The Cahuilla were long-distance traders. The routes westward through San Gorgonio Pass to the coast lay within their traditional use area, and the Cahuilla maintained trading relationships east of the Colorado River with the Maricopa. Like the Chemehuevi, they were part of a network that stretched as far east as the Great Plains (Bean et al 1978). A major east–west trade route referred to as the "Cocomaricopa" or "Halchidhoma Trail" connected the San Gorgonio Pass with the Gila River area and crossed the Colorado River near present-day Blythe. I-10 roughly follows the northern branch of the trail from Blythe westward to Desert Center (Cleland and Apple 2003). The Cahuilla would have been familiar with the southern portions of the proposed Riverside East SEZ.

Quechan

Sometimes referred to as the Yuma, the Quechan (Kwatsan) are a Yuman-speaking group closely allied with the Mohave, traditionally centered at the confluence of the Gila and Colorado Rivers. It is not clear when they arrived at the confluence. They were there by the 1770s, but were not mentioned by Francisco Vasquez de Coronado, who passed through the area in 1540. Quechan tradition relates that the Tribe migrated south from the sacred mountain *Avikwaame*, in the Newberry Mountains near Laughlin, Nevada. They are thought to have arrived at the confluence sometime between the thirteenth and the eighteenth centuries. Traditionally, the Quechan practiced floodplain horticulture, depending on the annual floods of the Colorado River to replenish their fields with fresh silt. The fertility of the soil allowed multiple plantings and harvests, which the Quechan supplemented by gathering plants from the desert and by fishing. During the growing season they dispersed along the floodplains of the Colorado and the Gila Rivers, moving to the upper terraces during the winter. The Quechan prospered using simple

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[17] Lake Cahuilla formed when the Colorado River shifted course to the west and flowed into the Salton Sea Basin, then dried when the river reverted to its former course. The process of formation and desiccation was cyclical before the construction of dams on the Colorado, with cycles lasting about 150 years (Redlands Institute 2002).

technology. Their bows were simple and unbacked. Arrows often had no stone points. Digging sticks served for planting maize, and clothing was minimal (Bee 1983).

While their settlements were more dispersed and independent than those of the Serrano or the Cahuilla, the Quechan had a sense that they were a Tribe, a nation occupying a specific territory. They acted together in warfare; acting together with their allies, the Mohave, they were often at odds with the Halchidhoma, the Maricopa, and the Cocopah.

The confluence of the Gila and Colorado Rivers was an important crossing along the Yuma-San Diego Trail, which led to the coast. Important to the Spanish, and later the Americans, the Spanish established a mission there in 1779 only to have it destroyed by the Quechan and Cahuilla 2 years later. The Hispanic connection remained important to the Quechan, who desired Spanish trade goods, for which they exchanged slaves captured during raids on their enemies (Knack 1981). Between 1826 and 1829 the Quechan joined the Mohave in driving out the Halchidhoma, who controlled another important river crossing. For a time, some Quechan moved into the Blythe area, but they had returned south by the second half of the nineteenth century (Bee 1983). After the defeat of Mexico in 1848, the United States established at fort at Yuma to control the crossing, which had become an important wagon road. A reservation was established for the Quechan in 1884.

Like that of their northern neighbors, Quechan cosmology included ritually important trails. The most important of these remains the *Xam Kwatcan* Trail. It follows the Colorado River, connecting Pilot Knob (*Avikwalali*) with Spirit Mountain (*Avikwaame*), connecting a series of ritually important places of power. One of these is Palo Verde Peak, located about 12 mi (19 km) south of the SEZ (Johnson 2003).

Mohave

The Mohave were primarily at home along the Colorado River, from time to time occupying its banks as far south as Blythe. They appear to have entered the Mojave Valley sometime around AD 1150. They resided chiefly along the eastern bank of the Colorado River, but travelled widely, for trade, to harvest seasonally available resources, and out of curiosity. They are likely to have been familiar with Chuckwalla Valley and lands included in the proposed Riverside East SEZ. They lived in sprawling settlements, rather than villages, with houses situated on low hills above the flood plain. They did not engage in irrigation agriculture, but relied on seasonal inundation to water and refresh their fields. Unlike most other Colorado Desert Tribes, families owned individual fields and individual mesquite trees (Stewart 1983). Most of the year the Mohave lived on terraces above the Colorado River, moving to the flood plain in the spring to plant crops after seasonal floods receded (Kroeber 1925).

The Mohave have traditionally thought of themselves as a nation inhabiting a territory under a hereditary great chief of the Malika clan. Divided into patrilineal clans, they came together for warfare and other purposes. War leaders and shamans had great influence, and power was gained by dreaming, often in sacred locations. Their territorial claims are extensive, reflecting their propensity to travel. They claim as their territory a much larger range than other

California Tribes, including all of the Mojave Desert and as far south as the Turtle, Granite, and Eagle Mountains (CSRI 2002), adjacent to, but not including the SEZ. This larger range was where they hunted and gathered to supplement their planted crops and the fish they took from the river. They are likely to have traded, hunted, and gathered in the Riverside East SEZ area. They were less reliant on hunting and gathering than the Chemehuevi, who hunted and gathered in much of the same area (Farmer et al. 2009).

Besides being used for travel for trade, war, and recreation, trails often had religious significance. The Salt Song Trail, which passes through the SEZ, seems to have originated with the Mohave. The Mohave revere other trails, such as the Keruk Trail of Dreams. The song cycles that are associated with the trails tied specific songs to specific places. Many of these were considered places of power, where individuals sought enlightenment, skills, and status through dreaming. These trails are considered sacred, and offerings continue to be left at sacred points along them (Halmo 2003).

Halchidhoma

The Halchidhoma were a Yuman-speaking group who were once located south of the Mohave along the Colorado River. Like the Mohave, they were floodplain cultivators and active traders. Culturally, they were similar to the Mohave and the Quechan, but politically they were their enemies. Their ties were with the Maricopa and Cocopah, also Yuman speakers. Like the Mohave, they were great travelers and traders, establishing the Cocomaricopa or Halchidhoma Trail, and an east–west route later followed by Euro-American immigrants. Their clashes with the Mohave and Quechan came to a head sometime around 1825. The Halchidhoma were defeated and began to move to the Gila River to join their Maricopa allies. This process continued until about 1840 (Harwell and Kelly 1983).

Chemehuevi

The Chemehuevi, a Southern Paiute group, occupied the Parker and Blythe Valleys along the Colorado at the invitation of the Mohave, with whom they were allied, sometime between 1825 and 1830, after the Mohave and Quechan had driven out the Halchidhoma. In the late 1860s, hostilities erupted between the Mohave and Chemehuevi, and part of the Chemehuevi moved west to join Cahuilla and Serrano villages near Twentynine Palms. In 1874, the Office of Indian Affairs set aside part of the Mohave reservation along the Colorado River for the Chemehuevi, but many did not want to return. In 1907 a separate reservation was established north of Parker, Arizona (Kelly and Fowler 1986).

The Chemehuevi ranged through the eastern half of the Mojave Desert, but were concentrated along the Colorado River, where they adopted flood plain agriculture, and the Chemehuevi Valley away from the river, where they retained their ties to the surrounding upland mountains and valleys. The latter have been called Desert Chemehuevi (*Tiiranniwiwi*) (Farmer et al. 2009). Even those living along the river retained more reliance on hunting and gathering than their neighbors. The Tiiranniwiwi may have been periodically present in the

Riverside East SEZ, although it is somewhat south of their claimed traditional Tribal use area. Taken together, they had a diverse subsistence base including irrigated mixed horticulture, wild plant management, and hunting. Normally they produced a surplus that they were able to trade (Halmo 2003).

Chemehuevi settlements were scattered and band size varied with the season and available water, plant, and animal resources. Dwellings varied from pole structures covered with brush, to rock shelters, to earth-covered huts often with open fronts, adopted from the Mohave. Other items of Mohave material culture were likewise adopted, including ceramic styles, square metates (grinding stones), storage platforms, and personal adornment (Farmer et al. 2009).

The relations between the Chemehuevi and neighboring Tribes were mostly amicable. They maintained a trading relationship with the Cahuilla, and groups of Chemehuevi would travel as far west as the coast to trade for shells and as far east as the Hopi mesas. They were involved in a trade network that stretched from the Channel Islands to the Gila River Valley and the Great Plains, with the potential to bring material culture from some distance away to the Chemehuevi homeland.

9.4.17.1.3 History

European explorers first entered the southeastern California deserts in the sixteenth century. Early explorers of Alta, California, reached the Colorado River by way of the Gulf of California, and proceeded up the stream past the confluence of the Gila River, but explored little of the interior deserts. For the next 200 years Spanish penetration of the interior deserts was intermittent, resulting in a prolonged protohistoric period (see Sections 9.4.17.1.1 and 9.4.17.1.2). Juan Bautista de Anza crossed the Colorado River with the assistance of the Quechan on his way to Monterey in 1774. His route, which is located well south of the proposed Riverside East SEZ near the border of California and Mexico, became the main travel corridor between Arizona and central California in the 1800s. Another trail, the Cocomaricopa Trail, passed through the SEZ; it began as a Native American trail and later served as the mail route between Sonora, Mexico, and Alta, California. The trail's name changed to Bradshaw Trail over time, as William Bradshaw established an overland stage route using the trail in an effort to attract miners to the area.

The nineteenth and early twentieth centuries were characterized by mining and prospecting in the Colorado Desert. Gold, silver, copper, gypsum, borax, and manganese were the primary deposits of interest. A series of military camps and forts were established in Arizona, Nevada, and California between 1848 and 1890 to protect those moving into the area from hostile Tribes; tensions had increased between settlers and Native Americans as a result of the estimated 8,000 immigrants to the area during the Gold Rush. In addition to the trail initially established by de Anza, Jedediah Smith created a new trail into California in 1826 that passed through present day Needles, well north of the SEZ. In 1877, gold prospector Thomas Blythe established water rights along the Colorado River in an effort to promote and establish a town bearing his name, located just east of the SEZ. This new development in the deserts was dependent on water and transportation. In 1872, the Southern Pacific Railroad started toward

California; by 1877, it extended to Yuma, Arizona, and by 1880 it had reached the Chocolate Mountains southeast of the SEZ. The Eagle Mountain Mine, located immediately west of the SEZ and north of Desert Center, operated as a gypsum and iron mine until 1983, and a 52 mi (84 km) rail line connected the mine with the Southern Pacific Railroad at Duramid. Production at the mines in the area increased during both World Wars as the need for metals (iron, gold, silver, manganese, and gypsum) increased. In addition to the Eagle Mountain Mine, mining prospects are known in the Mule Mountains, Big Maria Mountains, McCoy Mountains, and Palen Mountains, all of which are ranges located in very close proximity to the proposed Riverside East SEZ. Water did not come to the Colorado Desert until the 1930s when the MWD was created and work began on the CRA extending from Parker Dam to Los Angeles; it was completed in 1938. Associated with the construction of the aqueduct were several roads and transmission lines, as well engineering camps, one of which was built at the Eagle Mountain pump lift.

In 1942, the U.S. Army identified 18,000 mi^2 (46,000 km^2) of desert in California and Arizona for training troops in a desert environment in preparation for combat in North Africa. The area came to be known as the Desert Training Center/California-Arizona Maneuver area, or DTC/C-AMA, in 1943 as the massive training facility expanded its size to 31,500 mi^2 (81,600 km^2) and its range of activities from training troops, testing and developing equipment and supplies, and developing new techniques and tactics for desert warfare to large-scale training and maneuvering. It is estimated that over 1,000,000 men trained at the DTC/C-AMA. Although it only operated between 1942 and 1944, it represents a significant period in U.S. history and includes a number of archaeological features of importance, including the remains of training camps, airfields, bivouacs, maneuver areas, and tank tracks (Bischoff 2000).

In a larger context, the DTC was a part of the early days of U.S. involvement in WWII. The German army was advancing across Europe and the Italian army had struck out in Libya and Egypt. British forces had been able to successfully counterattack the Italian army, but this resulted in Germany entering North Africa to help the Italians. General Erwin Rommel of the German army was successful with his desert army advancing across Libya and then into Egypt against the British. The prospect of Germany and Italy controlling Egypt and the Japanese successes in India, propelling them toward Persia, leaving Russia wide open to attack, made it clear to the U.S. that they would need to go to North Africa. General Lesley J. McNair, chief of staff for the Army General Headquarters, recognized the need to prepare American soldiers for desert warfare in a terrain similar to that of North Africa. He placed Major General George S. Patton, Jr., who had previously conducted successful training maneuvers in Louisiana, in charge of the desert training center project (Bischoff 2000).

The location of the DTC was determined in March of 1942, as General Patton toured the desert. Aside from the mountain ranges, the uninhabited desert of eastern California was deemed sufficiently similar to that of North Africa. Patton felt the area was ideal for large-scale training exercises because it was remote and desolate, but water was available and three railroads supplied the area. In addition, there were other military facilities nearby (in Riverside, Las Vegas, Indio, Yuma, and Blythe). Patton worked out deals with the railroad companies (Union Pacific, Santa Fe, and Southern Pacific) and the Municipal Water District in order to supply transportation and water for the troops. Camp Young was the first camp established near

Blythe, and it became the DTC headquarters. Several other camps were constructed over the course of the DTC/C-AMA operation. The camps were temporary in nature, constructed mostly of tents with some wooden structures to house administrative centers or hospitals. The only permanent construction consisted of open-air chapels and large relief maps. Associated with most of the camps were maneuver areas, rock-lined insignias, and arms ranges. By late summer of 1942, Patton was ordered to North Africa, where he successfully commanded the western task force of the operation to victory under Operation Torch. The DTC was quickly placed under the command of Major General Alvan Gillem and the first set of maneuvers was conducted in the fall. This first set of maneuvers was considered unrealistic, and the DTC was ordered to operate like a theater of operations in a combat setting, including establishing communication zones and combat zones. This was the first time the Army had simulated a theater of operation. Riverine operations across the Colorado River were also added. At its height the DTC contained 14 camps, with 11 in California and 3 in Arizona, each capable of holding at least 15,000 soldiers during a typical 14-week training schedule. There were also airfields, hospitals, supply depots, and railheads. Several airfields were located in close proximity to the SEZ: Shaver's Summit, located near Chiriaco, the Desert Center Army Airfield, and Rice Army airfield, located north of the Riverside East SEZ. The importance of air support should not be overlooked, as it was seen as an integral part of the desert training experience. On-the-ground troops needed to be able to conceal themselves as much as possible to prevent detection during simulated air attacks. In 1943, as the need for desert training waned with the close of the North African campaign, the concept and name of the DTC changed to the California-Arizona Maneuver Area. Its mission was to conduct broader large-scale training to toughen soldiers mentally and physically and to provide battle conditions for conducting firing training and testing and developing equipment, supplies, and training methods. The DTC/C-AMA saw its greatest level of activity in the summer and fall of 1943. In late 1943, personnel shortages (due to needs for personnel overseas) resulted in inefficient operation of the C-AMA, and General McNair recommended the facility be closed. The DTC/C-AMA was declared surplus in April 1944 by the War Department and was closed by the end of the month (Bischoff 2000).

Of specific interest in the vicinity of the Riverside East SEZ are Camp Coxcomb, Camp Desert Center, and Camp Young. Camp Coxcomb was located just northwest of the SEZ, between State Route 177 and the MWD aqueduct, and was constructed in the summer of 1942. Considered more permanent than some of the other camps, it had wooden floors and screens in the Post Exchange, along with 39 shower buildings, 165 latrines, 284 pyramidal wooden tent frames, a 400,000-gallon water tank, and a combination observation tower and flag tower. Several infiltration courses, machine gun, rifle and pistol ranges, and training areas have been found in the surrounding area associated with the camp. Camp Desert Center was located on the north side of I-10, between Chiriaco Summit and Desert Center west of the SEZ. It consisted of a maneuver area, an encampment with temporary housing, an evacuation hospital, an observers' camp, an ordinance campsite, and a quartermaster truck site. Camp Young was located just east of the SEZ, outside Blythe, and it was here General Patton lived during most of his stay. This camp maintained two station hospitals, several rifle and combat ranges to the south of the camp, 98 administration facilities, and 50 warehouses, along with bathhouses, mess halls and kitchens, Post Exchanges, hundreds of latrines, a post office, a radio station, a coliseum, pump stations, officer clubs, and various shops.

9.4.17.1.4 Traditional Cultural Properties—Landscape

The Tribes in this part of California tend to take a holistic view of the world; they see the features of their environment as an interconnected whole imbued with a life force. Prominent features may be seen as places of power—sacred places. High hills and mountains tend to be regarded as sacred, while some peaks have special status. Other features that tend to be regarded as sacred include caves, certain rock formations, springs, and hot springs. Revered locations include panels of rock art, evidence of ancestral settlements, arranged-rock sites, burial or cremation areas, and systems of trails. Sacred sites are often seen as places of power where offerings are left (Halmo 2003). Tribes see themselves as exercising divinely given responsibilities of stewardship over the lands where they believe they were created and as retaining a divine birthright to those lands. Specific mountain peaks are seen as points of emergence associated with creation stories. Although adopting much of the Mohave cosmology, the Tribes have retained their own identities. For example, the Chemehuevi have their own mountain of creation, Charleston Peak in Nevada (Halmo 2003), distinct from the Mohave's *Avikwaame* (Spirit Mountain) or Newberry Peak, also in Nevada. As mentioned above, there remains considerable interaction among the Tribes that inhabit the southeastern California deserts. A system of alliances furthered trade and the sharing of hunting and gathering grounds.

From the Native American perspective, the proposed Riverside East SEZ includes elements of a sacred landscape tied together by a network of trails. A Prehistoric Trails Network Cultural Landscape/Historic District has been proposed for trails near the SEZ (Tremaine and Kline 2010). A trail of importance to the Chemehuevi and other area Tribes is the Salt Song Trail, which runs generally north–south from north of Las Vegas to an area south of Blythe. It enters the SEZ via the Palen Valley and crosses the Chuckwalla Valley to the Colorado River, where it turns north to its point of origin (CSRI 1987). The *Xam Kwatcan* Trail, which is significant to the Quechan, also runs north–south. It follows the Colorado River from Pilot Knob (*Avikwalali*) near the Mexican border with Spirit Mountain (*Avikwaame*), connecting a series of ritually important places of power. It crosses Palo Verde Mesa (Johnson 2003) on its way north, either within or adjacent to the southern lobe of the proposed Riverside East SEZ. It continues northward along the terraces above the Colorado River to the Blythe Intaglios east of the Big Maria Mountains. In particular, the I-10 corridor follows a route with Native American roots. The Cocomaricopa Trail was a major east–west trade route that is intersected by the Salt Song and *Xam Kwatcan* Trails. It forms a culturally significant corridor and ties together culturally important features like Black Rock in the east with Alligator Rock in the Chuckwalla Valley to the west. Segments of this trail have been identified less than 2 mi (3 km) south of the western half of the SEZ. Other segments have been identified in the southern lobe of the SEZ (Eckhardt and Walker 2004). These trails did not consist of a single path, but were a network of intertwining paths most visible on the shoulders and tops of ridge systems, relatively stable alluvial fans, and other upland areas where footing was solid and there was less vegetation to deal with (Cleland and Apple 2003). In addition, the McCoy Springs District, the largest concentration of petroglyphs in the region, is associated with the network of trails. Located on the western slope of the McCoy Mountains, within 4 mi (5.5 km) of the SEZ, the district consists of more than 3,360 rock art panels and associated trail segments, archaeological deposits, and sleeping circles. It was not only a focus of prehistoric activity, but remains a culturally important site for Native Americans in the surrounding area (Bagwell and Kline 2010).

During consultations between the BLM and the Tribes regarding the construction of the Blythe, Genesis, and Palen fast-track solar facilities within the Riverside SEZ, Native Americans identified Alligator Rock, the Alligator Rock ACEC, the Palen Dry Lake shoreline, the Palen Dry Lake ACEC, the South Chuckwalla Mountains Petroglyph District, McCoy Springs, Black Rock, and the Mule Mountains ACEC as landscape features within 15 mi (24 km) of the proposed facilities that are of religious or cultural importance to the Tribes (BLM and CA SHPO 2010a–c).

Other mountains considered sacred include the Big Maria, Coxcomb, and Eagle Mountains (Halmo 2003). The Big Maria Mountains are adjacent to and northwest of the SEZ and form the western wall of McCoy Wash, and the Coxcomb Mountains lie between the Chuckwalla and Palen Valleys. Both valleys include parts of the SEZ. The Eagle Mountains are just west of the SEZ.

The proposed Riverside East SEZ appears to have been primarily used as a seasonal gathering area. The remains of temporary occupation sites have been found between the Chuckwalla Mountains and the Coxcomb Mountains. Some are associated with roasting pits, suggesting the area was a seasonal agave-harvesting area. This part of the valley has been identified as more likely to include resources important to Native Americans than the eastern end of the basin. Sites associated with rituals tend to be found on the basin floors, with more permanent campsites found in the foothills (CSRI 1987).

According to a Sacred Lands File Search through the NAHC, no sacred sites were identified within the Riverside East SEZ (Singleton 2010).

9.4.17.1.5 Cultural Surveys and Known Archaeological and Historic Resources

At least 109 previous surveys have been conducted in the vicinity of the proposed Riverside East SEZ, resulting in the recording of 574 total sites, at least 414 of which lie within the SEZ. The other 160 recorded sites are located within at least 5 mi (8 km) of the Riverside East SEZ. Of these sites, 53% are historic in nature, consisting mostly of artifacts related to the DTC/C-AMA, but some artifacts may be associated with mining, and more rarely homesteading/grazing that occurred in the area. The historic site types consist of refuse scatters, consisting mostly of metal cans, glass bottles and jars, broken ceramics, milled lumber, and sundry metal items; historic trails and roads, as well as tank tracks; historic camps consisting of cleared areas, probably for tent pads, and associated features such as hearths/campfires and refuse scatters, which may be associated with construction camps for the linear facilities or military or mining camps; historic cairns, often associated with mining claims; historic features such as survey markers, rock features, prospect pits, stone and wooden structures, fortified positions, aircraft parts, and smoke land mines. About 45% of the sites in the SEZ are prehistoric sites that consist of lithic scatters and quarries related to stone tool and ground stone tool production and maintenance, which make up the majority of prehistoric sites, and ceramic shards and pot drops, cairns, thermal features, and fragmentary bone and trail segments. The remaining 2% of sites are multi-component sites, consisting of both historic and prehistoric artifacts.

Most of the information about archaeological sites in and around the Riverside East SEZ was obtained from current solar energy applications, designated as "fast-track" projects, located within the Riverside East SEZ. The Palen Solar Power Project is located in the area around Palen Lake, in the western part of the Riverside East SEZ. The archaeological survey and research of previously recorded sites in the APE found 57 total sites recorded in the project area, 46 of which are within the Riverside East SEZ. Of these 57 sites, 43 are historic, and 14 sites are prehistoric (AECOM 2009a). The Blythe Solar Power Project is located in the eastern portion of the Riverside East SEZ. Through archaeological survey and determination of previously recorded sites that are located in the Blythe APE, 254 total sites were reported. Of the 254 sites, 204 are located in the Riverside East SEZ, the remaining 50 located within 5 mi (8 km) of the SEZ. There are 180 historic sites recorded, 68 prehistoric sites, and 6 multi-component sites that contain both prehistoric and historic artifacts and features (AECOM 2009b). The Genesis Solar Energy Project is located in the central portion of the Riverside East SEZ, just north of Ford Dry Lake. The archaeological survey and previously recorded sites indicated 98 sites present in the Genesis APE, 36 of which are also within the Riverside East SEZ, the other 62 sites being located within 5 mi (8 km) of the SEZ (Tetra Tech 2009). Of the 98 sites, 77 are prehistoric in nature, 15 are historic, 4 are multi-component, and 2 are undetermined. The Desert Sunlight Solar Farm Project is located in the western portion of the proposed Riverside East SEZ, about 6 mi (10 km) north of Desert Center. The archaeological survey and previously recorded sites identified 87 sites in the Desert Solar APE, all of which also are present in the proposed Riverside East SEZ. Of these 87 sites, 75 are historic, 5 are prehistoric, 1 is a multicomponent site, and 2 are undetermined (BLM 2010g).

In addition to the solar energy fast-track projects, the Devers-Palo Verde II 500-kV transmission line survey also served as a valuable source of information regarding archaeological sites. This transmission line survey is located south and west of the Riverside East SEZ until it intersects the southeastern portion of the SEZ (as it crosses I-10 near the Wiley Well Rest Area to the area just west of the Palo Verde Mesa). This survey identified 78 archaeological sites—41 sites in the Riverside East SEZ, and 37 sites within 5 mi (8 km) of the SEZ. Fifty-nine of these sites are prehistoric in nature, and the other 19 are historic (Carrico et al. 2005).

There are two dry lakebeds located in the area of the SEZ, Ford Dry Lake and Palen Dry Lake, portions of which lie in the SEZ. During present times these lakes only hold water during occasional flooding, but it is likely that during the Late Pleistocene and Early Holocene these pluvial lakes were filled with water, providing a lacustrine environment upon which archaic peoples were able to subsist. Lake Cahuilla was located west of the SEZ, and was assuredly filled with water at times due to flooding episodes of the Colorado River and Early Pleistocene pluvial actions; a plethora of sites have been documented along the shores of Ancient Lake Cahuilla, dating from the Early Archaic to the Late Prehistoric period. Therefore, it is not unreasonable to assume that Palen Dry Lake and Ford Dry Lake provided similar potential for habitation and subsistence. Also associated with Lake Cahuilla is Obsidian Butte, a large source of obsidian that became available for ancient peoples to exploit during receding periods of the lake; this obsidian provided a valuable source of raw material for tool production.

In addition to Eagle Mountain Mine, located in the Eagle Mountains, mining activities took place in the McCoy Mountains, the Little and Big Maria Mountains, and the Mule

Mountains. Other than Eagle Mountain Mine, most of these mines operated for only short periods of time. In addition to these more established mines, there are some smaller prospecting pits in the surrounding mountains.

There are several areas near the SEZ related to DTC/C-AMA activities, in addition to the nearby camps mentioned in Section 9.4.17.1.3. One of these locations is the Desert Center Army Airfield, consisting of two paved runways, taxi-ways, a parking apron, and 40 constructed buildings that were demolished after DTC/C-AMA use. There is another location in the Midland-Big Maria Mountain area, site CA-RIV-1172, that consists of rock features probably related to defensive positions, rock walls, foxholes, dugouts, and cairns. This training area has been recommended as NHRP eligible. North of the SEZ at Palen Pass, is the site of the largest maneuver area in the DTC/C-AMA. This site consists of fortifications constructed throughout the pass, gun emplacements, barbed wire entanglements, bunkers, minefields, and foxholes. The best-preserved maneuver area, consisting of foxholes, associated refuse, concertina wire, concrete defensive positions and tank tracks, is in the valley bordered by the Palen, Little Maria, and McCoy Mountains, just outside the SEZ. A large minefield between the mountains and the sand dunes to the east of the Coxcomb Mountains may be located within the SEZ. In addition, small unit training exercises were held in the Chuckwalla Valley, as well as in the Midland and Styxx Passes.

The BLM has designated several locations relatively close to the proposed Riverside East SEZ as ACECs because of their significant cultural value. The ACECs contiguous with the SEZ on the south are the Mule Mountains ACEC on the eastern end of the SEZ and the Alligator Rock ACEC on the western end. The proposed SEZ surrounds the Palen Dry Lake ACEC on three sides. Two other ACECs are located just 5 mi (8 km) from the proposed SEZ. These are the Corn Springs ACEC to the south, which includes both historic and prehistoric resources, and the Big Marias ACEC to the east. The latter includes a concentration of Native American cultural resources including the Blythe Intaglios, prehistoric trails, and other archaeological sites. Approximately 12 mi (19 km) to the north is the Patton's Iron Mountain Divisional Camp ACEC, a site representing the importance of military history in the region (BLM 1999; 2008).

National Register of Historic Places

There are no historic properties listed in the NRHP within the SEZ; however, there are at least six NRHP-listed sites located within 5 mi (8 km) of the SEZ: McCoy Spring Archaeological Site, Corn Springs, the Gus Lederer Site, the North Chuckwalla Mountains Petroglyph District, the North Chuckwalla Quarry District, and the Blythe Intaglios. Other sites listed in the NRHP within the vicinity of the Riverside SEZ include archaeological sites CA-RIV-504 and CA-RIV-773.

Camp Coxcomb, mentioned in Section 9.4.17.1.3 and CA-RIV-1172, are two DTC/C-AMA–associated sites that have high integrity and substantial remains, suggesting that they are eligible for listing in the NRHP. Several of the other camps and maneuver areas may be eligible for NRHP inclusion; however, more research needs to be conducted to determine their eligibility. Also considered potentially eligible is the Contractor's General Hospital, located north of Desert

Center near the Eagle Mountains. This was a hospital created by Dr. Sidney Garfield in service to the workers on the CRA. Other potentially eligible sites in the vicinity of the SEZ include Wiley's Well Road, an offshoot of the Bradshaw Trail used between 1862 and 1877, the Blythe-Eagle Mountain 161-kV Transmission Line built in 1855, and the Blythe Intake Landmark 948.

9.4.17.2 Impacts

Direct impacts on significant cultural resources could occur in the proposed Riverside East SEZ; however, as stated in Section 9.4.17.1, further investigation is needed in a number of areas. A cultural resource survey of the entire APE of a proposed project would first need to be conducted to identify archaeological sites, historic structures and features, and traditional cultural properties, and an evaluation would need to follow to determine whether any are eligible for listing in the NRHP. The Riverside East area was regularly traversed in prehistoric and ethnohistoric times with trail networks ultimately connecting the Colorado River with Lake Cahuilla and the Pacific Coast. Archaeological sites and traditional cultural properties are likely abundant along these networks, and the trails themselves are considered important properties. Activities associated with the WWII DTC were also prominent in the valley and physical remnants of those activities are present within the SEZ. Possible impacts from solar energy development on cultural resources that are encountered within the Riverside East SEZ or along related ROWs, as well as general mitigation measures, are described in more detail in Section 5.15. Impacts would be minimized through the implementation of required programmatic design features described in Appendix A, Section A.2.2. Programmatic design features assume that the necessary surveys, evaluations, and consultations will occur.

Programmatic design features to reduce water runoff and sedimentation would reduce the likelihood of indirect impacts on cultural resources resulting from erosion outside of the SEZ boundary (including along ROWs). Indirect impacts on cultural resources through vandalism or theft are possible, given the large size of the SEZ and its accessibility, as well as its proximity to several NRHP-listed historic properties, eligible archaeological sites, areas of significance to Tribes and historic resources associated with the DTC/C-AMA.

No new access roads or transmission lines have been assessed for the proposed Riverside East SEZ, assuming existing corridors would be used; impacts on cultural resources related to the creation of new corridors would be evaluated at the project-specific level if new road or transmission construction or line upgrades are to occur.

Because of the interconnectedness of the landscape in Native American cosmology, a change in one part affects the whole, thus damage to one part of the sacred landscape would affect the entire network. The proposed Riverside East SEZ includes the southern end of the Salt Song Trail and a section of the northern branch of the Cocomaricopa Trail. Since visible segments tend to follow the shoulders and tops of ridge systems, it is likely that they will not be directly impacted by the development of solar facilities. However, Native Americans have expressed concern over the visual impacts of development on segments of those trails that have religious importance (Halmo 2003). Development that is visible from the trails may be considered intrusive. The proposed Riverside East SEZ is not pristine wilderness. It is crossed and bordered by a major interstate highway, and is scarred by tank tracks dating from WWII. However, the construction of an extensive solar energy facility would very likely have more visual impact on the landscape than already exists.

Native Americans have also expressed concern over other impacts likely to accompany development (Halmo 2003). The presence of an industrial facility and the associated increase in traffic and workers are likely to have a negative impact on the qualities that render a site sacred. An increase in the number of people in the area would increase the potential for damage to panels of rock art and the disturbance of burials and archaeological sites. While the development of the Riverside East SEZ would necessarily increase the number of people coming to and working in the SEZ, this impact should be greatest during the construction and decommissioning phases of a facility. The operation of a solar facility would require fewer personnel (see Section 9.4.19.2.2).

9.4.17.3 SEZ-Specific Design Features and Design Feature Effectiveness

Programmatic design features to mitigate adverse impacts on significant cultural resources, such as avoidance of significant sites and features, cultural awareness training for the workforce, and measures for addressing possible looting/vandalism issues through formalized agreement documents, are provided in Appendix A, Section A.2.2.

SEZ-specific design features would be determined in consultation with the California SHPO and affected Tribes. Consultation efforts should include discussions on significant archaeological sites and traditional cultural properties and on sacred sites and trails, such as the Salt Song Trail, within or with views of the proposed SEZ. SEZ-specific design features could include the following:

- Significant resources clustered in specific areas, such as those in the vicinity of Palen and Ford Dry Lakes, focused DTC/C-AMA activity areas that retain sufficient integrity, and Native American trails evident in the desert pavement should be avoided.

- Troops in training for WWII often used the same locations that Native Americans did for similar purposes (CSRI 1987). Any excavation of historic sites should take into consideration the potential for the co-location of prehistoric and ethnohistoric components.

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9.4.18 Native American Concerns

As discussed in Section 9.4.17, many Native Americans tend to view their environment holistically and share many environmental and socioeconomic concerns with other ethnic groups. For a discussion of issues of possible Native American concern shared with the population as a whole, several sections in this PEIS should be consulted. General topics of concern are addressed in Section 4.16. Specifically for the proposed Riverside East SEZ, Section 9.4.17 discusses archaeological sites, structures, landscapes, trails, and traditional cultural properties; Section 9.4.8 discusses mineral resources; Section 9.4.9.1.3 discusses water rights and water use; Section 9.4.10 discusses plant species; Section 9.4.11 discusses wildlife species, including wildlife migration patterns; Section 9.4.13 discusses air quality; Section 9.4.14 discusses visual resources; Sections 9.4.19 and 9.4.20 discuss socioeconomics and environmental justice, respectively; and issues of human health and safety are discussed in Section 5.21. This section focuses on concerns that are specific to Native Americans and to which Native Americans bring a distinct perspective.

The NAHC has been consulted to determine which Tribes have a traditional association with the California SEZs (Singleton 2010). All federally recognized Tribes with traditional ties to the proposed Riverside East SEZ have been contacted so that they could identify their concerns regarding solar energy development. Because Tribal land claims are overlapping and because conflicts among the Tribes and with Euro-Americans resulted in the dispersal of many of the original land occupants, contacts have been initiated over a wide area with Tribes that could include descendants of the indigenous inhabitants of the area. Table 9.4.18-1 lists the Tribes contacted with traditional ties to the SEZs in southeastern California. Appendix K lists all federally recognized Tribes contacted for this PEIS.

The concerns of Native Americans, including the Serrano, Cahuilla, Quechan, Mohave and Chemehuevi, over other energy development projects in the region also have been documented and are summarized in the next section. These comments provide important insights into their concerns over energy development in the area.

9.4.18.1 Affected Environment

As discussed in Section 9.4.17.1.2, the territorial boundaries of the Tribes who inhabited the Colorado Desert appear to have been fluid over time. At times they overlapped, and resources were shared where abundant. The Riverside East SEZ may well have been an intermittent joint use area (Knack 1981), lying between the home ranges of the Tribes in the region, but occasionally used by all. The Tribal Traditional Use Area boundaries considered here are those presented by the Tribes themselves to the Indian Claims Commission in the 1950s. While the commission recognized the individual claims for the Chemehuevi, Mohave, and Quechan, most of California, including much of the southeastern part of the state, was judged to be the common territory of the "Indians of California" and is so shown on maps of judicially established Native American land claims (Royster 2008). This category was created by Congress to accommodate the claims of California Native Americans who had lost their identities as

TABLE 9.4.18-1 Federally Recognized Tribes with Traditional Ties to the Southeastern California SEZs

Tribe	Location	State
Agua Caliente Band of Cahuilla Indians	Palm Springs	California
Cabazon Band of Cahuilla Mission Indians	Indio	California
Cahuilla Band of Mission Indians	Anza	California
Campo Kumeyaay Nation	Campo	California
Chemehuevi Indian Tribe	Havasu Lake	California
Colorado River Indian Tribes	Parker	Arizona
Ewiiaapaayp Band of Kumeyaay Indians	Alpine	California
Fort Mojave Indian Tribe	Needles	California
La Posta Band of Kumeyaay Indians	Boulevard	California
Los Coyotes Band of Cahuilla & Cupeno Indians	Warm Springs	California
Manzanita Band of Kumeyaay Indians	Boulevard	California
Morongo Band of Mission Indians	Banning	California
Quechan Indian Tribe of the Fort Yuma Reservation	Yuma	Arizona
Salt River Pima-Maricopa Indian Community	Scottsdale	Arizona
San Manuel Band of Mission Indians	Patton	California
Soboba Band of Luiseño Indians	San Jacinto	California
Sycuan Band of the Kumeyaay Nation	El Cajon	California
Torres-Martinez Desert Cahuilla Indians	Thermal	California
Twentynine Palms Band of Mission Indians	Coachella	California
Viejas Band of Kumeyaay Indians	Alpine	California

distinct tribes, bands, or villages due to the arrival and policies of Euro-Americans (Indian Claims Commission 1958). The claims of the Serrano and Cahuilla, and much of the land claimed by the Mohave and Quechan, lie within the Indians of California territory, but were also presented individually to the commission. In their claims, Tribes appear to have often taken into consideration the claims made by neighboring Tribes. The Mohave submitted two claims. One claim, accepted by the commission, was restricted to areas along the Colorado River, the other, reflecting their view that they were the original inhabitants of southeastern California and all others latecomers, includes much of Chemehuevi and Indians of California territory also claimed by the Serrano and the Cahuilla (Indian Claims Commission 1958; CSRI 2002). The next section presents territorial claims relevant to the Riverside East SEZ.

9.4.18.1.1 Territorial Boundaries

Serrano

Although the primary traditional homeland of the Serrano appears to have been the San Bernardino Mountains west of the SEZ, the Serrano claim includes most of the Riverside East SEZ north of I-10. Their claim extends from Cadiz, California, southeast to a point in the Big Marias 12 mi (19 km) west of the Colorado River, then parallels the Colorado River southward to a point 12 mi (19 km) due west of Blythe and extends westward to Hayfield Reservoir on the CRA. The Halchidhoma Trail appears to have formed the southern boundary of their claim in this part of the desert (CSRI 2002). Serrano descendants live primarily on the Morongo and San Manuel Reservations, where they have mixed with the Cahuilla.

Cahuilla

The Coachella Valley, southwest of the Riverside East SEZ, lies at the heart of Cahuilla territory, southwest of the Riverside East SEZ. However, the northern boundary of their claim matches the southern boundary of the Serrano. It extends eastward to a point 12 mi (19 km) west of Blythe then southward paralleling the Colorado River to a point 3 mi (5 km) south of the Riverside County line. It thus includes much of the southern portion of Chuckwalla Valley and the southeastern lobe of the SEZ (CRSI 2002). Cahuilla descendants may be found on several small reservations in Southern California.

Quechan

While the heart of Quechan territory lies at the confluence of the Gila and Colorado Rivers, well to the south of the SEZ, they have in the past occupied the banks of the Colorado River as far north as Blythe. Their territorial claim includes the eastern half of the SEZ. As presented to the Indian Claims Commission, their eastern boundary extended along the crest of the mountains east of the Colorado River as far north as Blythe, where it jogs westward to the channel of the Colorado River, following the channel northward to a point just north of the Riverside Mountains. It thus includes much of the *Xam Kwatcan* Trail. From the Riverside Mountains it extends southwest to the Little Maria Mountains, then south to the McCoy Mountains and southwest to the Chuckwalla Mountains (Indian Claims Commission 1958). The claim overlaps with those of the Cahuilla, Serrano, and Mohave. Quechan descendants occupy the Fort Yuma Indian Reservation in Arizona and California.

Mohave

The territory claimed by the Mohave lies primarily to the east of the SEZ. They claimed lands on both banks of the Colorado River to the crests of the mountains as far south as Blythe and inland north of a line extending from the Whipple Mountains to the Turtle, the Granite Mountains, the Eagle Mountains, and the San Bernardino Mountains, thus skirting the basins where the SEZ is located (CSRI 2002). Mohave descendants occupy the Fort Mojave Indian Reservation near Needles, California, and may be found on the reservation of the Colorado River Indian Tribes.

Chemehuevi

The Chemhuevi were northern neighbors. Their territorial claims extend only as far south as the Granite Mountains and the Little and Big Maria Mountains. As neighbors they are likely to have traversed this joint-use zone as well (CSRI 2002). Chemehuevi descendants occupy the Chemehuevi Reservation and share the Colorado River Indian Tribes Reservation with the Mohave and other Tribes.

Halchidhoma

The Halchidhoma were forced off their lands along the Colorado River by neighboring Tribes in about 1827, before the United States acquired the area from Mexico. They probably occupied territory around Blythe similar in extent to that claimed by the Mohave in that area. Their descendants have been integrated into the Maricopa Tribe and may be found on the Salt River Pima-Maricopa Indian Reservation in Arizona (Harwell and Kelly 1983).

9.4.18.1.2 Plant Resources

Native Americans tend to view the whole of the landscape as imbued with a lifeforce, including features and objects viewed by Euro-American cultures as inanimate. The importance of landscapes, geophysical features, trails, rock art, and archaeological sites is discussed in Section 9.4.17. To the extent that they are religiously significant, it is important to the Tribes that they retain access to such features located on federal land as required by AIRFA. This section focuses on other Native American concerns, including those that have ecological as well as cultural components. For many Native Americans, the taking of game or the gathering of plants or other natural resources may have been seen as both a sacred and secular act (Stoffle et al. 1990).

The traditional Native American subsistence base in the Colorado Desert was a mixture of floodplain agriculture and hunting and gathering. The proportion of farming to gathering varied with the Tribe and the land they occupied. The Riverside East SEZ does not lie within the heartland of any Tribe and is likely to have been used for hunting and gathering, as the campsites and agave roasting pits found throughout Chuckwalla Valley attest. Traditionally, Native American Tribes in the Colorado Desert practiced a seasonal round in harvesting naturally occurring plant resources. For example, agave heads are harvested in early spring, mesquite produced a summer crop, and fall might include harvests of pine nuts or acorns at higher elevations (Lightfoot and Parish 2009). Proximity to valuable plant resources and water were important factors in determining where Native Americans chose to build their villages and camps. Native Americans commenting on nearby development projects have voiced concern over the loss of culturally important plants used for food, medicine, and ritual purposes and for making tools, implements, and structures. The plant communities observed or likely to be present at the Riverside East SEZ are discussed in Section 9.4.10. Most of the valley bottoms support a combination of Sonora-Mojave Creosotebush-White Bursage Desert Scrub, and North American Warm Desert Wash plant communities. There are some areas of North American Warm Desert

Pavement near Palen Dry Lake, while Ford Dry Lake is classified as North American Warm Desert Playa. There are a few areas of North American Warm Desert Active and Stabilized Dune (NatureServe 2008). While these communities appear sparse most of the year, seasonal rains often result in an explosion of ephemeral herbaceous species. Native Americans commenting on the area for a previous project found that vegetation more luxuriant on the western end of the Chuckwalla Basin and more likely to attract game (CSRI 1987).

Native American populations have traditionally made use of hundreds of native plants. Table 9.4.18.1-1 lists plants often mentioned as important by Native Americans that were either observed at the Riverside East SEZ or are possible members of the cover-type plant communities

TABLE 9.4.18.1-1 Plant Species Important to Native Americans Observed or Likely To Be Present in the Proposed Riverside East SEZ

Common Name	Scientific Name	Status
Food		
Beavertail prickly pear cactus	*Opuntia basilaris*	Possible
Buckwheat	*Eriogonum* spp.	Possible
Cat claw	*Acacia greggii*	Possible
Cholla cactus	*Cylindropuntia* spp.	Observed
Desert almond	*Prunus fasciculatum*	Possible
Honey mesquite	*Prosopis glandolosa*	Observed
Palo Verde	*Cercidium floridum*	Observed
Saltbush	*Atriplex* spp.	Possible
Smoke tree/indigo bush	*Psorothamnus spinosus*	Observed
Sumac	*Rhus* spp.	Possible
Medicine		
Creosotebush	*Larrea tridentata*	Observed
Greasewood	*Sacarbatus vermiculatus*	Possible
Mormon tea	*Ephedra nevadensis*	Possible
Sagebrush	*Artemisia* spp.	Possible
Ritual		
Ironwood	*Olneya tesota*	Observed
Raw Material		
Desert-willow	*Chilopsis linaeris*	Observed
Unspecified		
Boxthorn	*Lycium* sp.	Possible
Brittlebush	*Opuntia* sp.	Observed
Burrowbush	*Ambrosia dumosa*	Observed
Cheesebush	*Hymenoclea salsola*	Observed
Ocotillo	*Fouquieria splendnens*	Possible

Sources: Field visit; Lightfoot and Parish (2009); and NatureServe (2008).

identified in the SEZ. The plants are grouped by use category, but a plant is not necessarily confined to one use. These plants are the dominant species; however, other plants important to Native Americans could occur in the SEZ, depending on localized conditions and the season. Overall, creosotebush dominates the SEZ, while ironwood and mesquite occur in the washes. Mesquite was among the most important food plants. Its long, bean-like pods were harvested in the summer, could be stored, and were widely traded. Groves were managed by burning. Its blossoms are edible, and the cicadas and grasshoppers that live in the groves were collected and eaten by the Cahuilla. Mesquite trunks served as a source of wood, fiber from its inner bark was made into string, its thorns were used for tattooing, and its gum was used as an adhesive, a cleansing agent, and medicine. Saltbush and buckwheat seeds were harvested, processed, and eaten (Lightfoot and Parish 2009).

The proposed Riverside East SEZ includes other plants useful to Native Americans. The leaves of the dominant creosotebush were widely made into tea for medicinal purposes. The trunks of greasewood were used in construction, while its leaves and branches were used in curing, as was a tea made from *Ephedra viridis*, or Mormon tea. Desert-willow was used in house construction and for making bows (Lightfoot and Parish 2009), while ironwood was considered sacred by the Cahuilla (Bean et al. 1978).

9.4.18.1.3 Other Resources

The proposed Riverside East SEZ may also have been a hunting ground. The mountains surrounding the SEZ provide habitat for the reclusive burro deer, a desert-adapted variety of mule deer, and desert bighorn sheep. Traditionally, deer have been an important source of both food and materials, such as bone, sinew, and hide, used to make a variety of implements. Scat and tracks of both burrow deer and bighorn sheep have been observed seasonally within the SEZ (Chaney-Davis et al. 2010). While big game was highly prized, smaller animals such as black-tailed jackrabbits and desert cottontail, both present in the SEZ, traditionally provided a larger proportion of the protein in Native American diets and were an important source for making blankets and clothing (Lightfoot and Parrish 2009). Animals traditionally hunted by Native Americans are listed in Table 9.4.18.1-2.

Mineral resources important to Native Americans in the Colorado Desert include clay suitable for making pottery, stone suitable for the manufacture of both cutting and grinding tools, hematite for pigment, and quartz crystals considered to have healing properties (Halmo 2003). The dry lakebeds may have served as a source of clay, while quartz crystals have been recorded during cultural resource surveys in the area (Eckhardt and Wilson 2009).

As long-time desert dwellers, Native Americans have a great appreciation for the importance of water in a desert environment. They have expressed concern over the use and availability of water for solar energy installations (Halmo 2003; Jackson 2009). One of the main concerns over past industrial projects planned for the region was the contamination of ground water, which they see as ultimately flowing to the Colorado River and affecting the basin as a whole (CSRI 1987).

TABLE 9.4.18.1-2 Animal Species Used by Native Americans Whose Range Includes the Proposed Riverside East SEZ

Common Name	Scientific Name	Status
Mammals		
Badger	*Taxidea taxus*	All year
Bighorn sheep	*Ovis canadensis*	All year
Black-tailed jackrabbit	*Lepus californicus*	All year
Bobcat	*Lynx rufus*	All year
Coyote	*Canis latrans*	All year
Desert cottontail	*Silvilagus audubonii*	All year
Mule deer	*Odocoileus hemionus*	Seasonally
Squirrel	*Spermophilus* sp. and *Ammospermophilus* sp.	All year
Wood rat	*Neotoma* spp.	All year
Birds		
Gambel's quail	*Callipepla gambelii*	All year
Doves		
White-winged dove	*Zenaida asiatica*	Summer
Mourning dove	*Zenaida macrocura*	All year
Reptiles		
Desert tortoise	*Gopherus agassizii*	All year
Rattlesnake	*Crotalus* spp.	All year

Sources: Lightfoot and Parrish (2009); Fowler (1986); Stewart (1983).

Some Tribes share with the populace as a whole concerns over potential danger from electromagnetic fields. In traditional Cahuilla culture, electricity, both natural (lightning) and artificially generated, is considered dangerous and something to be avoided (Bean et al. 1978). They may have concerns over a facility that produces electricity and its associated transmission system.

In addition, Native Americans have expressed concern over ecological segmentation, that is, development that fragments animal habitat and does not provide corridors for movement. They would prefer solar energy development take place on land that has already been disturbed, such as abandoned farmland, rather than on undisturbed ground (Jackson 2009).

9.4.18.2 Impacts

To date, no comments have been received from the Tribes specifically referencing the proposed Riverside East SEZ. However, the Soboba Band of Luiseño Indians, based on their traditional ties to the Cahuilla, find some of the California SEZs to be within their Tribal Traditional Use Area and consider part of the area to be highly sensitive (Ontiveros 2010). The Agua Caliente Band of Cahuilla Indians, commenting on the fast-track solar facilities proposed for within the SEZ, considers much of the proposed Riverside East SEZ to be within their

Traditional Use Area. They are concerned about adverse effects on historical resources including traditional cultural places, sacred places, gathering places, trails, and their associated cultural landscapes (Garcia-Tuck 2010). In a response letter, the Quechan Indian Tribe of Fort Yuma indicates that some of the SEZs lie within their Tribal Traditional Use Area. They stress the importance of evaluating impacts on landscapes as a whole. Because trails have both physical and spiritual components, from their perspective the intrusion of industrial development nearby would have negative effects on trails (Jackson 2009).

In the past, the Chemehuevi have expressed concerns over the Salt Song Trail, which passes down Palen Valley and through the SEZ (Ridder 1998; Halmo 2003), as has the NALC, an inter-tribal organization (Russo 2009). Even if solar energy development within the western portions of the SEZ avoids the trail, facilities would be visible from the trail and would present a visual intrusion.

The impacts that would be expected from solar energy development within the proposed Riverside East SEZ on resources important to Native Americans fall into two major categories: impacts on the landscape and impacts on discrete localized resources.

Potential landscape-scale impacts are those caused by the presence of an industrial facility within a sacred landscape that includes sacred mountains and other geophysical features tied together by a network of culturally important trails. Impacts may be visual—the intrusion of an industrial feature in sacred space; audible—noise from the construction, operation, or decommissioning of a facility detracting from the traditional cultural values of the site; or demographic—the presence of a larger number of outsiders in the area that would increase the chance that the sacredness of the area would be degraded by more foot and motorized traffic. 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 noise effects of solar energy development within the SEZ on the landscape, such as on the Big Maria, Coxcomb, and Eagle Mountains, physical features such as Alligator Rock and Black Rock, on the Salt Song Trail, and on shrines and sacred places (see also Section 9.4.17).

Localized effects could occur both within the SEZ and in adjacent areas. Within the SEZ these effects would include destroying or degrading important plant resources, destroying the habitat of and impeding the movement of culturally important animal species, destroying archaeological sites and burials, and degrading or destroying trails and sacred places. Known resources of this type are scattered throughout the SEZ. Any ground-disturbing activity associated with the development within the SEZ has the potential for destruction of localized resources. Since solar energy facilities cover large tracts of ground, even taking into account the implementation of programmatic design features, it is unlikely that avoidance of all resources would be possible. Programmatic design features (see Appendix A, Section A.2.2) assume that the necessary cultural surveys, site evaluations, and Tribal consultations will occur.

Implementation of programmatic design features, as discussed in Appendix A, Section A.2.2, should eliminate impacts on Tribes' reserved water rights and the potential for groundwater contamination issues.

Whether there are any issues relative to socioeconomics, environmental justice, or health and safety relative to Native American populations is yet to be determined.

9.4.18.3 SEZ-Specific Design Features and Design Feature Effectiveness

Programmatic design features to mitigate impacts of potential concern to Native Americans, such as avoidance of sacred sites, water sources, and tribally important plant and animal species, are provided in Appendix A, Section A.2.2.

The development of solar energy facilities in the state of California requires developers to follow CEC guidelines for interacting with Native American in addition to federal requirements (CEC 2009c). Developers must obtain information from California's NAHC on the presence of Native American sacred sites in the project vicinity and a list of Native Americans who want to be contacted about proposed projects in the region. Table 9.4.18.3-1 lists the tribes recommended for contact by the NAHC.

The need for and nature of SEZ-specific design features regarding potential issues of concern would be determined during government-to-government consultation with affected Tribes.

The Agua Caliente consider the cumulative effects of the development of solar energy facilities in and around the SEZ on Tribally important resources to be "immeasurable and unmitigable" and wishes to be involved in the process of determining project significance (Garcia-Tuck 2010).

TABLE 9.4.18.3-1 Federally Recognized Tribes Listed by the NAHC to Contact Regarding the Riverside East SEZ

Tribe	Location	State
Agua Caliente Band of Cahuilla Indians	Palm Springs	California
Chemehuevi Indian Tribe	Havasu Lake	California
Colorado River Indian Tribes	Parker	Arizona
Cocopah Indian Tribe	Somerton	Arizona
Fort Mojave Indian Tribe	Needles	California
Morongo Band of Mission Indians	Banning	California
Quechan Indian Tribe of the Fort Yuma Reservation	Yuma	Arizona
San Manuel Band of Mission Indians	Patton	California
Torres-Martinez Desert Cahuilla Indians	Thermal	California
Twentynine Palms Band of Mission Indians	Coachella	California

Source: Singleton (2010).

The Quechan Tribe and the Soboba Band of Luiseño Indians have requested that they be consulted at the inception of any solar energy project that would affect resources important to them. The Quechan also suggest that the clustering of large solar energy facilities be avoided, that priority for development be given to lands that have already been disturbed by agricultural or military use, and that the feasibility of placing solar collectors on existing structures be considered, thus minimizing or avoiding the use of undisturbed land (Jackson 2009).

The BLM has actively sought the participation of the Tribes of southeastern California in identifying cultural resources important to Native Americans that would be adversely affected by the construction and operation of three fast-track solar facilities that lie within the SEZ. Tribes have participated in the development of programmatic agreements for each of the proposed Blythe, Genesis, and Palen facilities (see Table 9.4.18.3-2). Under the terms of these agreements, the Tribes are afforded the opportunity to review and comment on BLM's findings of effect on cultural resources important to the Tribes and participate in the development of Historic Properties Treatment Plans, Historic Properties Management Plans, and monitoring and discovery plans in order to ensure the resolution of identified adverse effects on cultural properties important to the Tribes through avoidance, minimization, or mitigation. These plans will include provisions for Tribal cultural specialists to monitor the construction and operation of the facilities for adverse effects on cultural properties (BLM and CA SHPO 2010a–c).

Mitigation of impacts on archaeological sites and traditional cultural properties is discussed in Section 9.4.17.3, in addition to programmatic design features for historic properties discussed in Appendix A, Section A.2.2.

TABLE 9.4.18.3-2 Federally Recognized Tribes Invited to Concur on Programmatic Agreements for the Fast-Track Solar Energy Projects within the Proposed Riverside East SEZ

Tribe	Blythe	Genesis	Palen
Agua Caliente Band of Cahuilla Indians	×	×	×
Augustine Band of Mission Indians	×	×	×
Cabazon Band of Mission Indians	×	×	-
Chemehuevi Indian Tribe	×	×	×
Cocopah Indian Tribe	×	×	-
Colorado River Indian Tribes	×	×	×
Fort Mojave Indian Tribe	×	×	×
Morongo Band of Mission Indians	×	×	×
Quechan Indian Tribe of the Fort Yuma Reservation	×	×	×
Ramona Band of Mission Indians	-	×	×
San Manuel Band of Mission Indians	×	×	×
Soboba Band of Luiseño Indians	-	×	-
Torres-Martinez Desert Cahuilla Indians	×	×	×
Twentynine Palms Band of Mission Indians	×	×	×

Source: BLM and California SHPO (2010a–c).

9.4.19 Socioeconomics

9.4.19.1 Affected Environment

This section describes current socioeconomic conditions and local community services within the ROI surrounding the proposed Riverside East SEZ. The ROI is a one-county area consisting of Riverside County in California. It encompasses the area in which workers are expected to spend most of their salaries and in which a portion of site purchases and nonpayroll expenditures from the construction, operation, and decommissioning phases of the proposed SEZ facility are expected to take place.

9.4.19.1.1 ROI Employment

In 2008, employment in the ROI stood at 839,878 (Table 9.4.19.1-1). Over the period 1999 to 2008, the annual average employment growth rate in Riverside County was 2.5%, slightly higher than the average rate for California (0.9%).

In 2006, the service sector provided the highest percentage of employment in the ROI at 44.3%, followed by wholesale and retail trade with 20.4 % (Table 9.4.19.1-2). Smaller employment shares were held by construction (13.8%) and manufacturing (9.9%).

9.4.19.1.2 ROI Unemployment

Over the period 1999 to 2008, the average rate in Riverside County was 6.0%, slightly higher than the average rate for California (5.8%) (Table 9.4.19.1-3). The unemployment rate for the first 10 months of 2009 (13.8%), contrasts with the rate for 2008 as a whole (8.6%). The average rate for California as a whole (11.6%) was also higher during this period than the corresponding average rates for 2008.

TABLE 9.4.19.1-1 ROI Employment in the Proposed Riverside East SEZ

Location	1999	2008	Average Annual Growth Rate, 1999–2008 (%)
Riverside County	653,552	839,878	2.5
California	15,566,900	17,059,574	0.9

Sources: U.S Department of Labor (2009a,b).

TABLE 9.4.19.1-2 ROI Employment in the Proposed Riverside East SEZ, by Sector, 2006[a]

Industry	Riverside County	% of Total
Agriculture[a]	17,064	3.0
Mining	505	0.1
Construction	78,556	13.8
Manufacturing	56,582	9.9
Transportation and public utilities	21,835	3.8
Wholesale and retail trade	116,343	20.4
Finance, insurance, and real estate	26,964	4.7
Services	252,847	44.3
Other	89	0.0
Total	570,468	

[a] Agricultural employment includes 2007 data for hired farmworkers.

Sources: U.S. Bureau of the Census (2009a); USDA (2009).

TABLE 9.4.19.1-3 ROI Unemployment Rates (%) for the Proposed Riverside East SEZ

Location	1999–2008	2008	2009[a]
Riverside County	6.0%	8.6%	13.8%
California	5.8%	7.2%	11.6%

[a] Rates for 2009 are the average for January through May.

Sources: U.S. Department of Labor (2009a–c).

9.4.19.1.3 ROI Urban Population

The population of Riverside County in 2006 to 2008 was 68% urban, with the majority of urban areas located in the western portion of the county. The largest urban area, Riverside, had an estimated 2008 population of 293,207; other large cities in the western portion of the county in include Moreno Valley (188,676) and Corona (148,336) (Table 9.4.19.1-4). In addition, there are eight cities in the county with a 2008 population between 50,000 and 99,999 persons. The

TABLE 9.4.19.1-4 ROI Urban Population and Income for the Proposed Riverside East SEZ

	Population			Median Household Income ($ 2008)		
City	2000	2008	Average Annual Growth Rate, 2000–2008 (%)	1999	2006–2008	Average Annual Growth Rate, 1999 and 2006–2008 (%)[a]
Riverside	255,166	293,207	1.8	53,620	56,805	0.6
Moreno Valley	142,381	188,676	3.6	61,101	55,178	–1.1
Corona	124,966	148,336	2.2	76,755	78,120	0.2
Murietta	44,282	97,935	10.4	78,424	79,135	0.1
Temecula	57,716	95,853	6.5	76,628	77,394	0.1
Indio	49,116	83,475	6.9	44,579	53,824	2.1
Hemet	58,812	70,821	2.3	34,556	34,974	0.1
Perris	36,189	55,150	5.4	45,774	53,442	1.7
Cathedral City	42,647	51,790	2.5	50,068	42,026	–1.9
Palm Desert	41,155	50,490	2.6	62,208	55,218	–1.3
Lake Elsinore	28,928	50,490	7.1	53,926	58,496	0.9
La Quinta	23,694	43,229	7.8	70,237	78,898	1.3
Coachella	22,724	39,014	7.0	36,810	40,463	1.1
San Jacinto	23,779	37,475	5.9	39,433	47,127	2.0
Norco	24,157	26,455	1.1	80,537	78,141	–0.3
Desert Hot Springs	16,582	23,996	4.7	33,459	38,465	1.6
Blythe	12,155	21,650	7.5	45,480	37,937	–2.0
Rancho Mirage	13,249	16,651	2.9	77,027	NA[b]	NA
Canyon Lake	9,952	11,064	1.3	90,263	NA	NA
Calimesa	7,139	7,478	0.6	48,731	NA	NA
Indian Wells	3,816	5,113	3.7	121,008	NA	NA

[a] Data are averages for the period 2006 to 2008.

[b] NA = data not available.

Source: U.S. Bureau of the Census (2009b–d).

majority of these cities are part of the larger urban region that includes Los Angeles, Riverside and San Bernardino, and most are more than 100 mi (161 km) from the site of the proposed SEZ.

Population growth rates among the larger cities in the western part of the county have varied over the period 2000 and 2008. Murietta grew at an annual rate of 10.4% during this period; higher than average growth was also experienced in Lake Elsinore (7.1%), Temecula (6.5%) and San Jacinto (5.9%). The cities of Hemet (2.3%), Corona (2.2%), Riverside (1.8%) all experienced lower growth rates between 2000 and 2008.

A smaller group of cities is about 70 mi (113 km) from the SEZ site, including Indio (83,475), Cathedral City (51,790), Palm Desert (50,490), Coachella (39,014), La Quinta (43,229), and Desert Hot Springs (23,996). Population growth in these cities between 2000 and 2008 has been relatively high: La Quinta (7.8%), Coachella (7.0%), Indio (6.9%), and Desert Hot Springs (4.7%). One city, Blythe (21,650), is located on the eastern border of the county, on the Colorado River, less than 10 mi (16 km) from the proposed SEZ location, and had a relatively high population growth rate (7.5%) between 2000 and 2008.

9.4.19.1.4 ROI Urban Income

Median household incomes varied considerably across cities in the county. A number of cities in the western San Bernardino County—Murietta ($79,135), Norco ($78,141), and Temecula ($77,394)—had median incomes in 2006-2008 that were higher than the average for the state ($61,154) (Table 9.4.19.1-4). A number of cities in the western portion of the county had relatively low median household incomes, notably, Hemet ($34,974) and San Jacinto ($47,127).

Among the cities in the western part of the county, median income growth rates between 1999 and 2006 to 2008 were highest in San Jacinto (2.0%) and Perris (1.7%), with annual growth rates of less than 1% elsewhere. Moreno Valley (–1.1%) and Norco (–0.3%) had negative growth rates between 1999 and 2006 to 2008. The average median household income growth rate for the state as a whole over this period was less than 0.1%.

Elsewhere in the county, La Quinta ($78,898) had a median household income higher than the state average between 2006 and 2008, while other cities—Palm Desert ($55,218), Indio ($53,824), Cathedral City ($42,026), Coachella ($40,463), and Desert Hot Springs ($38,465)—had median incomes less than the state average. The median income in Blythe in 2006 to 2008 was $37,937. Growth rates in these cities over the period 1999 and 2006–2008 varied from 2.1% in Indio to −2.0% in Blythe.

9.4.19.1.5 ROI Population

Table 9.4.19.1-5 presents recent and projected populations in Riverside County and in the state as a whole. Population in the county stood at 2,087,917 in 2008, having grown at an average annual rate of 3.8% since 2000. Population growth in the county was higher than that for California (1.5%) over the same period. The county population is expected to increase to 2,965,113 by 2021 and to 3,085,643 by 2023.

9.4.19.1.6 ROI Income

Total personal income in Riverside County stood at $63.1 billion in 2007 and has grown at an annual average rate of 4.1% over the period 1998 to 2007 (Table 9.4.19.1-6). Per-capita

TABLE 9.4.19.1-5 ROI Population for the Proposed Riverside East SEZ

Location	2000	2008	Average Annual Growth Rate, 2000–2008 (%)	2021	2023
Riverside County	1,559,039	2,087,917	3.8	2,965,113	3,085,643
California	33,871,648	38,129,628	1.5	44,646,420	45,667,413

Sources: U.S. Bureau of the Census (2009e,f); California Department of Finance (2010).

TABLE 9.4.19.1-6 ROI Personal Income for the Proposed Riverside East SEZ

Location	1998	2007	Average Annual Growth Rate, 1998–2007 (%)
Riverside County			
Total income[a]	42.2	63.1	4.1
Per-capita income	28,886	30,713	0.6
California			
Total income[a]	1,231.7	1,573.6	2.5
Per-capita income	37,339	41,821	1.1

[a] Unless indicated otherwise, values are reported in $ billion 2008.

Sources: U.S. Department of Commerce (2009); U.S. Bureau of Census (2009e,f).

income in the county also rose over the same period at a rate of 0.6%, increasing from $28,886 to $30,713. The personal income growth rate in the county was higher than the state rate (2.5%), but the per-capita income growth rate was slightly lower in the ROI than for California as a whole (1.1%).

Median household income in the ROI stood at $58,168 in Riverside County (U.S. Bureau of the Census 2009d).

9.4.19.1.7 ROI Housing

In 2007, more than 754,415 housing units were located in Riverside County (Table 9.4.19.1-7). Owner-occupied units accounted for approximately 69% of the occupied units in the two counties, with rental housing making up 31% of the total. Vacancy rates in 2007 were 14.2% in Riverside County, and 6.5% of housing units in Riverside County were used for seasonal or recreational purposes. With an overall vacancy rate of 14.2% in the county, there were 106,972 vacant housing units in 2007, of which 33,280 are estimated to be rental units that would be available to construction workers. There were 38,208 seasonal, recreational, or occasional-use units vacant at the time of the 2000 Census.

Housing stock in Riverside County grew at an annual rate of 3.7% over the period 2000 to 2007, with 169,741 new units added to the existing housing stock (Table 9.4.19.1-7).

The median value of owner-occupied housing in Riverside County in 2006–2008 was $380,600 (U.S. Bureau of the Census 2009g).

9.4.19.1.8 ROI Local Government Organizations

The various local and county government organizations in Riverside County are listed in Table 9.4.19.1-8. In addition, there are 11 tribal governments located in the county; members of other tribal groups are located in the state, but their tribal governments are located in adjacent states.

9.4.19.1.9 ROI Community and Social Services

This section describes educational, health care, law enforcement, and firefighting resources in the ROI.

TABLE 9.4.19.1-7 ROI Housing Characteristics for the Proposed Riverside East SEZ

Parameter	2000	2007
Riverside County		
Owner-occupied	348,532	446,017
Rental	157,686	201,426
Vacant units	78,456	106,972
Seasonal and recreational use	38,208	NA[a]
Total units	584,674	754,415

[a] NA = data not available.

Sources: U.S. Bureau of the Census (2009h,i).

TABLE 9.4.19.1-8 ROI Local Government Organizations and Social Institutions for the Proposed Riverside East SEZ

Governments	
City	
Blythe	Lake Elsinore
Calimesa	Moreno Valley
Canyon Lake	Murietta
Cathedral City	Norco
Coachella	Palm Desert
Corona	Perris
Desert Hot Springs	Rancho Mirage
Hemet	Riverside
Indian Wells	San Jacinto
Indio	Temecula
La Quinta	
County	
Riverside County	
Tribal	
Agua Caliente Band of Cahuilla Indians of the Agua Caliente Indian Reservation, California	
Augustine Band of Cahuilla Mission Indians of the Augustine Reservation, California	
Cabazon Band of Mission Indians, California	
Cahuilla Band of Mission Indians of the Cahuilla Reservation, California	
Ione Band of Miwok Indians of California	
Morongo Band of Cahuilla Mission Indians of the Morongo Reservation, California	
Pechanga Band of Luiseno Mission Indians of the Pechanga Reservation, California	
Ramona Band or Village of Cahuilla Mission Indians of California	
Santa Rosa Band of Cahuilla Indians, California	
Soboba Band of Luiseno Indians, California	
Torres Martinez Desert Cahuilla Indians, California	

Sources: U.S. Bureau of the Census (2009b); U.S. Department of Interior (2010).

Schools

Table 9.4.19.1-9 provides summary statistics for enrollment and educational staffing and two indices of educational quality—student-teacher ratios and levels of service (number of teachers per 1,000 population). The student-teacher ratio in Riverside County schools in 2007 was 22.1, while the level of service is slightly higher in Riverside County was 9.3.

Health Care

There were 3,277 physicians in Riverside County in 2007, and the number of doctors per 1,000 population was 1.6 (Table 9.4.19.1-10).

TABLE 9.4.19.1-9 ROI School District Data for the Proposed Riverside East SEZ, 2007

Location	Number of Students	Number of Teachers	Student-Teacher Ratio	Level of Service[a]
Riverside County	421,642	19,105	22.1	9.3

[a] Number of teachers per 1,000 population.

Source: NCES (2009).

TABLE 9.4.19.1-10 Physicians in the ROI for the Proposed Riverside East SEZ, 2007

Location	Number of Primary Care Physicians	Level of Service[a]
Riverside County	3,277	1.6

[a] Number of physicians per 1,000 population.

Source: AMA (2009).

Public Safety

Riverside County has 1,965 officers and would provide law enforcement services to the SEZ (Table 9.4.19.1-11), and currently, there are 2,205 professional firefighters in the. Levels of service of police protection are 1.0 in Riverside County and 1.1 for fire services.

9.4.19.1.10 ROI Social Change

Community social structures and other forms of social organization within the ROI are related to various factors, including historical development, major economic activities and sources of employment, income levels, race and ethnicity, and forms of local political organization. Although an analysis of the character of community social structures is beyond the scope of the current programmatic analysis, project-level NEPA analyses would include a description of ROI social structures, contributing factors, their uniqueness, and consequently, the susceptibility of local communities to various forms of social disruption and social change.

Various energy development studies have suggested that once the annual growth in population is between 5% and 15% in smaller rural communities, alcoholism, depression, suicide, social conflict, divorce, and delinquency would increase, and levels of community satisfaction would deteriorate (BLM 1980, 1983, 1996). Tables 9.4.19.1-12 and 9.4.19.1-13 present data for a number of indicators of social change, including violent crime and property

TABLE 9.4.19.1-11 Public Safety Employment in the ROI

Location	Number of Police Officers[a]	Level of Service[b]	Number of Firefighters[c]	Level of Service
Riverside County	1,965	1.0	2,205	1.1

[a] 2007 data.

[b] Number per 1,000 population.

[c] 2008 data; number does not include volunteers.

Sources: U.S. Department of Justice (2008); Fire Departments Network (2009).

TABLE 9.4.19.1-12 County and ROI Crime Rates in the ROI for the Proposed Riverside East SEZ[a]

	Violent Crime[b]		Property Crime[c]		All Crime	
	Offenses	Rate	Offenses	Rate	Offenses	Rate
Riverside County	7,351	3.5	57,839	27.5	65,190	31.0

[a] Rates are the number of crimes per 1,000 population.

[b] Violent crime includes murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault.

[c] Property crime includes burglary, larceny, theft, motor vehicle theft, and arson.

Sources: U.S. Department of Justice (2009a, b).

crime rates, alcoholism and illicit drug use, and metal health and divorce, that might be used to indicate social change.

Violent crime in Riverside County in 2007 stood at 3.5 per 1,000 population (Table 9.4.19.1-12), while the property-related crime rate was 27.5, producing an overall crime rate of 31.0.

Other measures of social change—alcoholism, illicit drug use, and mental health—are not available at the county level, and thus are presented for the SAMHSA region in which the county is located (Table 9.4.19.1-13).

9.4.19.1.11 ROI Recreation

There are various areas in the vicinity of the proposed SEZ that are used for recreational purposes, with natural, ecological, and cultural resources in the ROI attracting visitors for a

TABLE 9.4.19.1-13 Alcoholism, Drug Use, Mental Health, and Divorce in the Proposed Riverside East SEZ ROI[a]

Geographic Area	Alcoholism	Illicit Drug Use	Mental Health[b]	Divorce[c]
California Region 13 (includes Riverside County)	8.5	3.2	8.6	–[d]
California				4.3

[a] Data for alcoholism and drug use represent the percentage of the population over 12 years of age with dependence or abuse of alcohol, illicit drugs. Data are averages for 2004 to 2006.

[b] Data for mental health represent the percentage of the population over 18 years of age suffering from serious psychological distress. Data are averages for 2002 to 2004.

[c] Divorce rates are the number of divorces per 1,000 population. Data are for 1990.

[d] A dash indicates not applicable.

Sources: SAMHSA (2009); CDC (2009).

range of activities, including hunting, fishing, boating, canoeing, wildlife watching, camping, hiking, horseback riding, mountain climbing, and sightseeing. These areas are discussed in Section 9.4.5.

Because the number of visitors using state and federal lands for recreational activities is not available from the various administering agencies, the value of recreational resources in these areas, based solely on the number of recorded visitors is likely to be an underestimation. In addition to visitation rates, the economic valuation of certain natural resources can also be assessed in terms of the potential recreational destination for current and future users, that is, their nonmarket value (see Section 5.17.1.1.1).

Another method is to estimate the economic impact of the various recreational activities supported by natural resources on public land in the vicinity of the proposed solar development, by identifying sectors in the economy in which expenditures on recreational activities occur. Not all activities in these sectors are directly related to recreation on state and federal lands, with some activity occurring on private land (e.g., dude ranches, golf courses, bowling alleys, and movie theaters). Expenditures associated with recreational activities form an important part of the economy of the ROI. In 2007, 75,858 people were employed in Riverside County in the various sectors identified as recreation, constituting 8.9% of total ROI employment (Table 9.4.19.1-14). Recreation spending also produced almost $1,871 million in income in the ROI in 2007. The primary sources of recreation-related employment were eating and drinking places.

TABLE 9.4.19.1-14 ROI Recreation Sector Activity for the Proposed Riverside East SEZ, 2007

ROI	Employment	Income ($ million)
Amusement and recreation services	5,289	172.5
Automotive rental	605	27.5
Eating and drinking places	54,938	1,130.4
Hotels and lodging places	8,589	300.7
Museums and historic sites,	299	21.6
Recreational vehicle parks and campsites	602	16.8
Scenic tours	1,742	114.5
Sporting goods retailers	3,794	86.5
Total ROI	75,858	1,870.5

Source: MIG, Inc. (2009).

9.4.19.2 Impacts

The following analysis begins with a description of the common impacts of solar development, including common impacts on recreation and on social change. These impacts would occur regardless of the solar technology developed in the SEZ. The impacts of facilities employing various solar energy technologies are analyzed in detail in subsequent sections.

9.4.19.2.1 Common Impacts

Construction and operation of a solar energy facility at the proposed Riverside East SEZ would produce direct and indirect economic impacts. Direct impacts would occur as a result of expenditures on wages and salaries, procurement of goods and services required for project construction and operation, and the collection of state sales and income taxes. Indirect impacts would occur as project wages and salaries, procurement expenditures, and tax revenues subsequently circulate through the economy of each state, thereby creating additional employment, income, and tax revenues. Facility construction and operation would also require in-migration of workers and their families into the ROI surrounding the site, and this would affect population, rental housing, health service employment, and public safety employment. Socioeconomic impacts common to all utility-scale solar energy facilities are discussed in detail in Section 5.17. These impacts will be minimized through the implementation of programmatic design features described in Appendix A, Section A.2.2.

Recreation Impacts

Estimating the impact of solar facilities on recreation is problematic because it is not clear how solar development in the SEZ would affect recreational visitation and nonmarket values (i.e., the value of recreational resources for potential or future visits; see Section 5.17.1.2.3). While it is clear that some land in the ROI would no longer be accessible for recreation, the majority of popular recreational locations would be precluded from solar development. It is also possible that solar facilities in the ROI would be visible from popular recreation locations and that construction workers residing temporarily in the ROI would occupy accommodations otherwise used for recreational visits, thus reducing visitation and consequently affecting the economy of the ROI.

Social Change

Although an extensive literature in sociology documents the most significant components of social change in energy boomtowns, the nature and magnitude of the social impact of energy facilities in small rural communities are still unclear (see Section 5.17.1.1.4). While some degree of social disruption is likely to accompany large-scale in-migration during the boom phase, there is insufficient evidence to predict the extent to which specific communities are likely to be affected, which population groups within each community are likely to be most affected, and the extent to which social disruption is likely to persist beyond the end of the boom period (Smith et al. 2001). Accordingly, because of the lack of adequate social baseline data, it has been suggested that social disruption is likely to occur once an arbitrary population growth rate associated with solar energy development projects has been reached, with an annual rate of between 5% and 10% growth in population assumed to result in a breakdown in social structuresand a consequent increase in alcoholism, depression, suicide, social conflict, divorce, delinquency, and deterioration in levels of community satisfaction (BLM 1980, 1983, 1996).

In overall terms, the in-migration of workers and their families into the ROI would represent an increase of 0.1% in county population during construction of the trough technology, with smaller increases for the power tower, dish engine, and PV technologies, and during the operation of each technology. While it is possible that some construction and operations workers will choose to locate in communities closer to the SEZ, the lack of available housing in smaller rural communities in the ROI to accommodate all in-migrating workers and families, and the insufficient range of housing choices to suit all solar occupations, many workers are likely to commute to the SEZ from larger communities elsewhere in the ROI, thereby reducing the potential impact of solar facilities on social change. Regardless of the pace of population growth associated with the commercial development of solar resources and the likely residential location of in-migrating workers and families in communities some distance from the SEZ itself, the number of new residents from outside the ROI is likely to lead to some demographic and social change in small rural communities in the ROI. Communities hosting solar facilities are likely to be required to adapt to a different quality of life, with a transition away from a more traditional lifestyle involving ranching and taking place in small, isolated, close-knit, homogenous communities with a strong orientation toward personal and family relationships, toward a more urban lifestyle, with increasing cultural and ethnic diversity, and increasing dependence on formal social relationships within the community.

9.4.19.2.2 Technology-Specific Impacts

The economic impacts of solar energy development in the proposed SEZ were measured in terms of employment, income, state tax revenues (sales and income), population in-migration, housing, and community service employment (education, health, and public safety). More information on the data and methods used in the analysis are provided in Appendix M.

The assessment of the impact of the construction and operation of each technology was based on SEZ acreage, assuming 80% of the area could be developed. To capture a range of possible impacts, solar facility size was estimated on the basis of land requirements of various solar technologies, assuming that 9 acres/MW (0.04 km^2/MW) would be required for power tower, dish engine, and PV technologies, and 5 acres/MW (0.02 km^2/MW) for solar trough technologies. Impacts of multiple facilities employing a given technology at each SEZ were assumed to be the same as impacts for a single facility with the same total capacity. Construction impacts were assessed for a representative peak year of construction, assumed to be 2021 for each technology. Construction impacts assumed that a maximum of three projects could be constructed within a given year, with a corresponding maximum land disturbance of up to 9,000 acres (36 km^2). For operations impacts, a representative first year of operations was assumed to be 2023 for trough and power tower, 2022 for the minimum facility size for dish engine and PV, and 2023 for the maximum facility size for these technologies. The years of construction and operations were selected as representative of the entire 20-year study period, because they are the approximate midpoint; construction and operations could begin earlier.

Solar Trough

Construction. Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of solar trough technologies would be up to 15,633 jobs (Table 9.4.19.2-1). Construction activities would constitute 1.3% of total ROI employment. A solar development would also produce $927.3 million in income. Direct sales taxes would be $41.2 million; direct income taxes $18.9 million.

Given the scale of construction activities and the likelihood of local worker availability in the required occupational categories, construction of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 2,229 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) would mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with 1,114 rental units expected to be occupied in the ROI. This occupancy rate would represent 2.3% of the vacant rental units expected to be available in the ROI.

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

TABLE 9.4.19.2-1 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ with Trough Facilities[a]

Parameter	Maximum Annual Construction Impacts	Operations Impacts
Employment (no.)		
Direct	5,232	7,079
Total	15,633	11,670
Income[b]		
Total	927.3	423.9
Direct state taxes[b]		
Sales	41.2	0.5
Income	18.9	11.2
BLM payments ($ million 2008)		
Rental	NA[d]	63.7
Capacity[e]	NA	213.5
In-migrants (no.)	2,229	902
Vacant housing[c] (no.)	1,114	812
Local community service employment		
Teachers (no.)	21	8
Physicians (no.)	4	1
Public safety (no.)	5	2

[a] Construction impacts are based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 1,800 MW (corresponding to 9,000 acres [36 km^2] of land disturbance) could be built. Operations impacts were based on full build-out of the site, producing a total output of 32,469 MW.

[b] Unless indicated otherwise, values are reported in $ million 2008.

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

[d] Not applicable.

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

21 new teachers, 4 physicians, and 5 public safety employees (career firefighters and uniformed police officers) would be required in the ROI. These increases would represent 0.1% of total ROI employment expected in these occupations.

Operations. Total operations employment impacts in the ROI (including direct and indirect impacts) of a build-out using solar trough technologies would be 11,670 jobs (Table 9.4.19.2-1). Such a solar development would also produce $423.9 million in income. Direct sales taxes would be $0.5 million; direct income taxes $11.2 million. Based on fees established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010i), acreage rental payments would be $63.7 million, and solar generating capacity payments, at least $213.5 million.

Given the likelihood of local worker availability in the required occupational categories, operation of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 902 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with 812 owner-occupied units expected to be occupied in the ROI.

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

Power Tower

Construction. Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of power tower technologies would be up to 6,227 jobs (Table 9.4.19.2-2). Construction activities would constitute 0.5% of total ROI employment. Such a solar development would also produce $369.3 million in income. Direct sales taxes would be less than $16.4 million; direct income taxes $7.5 million.

Given the scale of construction activities and the likelihood of local worker availability in the required occupational categories, construction of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 888 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with

TABLE 9.4.19.2-2 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ with Power Tower Facilities[a]

Parameter	Maximum Annual Construction Impacts	Operations Impacts
Employment (no.)		
Direct	2,084	3,656
Total	6,227	5,135
Income[b]		
Total	369.3	171.1
Direct state taxes[b]		
Sales	16.4	0.1
Income	7.5	5.8
BLM payments ($ million 2008)		
Rental	NA[d]	63.7
Capacity[e]	NA	118.6
In-migrants (no.)	888	466
Vacant housing[c] (no.)	444	419
Local community service employment		
Teachers (no.)	8	4
Physicians (no.)	1	1
Public safety (no.)	2	1

[a] Construction impacts are based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 1,000 MW (corresponding to 9,000 acres [36 km^2] of land disturbance) could be built. Operations impacts were based on full build-out of the site, producing a total output of 18,038 MW.

[b] Unless indicated otherwise, values are reported in $ million 2008.

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

[d] Not applicable.

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

444 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.5% of the vacant rental units expected to be available in the ROI.

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

Operations. Total operations employment impacts in the ROI (including direct and indirect impacts) of a build-out using power tower technologies would be 5,135 jobs (Table 9.4.19.2-2). Such a solar development would also produce $171.1 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes $5.8 million. Based on fees established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010i), acreage rental payments would be $63.7 million, and solar generating capacity payments, at least $118.6 million.

Given the likelihood of local worker availability in the required occupational categories, operation of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 466 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels and mobile home parks) would mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with 419 owner-occupied units expected to be required in the ROI.

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

Dish Engine

Construction. Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of dish engine technologies would be up to 2,531 jobs (Table 9.4.19.2-3). Construction activities would constitute 0.2% of total ROI employment. Such a solar development would also produce $150.1 million in income. Direct sales taxes would be less than $6.7 million, with direct income taxes of $3.1 million.

Given the scale of construction activities and the likelihood of local worker availability in the required occupational categories, construction of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with

TABLE 9.4.19.2-3 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ with Dish Engine Facilities[a]

Parameter	Maximum Annual Construction Impacts	Operations Impacts
Employment (no.)		
Direct	847	3,553
Total	2,531	4,990
Income[b]		
Total	150.1	166.2
Direct state taxes[b]		
Sales	6.7	0.1
Income	3.1	5.6
BLM payments ($ million 2008)		
Rental	NA[d]	63.7
Capacity[e]	NA	118.6
In-migrants (no.)	361	453
Vacant housing[c] (no.)	180	407
Local community service employment		
Teachers (no.)	3	4
Physicians (no.)	1	1
Public safety (no.)	1	1

a Construction impacts are based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 1,000 MW (corresponding to 9,000 acres [36 km^2] of land disturbance) could be built. Operations impacts were based on full build-out of the site, producing a total output of 18,038 MW.

b Unless indicated otherwise, values are reported in $ million 2008.

c Construction activities would affect vacant rental housing; operations activities would affect vacant owner-occupied housing.

d Not applicable.

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

361 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with 180 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.4% of the vacant rental units expected to be available in the ROI.

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

Operations. Total operations employment impacts in the ROI (including direct and indirect impacts) of a build-out using dish engine technologies would be 4,990 jobs (Table 9.4.19.2-3). Such a solar development would also produce $166.2 million in income. Direct sales taxes would be $0.1 million; direct income taxes $5.6 million. Based on fees established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010i), acreage rental payments would be $63.7 million, and solar generating capacity payments, at least $118.6 million.

Given the likelihood of local worker availability in the required occupational categories, operation of a dish engine solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 453 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with 407 owner-occupied units expected to be required in the ROI.

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

Photovoltaic

Construction. Total construction employment impacts in the ROI (including direct and indirect impacts) from the use of PV technologies would be up to 1,181 jobs (Table 9.4.19.2-4). Construction activities would constitute 0.1 % of total ROI employment. Such a solar

TABLE 9.4.19.2-4 ROI Socioeconomic Impacts Assuming Full Build-out of the Proposed Riverside East SEZ with PV Facilities[a]

Parameter	Maximum Annual Construction Impacts	Operations Impacts
Employment (no.)		
Direct	395	354
Total	1,181	498
Income[b]		
Total	70.0	16.6
Direct state taxes[b]		
Sales	3.1	<0.1
Income	1.4	0.6
BLM payments ($ million 2008)		
Rental	NA[d]	63.7
Capacity[e]	NA	94.9
In-migrants (no.)	168	45
Vacant housing[c] (no.)	84	41
Local community service employment		
Teachers (no.)	2	0
Physicians (no.)	0	0
Public safety (no.)	0	0

a Construction impacts are based on the development at the site in a single year; it was assumed that several facilities with a combined capacity of up to 1,000 MW (corresponding to 9,000 acres [36 km^2] of land disturbance) could be built. Operations impacts were based on full build-out of the site, producing a total output of 18,038 MW.

b Unless indicated otherwise, values are reported in $ million 2008.

c Construction activities would affect vacant rental housing; operations activities would affect owner-occupied housing.

d Not applicable.

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

development would also produce $70.0 million in income. Direct sales taxes would be less than $3.1 million; direct income taxes, of $1.4 million.

Given the scale of construction activities and the likelihood of local worker availability in the required occupational categories, construction of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 168 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility construction on the number of vacant rental housing units is not expected to be large, with 84 rental units expected to be occupied in the ROI. This occupancy rate would represent 0.2% of the vacant rental units expected to be available in the ROI.

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

Operations. Total operations employment impacts in the ROI (including direct and indirect impacts) of a build-out using PV technologies would be 498 jobs (Table 9.4.19.2-4). Such a solar development would also produce $16.6 million in income. Direct sales taxes would be less than $0.1 million; direct income taxes less than $0.6 million. Based on fees established by the BLM in its Solar Energy Interim Rental Policy (BLM 2010i), acreage rental payments would be $63.7 million, and solar generating capacity payments, at least $94.9 million.

Given the likelihood of local worker availability in the required occupational categories, operation of a solar facility means that some in-migration of workers and their families from outside the ROI would be required, with 45 persons in-migrating into the ROI. Although in-migration may potentially affect local housing markets, the relatively small number of in-migrants and the availability of temporary accommodations (hotels, motels, and mobile home parks) mean that the impact of solar facility operation on the number of vacant owner-occupied housing units is not expected to be large, with 41 owner-occupied units expected to be required in the ROI.

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

9.4.19.3 SEZ-Specific Design Features and Design Feature Effectiveness

No SEZ-specific design features addressing socioeconomic impacts have been identified for the proposed Riverside East SEZ. Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM's proposed Solar Energy Program, would reduce the potential for socioeconomic impacts during all project phases.

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9.4.20 Environmental Justice

9.4.20.1 Affected Environment

On February 11, 1994, the President signed E. O. 12898,"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," which formally requires federal agencies to incorporate environmental justice as part of their missions (*Federal Register*, Volume 59, page 7629, Feb. 11, 1994). Specifically, it directs them to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations.

The analysis of the impacts of solar energy projects on environmental justice issues follows guidelines described in the CEQ's *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997). The analysis method has three parts: (1) a description of the geographic distribution of low-income and minority populations in the affected area is undertaken; (2) an assessment is conducted to determine whether construction and operation would produce impacts that are high and adverse; and (3) if impacts are high and adverse, a determination is made as to whether they disproportionately affect minority and low-income populations.

Construction and operation of solar energy projects in the proposed Riverside East SEZ could affect environmental justice if any adverse health and environmental impacts resulting from either phase of development are significantly high and if these impacts would disproportionately affect minority and low-income populations. If the analysis determines that health and environmental impacts are not significant, there can be no disproportionate impacts on minority and low-income populations. In the event impacts are significant, disproportionality would be determined by comparing the proximity of any high and adverse impacts with the location of low-income and minority populations.

The analysis of environmental justice issues associated with the development of solar facilities considered impacts within the proposed Riverside East SEZ and an associated 50-mi (80-km) radius around the boundary of the SEZ. A description of the geographic distribution of minority and low-income groups in the affected area was based on demographic data from the 2000 Census (U.S. Bureau of the Census 2009k,l). The following definitions were used to define minority and low-income population groups:

- **Minority.** Persons are included in the minority category if they identify themselves as belonging to any of the following racial groups: (1) Hispanic, (2) Black (not of Hispanic origin) or African American, (3) American Indian or Alaska Native, (4) Asian, or (5) Native Hawaiian or Other Pacific Islander.

  Beginning with the 2000 Census, where appropriate, the census form allows individuals to designate multiple population group categories to reflect their ethnic or racial origin. In addition, persons who classify themselves as being of multiple racial origin may choose up to six racial groups as the basis of their racial origins. The term minority includes all persons, including those classifying themselves in multiple racial categories, except those who classify themselves as not of Hispanic origin and as White or “Other Race” (U.S. Bureau of the Census 2009k).

The CEQ guidance proposed that minority populations should be identified where either (1) the minority population of the affected area exceeds 50%, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The PEIS applies both criteria in using the Census Bureau data for census block groups, wherein consideration is given to the minority population that is both greater than 50% and 20 percentage points higher than in the state (the reference geographic unit).

- Low-Income. Individuals fall below the poverty line. The poverty line takes into account family size and age of individuals in the family. In 1999, for example, the poverty line for a family of five with three children younger than 18 was $19,882. For any given family below the poverty line, all family members are considered as being below the poverty line for the purposes of analysis (U.S. Bureau of the Census 2009l).

The data in Table 9.4.20.1-1 show the minority and low-income composition of the total population located in the proposed SEZ based on 2000 Census data and CEQ guidelines. Individuals identifying themselves as Hispanic or Latino are included in the table as a separate entry. However, because Hispanics can be of any race, this number also includes individuals also identifying themselves as being part of one or more of the population groups listed in the table.

A large number of minority and low-income individuals are located in the 50-mi (80-km) area around the boundary of the SEZ. Within the 50-mi (80-km) radius in Arizona, 24.5% of the population is classified as minority, while 13.0% is classified as low-income. The number of minority individuals does not exceed 50% of the total population in the area, and the number of minority individuals exceeds the state average by 20 percentage points or more, meaning that there is no minority population in the SEZ area based on 2000 Census data and CEQ guidelines. The number of low-income individuals does not exceed the state average by 20 percentage points or more and does not exceed 50% of the total population in the area, meaning that there are no low-income populations in the SEZ.

Within the 50-mi (80-km) radius in California, 60.3% of the population is classified as minority, while 20.5% is classified as low-income. While the number of minority individuals does not exceed the state average by 20 percentage points or more, the number of minority individuals exceeds 50% of the total population in the area meaning that there is a minority population in the SEZ as a whole area based on 2000 Census data and CEQ guidelines. The number of low-income individuals does not exceed the state average by 20 percentage points or

TABLE 9.4.20.1-1 Minority and Low-Income Populations within the 50-mi (80-km) Radius Surrounding the Proposed Riverside East SEZ

Parameter	Arizona	California
Total population	66,364	255,043
White, non-Hispanic	53,608	101,207
Hispanic or Latino	8,717	131,953
Non-Hispanic or Latino minorities	4,039	21,883
One race	3,196	18,253
Black or African American	354	11,721
American Indian or Alaskan Native	2,426	2,184
Asian	341	3,513
Native Hawaiian or Other Pacific Islander	46	453
Some other race	29	382
Two or more races	843	3,630
Total minority	12,756	153,836
Low-income	8,496	46,222
Percentage minority	19.2	60.3
State percent minority	24.5	40.5
Percentage low-income	13.0	20.5
State percent low-income	13.9	14.2

Source: U.S Bureau of the Census (2009k,l).

more and does not exceed 50% of the total population in the area, meaning that there are no low-income populations in the SEZ as a whole.

Figures 9.4.20.1-1 and 9.4.20.1-2 show the locations of the minority and low-income population groups within the 50-mi (80-km) radius around the boundary of the SEZ.

In the California portion of the 50-mi (80-km) radius around the SEZ, more than 50% of the population is classified as minority in block groups located in the city of Blythe itself and to the immediate west and southwest of the city; in the western part of the county in the vicinity of Desert Hot Springs; in Imperial County in the vicinity of Calipatria and Westmoreland; and in the Fort Yuma Indian Reservation in the Colorado River valley. Block groups with a minority population which is more than 20 percentage points higher than the state average are located in the city of Blythe, to the immediate west of the city, and in the western portions of the 50-mi (80-km) radius in the vicinity of Indio and Coachella. In the Arizona portion of the 50-mi (80-km) radius, more than 50% of the population is classified as minority in block groups located

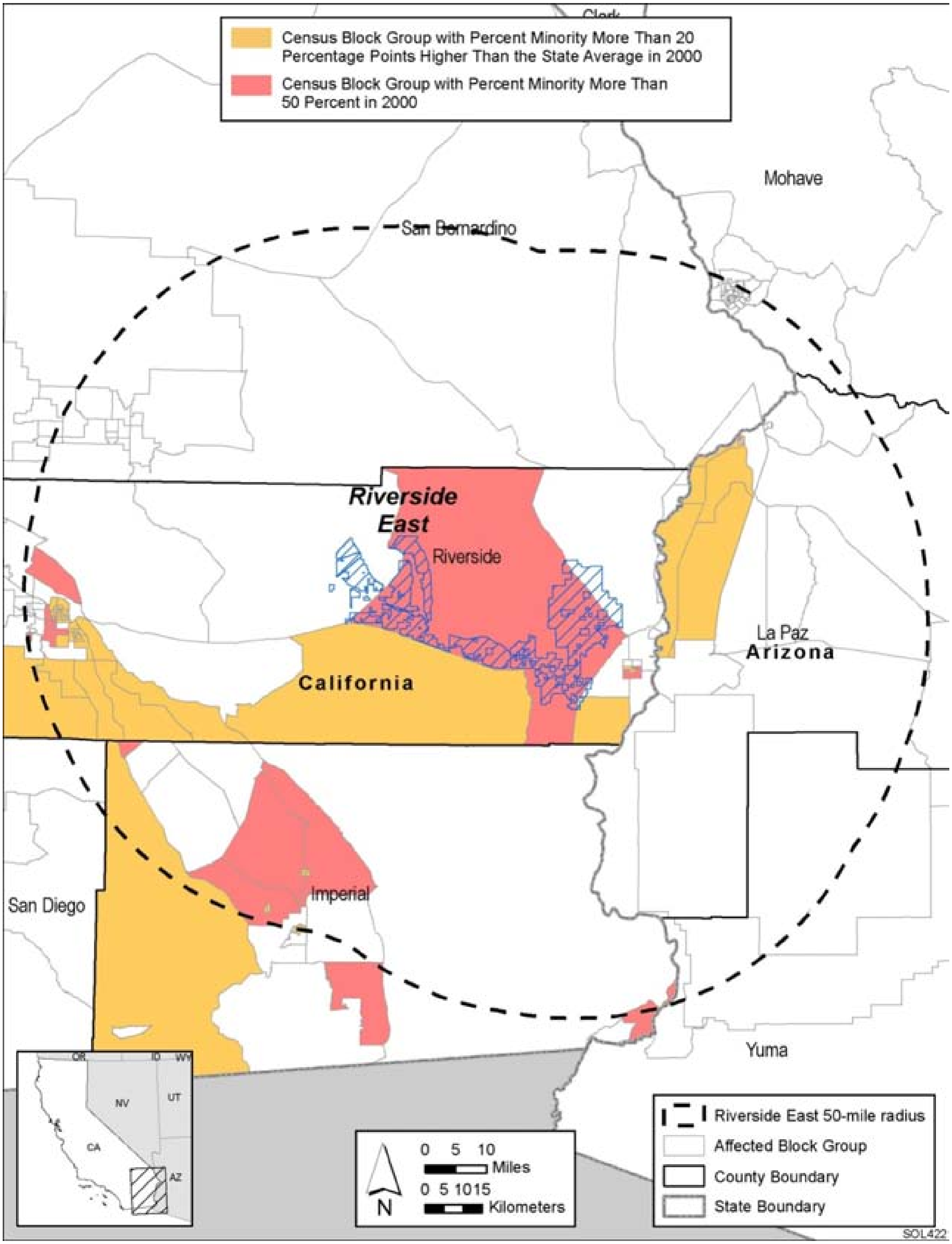

FIGURE 9.4.20.1-1 Minority Population Groups within the 50-mi (80-km) Radius Surrounding the Proposed Riverside East SEZ

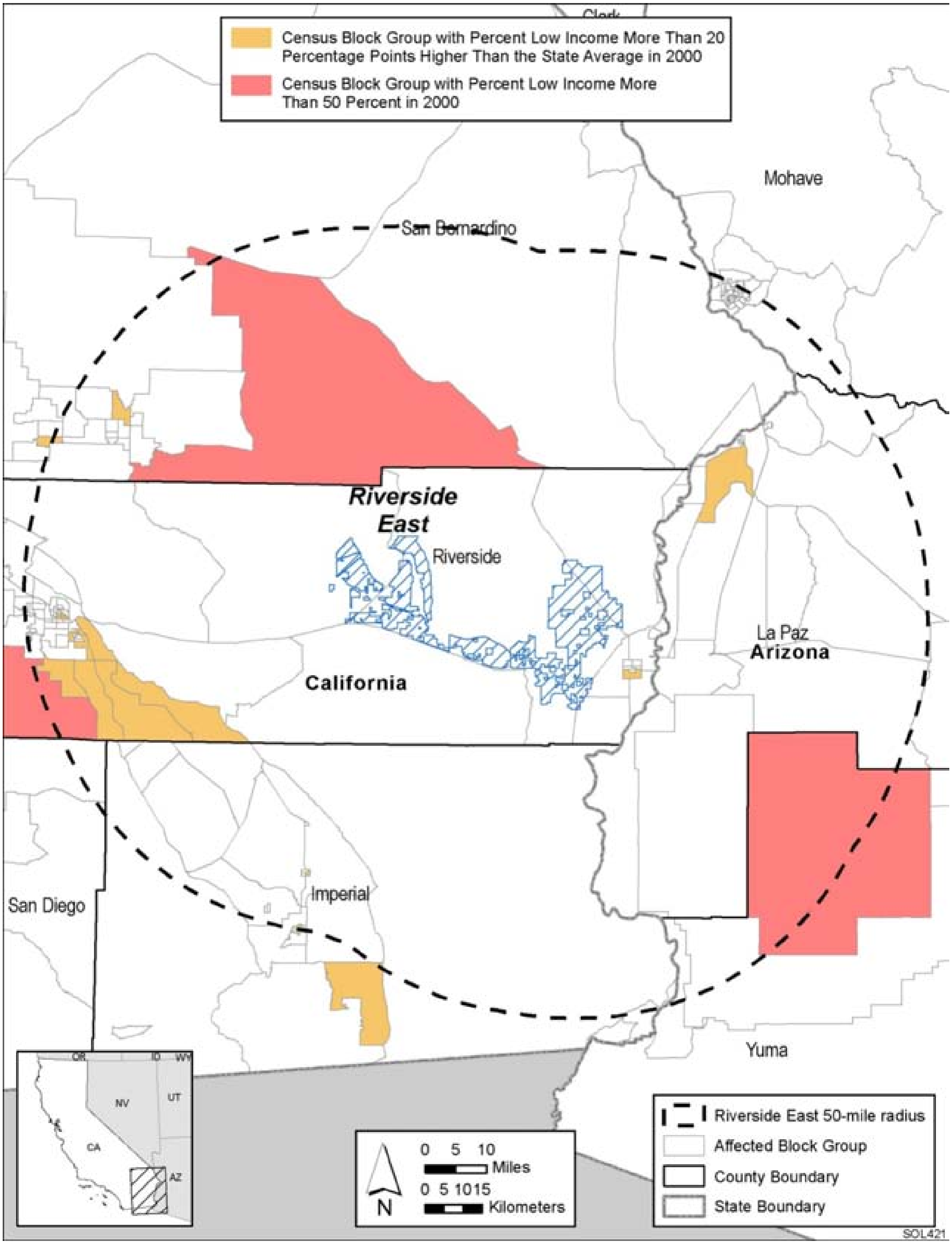

FIGURE 9.4.20.1-2 Low-Income Population Groups within the 50-mi (80-km) Radius Surrounding the Proposed Riverside East SEZ

in the Colorado River Indian Reservation, in the city of Parker, and to the east of the Colorado River, south of Blythe.

Census block groups in the 50-mi (80-km) radius in California that have more than 50% of their population classified as low-income are located in the vicinity of the city of Twentynine Palms, in the western portion of Riverside County, and in Arizona, to the northeast of Yuma. Census block group in California where the low-income population is more than 20 percentage points higher than the state average, are located in the city of Blyth, in the western portion of the county, in the Colorado River Indian Reservation, and in the vicinity of the city of Victorville.

9.4.20.2 Impacts

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

Potential impacts on low-income and minority populations could be incurred as a result of the construction and operation of solar facilities involving each of the four technologies. Although impacts are likely to be small, there are minority populations defined by CEQ guidelines (Section 9.4.20.1) within the 50-mi (80-km) radius around the boundary of the SEZ, meaning that any adverse impacts of solar projects could disproportionately affect minority populations. Because there are also low-income populations within the 50-mi (80-km) radius, according to CEQ guidelines, there could also be impacts on low-income populations.

9.4.20.3 SEZ-Specific Design Features and Design Feature Effectiveness

No SEZ-specific design features addressing environmental justice impacts have been identified for the proposed Riverside East SEZ. Implementing the programmatic design features described in Appendix A, Section A.2.2, as required under BLM's proposed Solar Energy Program, would reduce the potential for environmental justice impacts during all project phases.

9.4.21 Transportation

The proposed Riverside East SEZ is accessible by road. An interstate highway passes through it, and eight small airports are located within 72 mi (116 km) of the SEZ. General transportation considerations and impacts are discussed in Sections 3.4 and 5.19, respectively.

9.4.21.1 Affected Environment

I-10 passes along the southern edge and then through the proposed Riverside East SEZ as shown in Figure 9.4.21-1. The town of Blythe is situated on the eastern border of the SEZ. To the west of the SEZ, I-10 passes through Indio, about 47 mi (76 km) from the western edge of the SEZ, on its way to the Los Angeles area, about 120 mi (193 km) from the SEZ. There are a number of exits from I-10 as it passes by and through the SEZ; they are listed in Table 9.4.21-1. Figure 9.4.21-1 also shows the designated open OHV routes in the proposed Riverside East SEZ. These routes were designated under the CDCA Plan (BLM 1999).

Other paved roads that cross parts of the Riverside East SEZ include State Route 177 and Midland Road. State Route 177 runs north–south through the western section of the SEZ between I-10 and State Route 62. In the eastern section of the SEZ, Midland Road crosses the northeastern portion from Blythe to the ghost town of Midland, which is situated at the northern edge of the eastern section of the SEZ. A number of dirt roads also cross the SEZ at various points. Another major route in the area is U.S. 95, which runs north–south through Blythe and passes within 2 to 4 mi (3 to 6 km) of the eastern edge of the SEZ. Table 9.4.21-2 gives the annual average traffic volumes along I-10 and state roads near the SEZ for 2008.

The nearest operating railroad is the ARZC Railroad, which passes through Rice, about 18 mi (29 km) north of the large eastern section of the proposed Riverside East SEZ. However, the shortest drive from the SEZ to Rice is on Midland Road, a dirt road north of Midland. The Vidal rail stop on the ARZC Railroad is about a 41-mi (66-km) drive via U.S. 95 from the eastern edge of the SEZ. The ARZC Railroad is a regional short line railroad that originates in Cadiz, approximately 50 mi (80 km) northwest of Rice, where it has an interchange with the BNSF Railroad (RailAmerica 2010). The ARZC Railroad continues on from Rice through Vidal to the east for about 150 mi (240 km), passing through Parker, California, and eventually joining with the BNSF Railroad again in Matthie, Arizona, northwest of Phoenix. The next closest railroad to the SEZ is the UP Railroad, which provides service in Indio (UPR 2009).

The ARZC Railroad also has a spur that runs south from Rice through the eastern section of the SEZ and goes to Blythe. However, this spur has become inactive and may be abandoned (Blythe City Council 2008). Another inactive railroad, the Eagle Mountain (EM) Railroad, runs north–south immediately to the west of the large western section of the SEZ and has an interchange with the UP Railroad at Ferrum, approximately 31 mi (50 km) southwest of the southwestern corner of the proposed Riverside East SEZ. The EM Railroad is a private railroad owned by Kaiser Ventures, LLC, that was originally used for hauling iron ore and is currently in need of repair. Kaiser Ventures is seeking to convert its former iron ore mine into a regional municipal solid waste landfill operation (Kaiser Ventures 2010) that would use the railroad for hauling waste to the landfill.

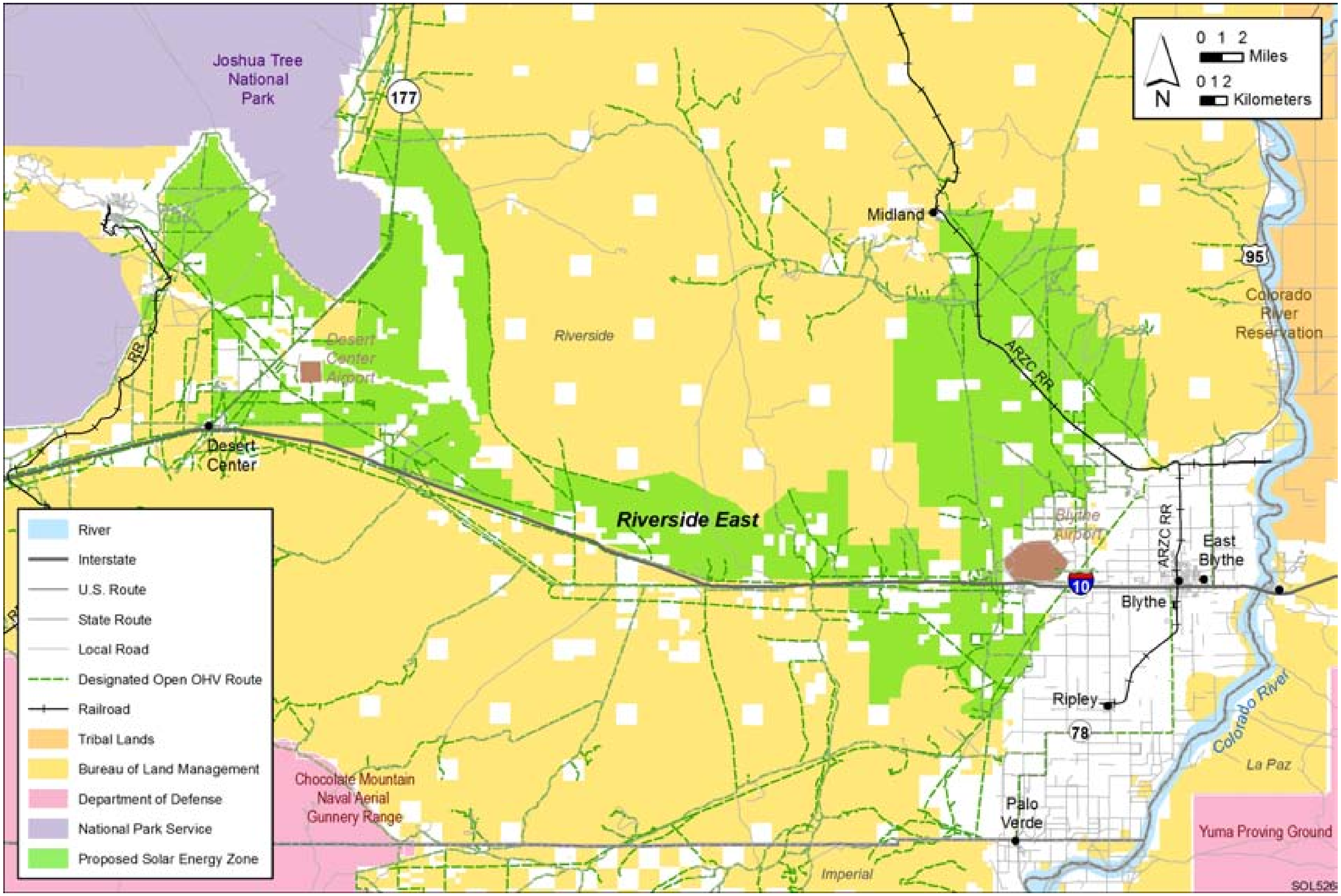

FIGURE 9.4.21.1-1 Local Transportation Network Serving the Proposed Riverside East SEZ

TABLE 9.4.21.1-1 I-10 Freeway Exits in the Vicinity of the Proposed Riverside East SEZ

Road Name	Exit Number/ Mile Marker
Desert Center Rice Road (State Route 177)	192
Corn Springs Road	201
Paled Dunes Drive and Chuckwalla Valley Road	217
Wiley's Well Road	222
Mesa Drive (at Blythe Airport)	232
Neighbours Boulevard (State Route 78) (western side of Blythe)	238

TABLE 9.4.21.1-2 AADT on Major Roads near the Proposed Riverside East SEZ, 2008

Road	General Direction	Location	AADT (Vehicles)
I-10	East–West	West of junction State Route 62 North	81,000
		East of junction State Route 62 North	79,000
		West of junction State Route 86 South	52,000
		East of junction State Route 86 South	25,000
		West of Chiriaco Summit Interchange	22,500
		West of junction State Route 177 North	23,000
		East of junction State Route 177 North	21,400
		Corn Springs Road Interchange	21,400
		West of Wiley's Well Road	21,300
		East of Wiley's Well Road	23,500
		East of Mesa Drive	22,500
		East of junction State Route 78 South	23,800
		West of junction U.S. 95 North	25,000
		East of junction U.S. 95 North	25,500
State Route 62	East–West	Junction State Route 177	2,200
		Cadiz Road	2,000
		Blythe Rice Road	2,000
		Junction U.S. 95	2,700
State Route 78	North–South	Junction I-10	2,900
		South of 28th Avenue	1,800
		Fourth Street (Palo Verde)	2,650
State Route 177	North–South	Junction I-10	3,700
		Junction State Route 62	1,300
U.S. 95	North–South	Junction State Route 62	3,000
		South of Riverside/San Bernardino Co. Line	1,900
		North of Sixth Avenue (Blythe)	2,400
		North of Hobson Way (Blythe)	3,500

Source: Caltrans (2009).

Eight small airports, listed in Table 9.4.21.1-3, are open to the public and within a driving distance of approximately 72 mi (116 km) of the proposed Riverside East SEZ. None of these airports has regularly scheduled passenger service. The nearest public airports are the Blythe and Desert Center Airports, which are immediately adjacent to (Blythe) or within the bounds of (Desert Center) the general SEZ area.

9.4.21.2 Impacts

As discussed in Section 5.19, primary transportation impacts of the SEZ are anticipated to come from commuting worker traffic. I-10, a regional traffic corridor, would experience small impacts for single projects that may have up to 1,000 daily workers, with an additional 2,000 vehicle trips per day (maximum). Such an increase is less than 10% of the current traffic on I-10, as summarized in Table 9.4.21.1-2, which provides the available AADT values for routes in the vicinity of the SEZ. However, the exits on I-10 might experience moderate impacts with some congestion. Local road improvements would be necessary in any portion of the SEZ near I-10 that might be developed so as not to overwhelm the local roads near any site access point(s). Similarly, any access to portions of the SEZ using State Route 177 or U.S. 95 may require road improvements on State Route 177 or U.S. 95 and local access roads.

Solar development within the SEZ would affect public access along OHV routes designated open and available for public use. There are several routes designated as open within the proposed SEZ. Open routes crossing areas granted ROWs for solar facilities would be redesignated as closed (see Section 5.5.1 for more details on how routes coinciding with proposed solar facilities would be treated).

If up to three large projects with approximately 1,000 daily workers each were under development simultaneously, an additional 6,000 vehicle trips per day could be added to I-10 in the vicinity of the SEZ, assuming ride-sharing was not implemented and all access to the SEZs was funneled through I-10 (i.e., no workers commuted to work via State Route 177 from State Route 62 to the north or via local roads from U.S. 95 to the east). This would be an increase of about 25% of the current average daily traffic on most segments of I-10 near the SEZ, and could have moderate impacts on traffic flow during peak commute times. The extent of the problem would depend on the relative locations of the projects within the SEZ, where the worker populations originate, and work schedules. Affected exits on I-10 would experience moderate impacts with some congestion. Local road improvements would be necessary in any portion of the SEZ near I-10 that might be developed so as not to overwhelm the local roads near any site access point(s). Similarly, any access to portions of the SEZ that use State Route 177 or U.S. 95 may also require road improvements on State Route 177 or U.S. 95 and local access roads, depending on the percentage of worker commuter traffic using those routes.

TABLE 9.4.21.1-3 Airports Open to the Public in the Vicinity of the Proposed Riverside East SEZ

			Runway 1[a]			Runway 2[a]		
Airport	Location	Owner/Operator	Length (ft [m])	Type	Condition	Length (ft [m])	Type	Condition
Avi Suquilla	Just across the border in Parker, Arizona, approximately 62 mi (100 km) by way of U.S. 95 east of the SEZ	Colorado River Indian Tribes	6,250 (1,905)	Asphalt	Good	–[b]	–	–
Bermuda Dunes	54 mi (87 km) west of the SEZ off I-10	Bermuda Dunes Airport Corporation	5,002 (1,525)	Asphalt	Good	–	–	–
Blythe	Off I-10, at the eastern edge of the SEZ	County of Riverside/ City of Blythe	5,800 (1,768)	Asphalt	Good	6,543 (1,994)	Asphalt	Good
Chiriaco Summit	Off I-10, exit 173, 19 mi (31 km) west of the SEZ	County of Riverside	4,600 (1,402)	Asphalt	Fair	–	–	–
Desert Center	Off State Route 177 just north of I-10, surrounded by the SEZ	Chuckwalla Valley Associates	4,200 (1,280)	Asphalt	Fair	–	–	–
Jacqueline Cochran Regional	West of State Route 86 south of I-10 interchange, about 53 mi (85 km) from the SEZ to the west	County of Riverside	4,995 (1,522)	Asphalt	Good	8,500 (2,591)	Asphalt	Good
Palm Springs International	About 72 mi (116 km) to the west of the SEZ near I-10	City of Palm Springs	4,952 (1,509)	Asphalt	Good	10,001 (3,048)	Asphalt/ Porous Friction	Good

TABLE 9.4.21.1-3 (Cont.)

			Runway 1[a]			Runway 2[a]		
Airport	Location	Owner/Operator	Length (ft [m])	Type	Condition	Length (ft [m])	Type	Condition
Twentynine Palms	Approximately 55 mi (88 km) to the northwest of the SEZ along State Route 62	County of San Bernardino	3,797 (1,157)	Asphalt	Good	5,531 (1,686)	Asphalt	Good

[a] Source: FAA (2009).

[b] A dash indicates not applicable.

Because of the proximity of the Blythe and Desert Center Airports, there is a potential for impacts on or interference with flight paths and related flight operations, depending on the location of a solar project within the SEZ. Without proper planning, there could be problems with reflector glare interfering with pilot vision during takeoffs and landings. Problems with glare would be dependent on the specific locations of reflectors within the SEZ. Compliance with FAA regulations and implementation of required programmatic design features would address these concerns. For example, the location of power towers and other taller structures would take into account runway takeoff and landing patterns.

9.4.21.3 SEZ-Specific Design Features and Design Feature Effectiveness

The programmatic design features discussed in Appendix A, Section A.2.2, 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 locations of proposed solar facilities within the SEZ, more specific access locations and local road improvements could be implemented.

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9.4.22 Cumulative Impacts

The analysis presented in this section addresses the potential cumulative impacts in the vicinity of the proposed Riverside East SEZ in Riverside County, California. The CEQ guidelines for implementing NEPA define cumulative impacts as environmental impacts resulting from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). The impacts of other actions are considered without regard to the agency (federal or nonfederal), organization, or person that undertakes them. The time frame of this cumulative impacts assessment could appropriately include activities that would occur up to 20 years in the future (the general time frame for PEIS analyses), but little or no information is available for projects that could occur further than 5 to 10 years in the future.

The nearest population center is the small community of Blythe located 6 mi (9 km) east of the SEZ. The small town of Desert Center is adjacent to the southwestern boundary of the SEZ. The proposed Riverside East SEZ is closely surrounded by Joshua Tree NP to the west and seven WAs: the Palen-McCoy WA, Rice Valley WA, and Big Maria Mountains WA are all located north of the SEZ; the Chuckwalla Mountains WA, Little Chuckwalla Mountains WA, and Palo Verde Mountain WA are all located south of the SEZ; and Joshua Tree WA is located to the west. In addition, the Riverside East SEZ is located close to the Iron Mountain SEZ, and in some areas, impacts from the two SEZs overlap.

The geographic extent of the cumulative impacts analysis for potentially affected resources near the Riverside East SEZ is identified in Section 9.4.22.1. An overview of ongoing and reasonably foreseeable future actions is presented in Section 9.4.22.2. General trends in population growth, energy demand, water availability, and climate change are discussed in Section 9.4.22.3. Cumulative impacts for each resource area are discussed in Section 9.4.22.4.

9.4.22.1 Geographic Extent of the Cumulative Impacts Analysis

The geographic extent of the cumulative impacts analysis for potentially affected resources evaluated near the Riverside East SEZ is provided in Table 9.4.22.1-1. These geographic areas define the boundaries encompassing potentially affected resources. Their extent varies on the basis of the nature of the resource being evaluated and the distance at which an impact may occur (thus, for example, the evaluation of air quality may have a greater regional extent of impact than visual resources). Most of the lands around the SEZ are administered by the BLM, the NPS, or the DoD; there are also some Tribal Lands about 10 mi (16 km) to the east and northeast of the SEZ. The BLM administers approximately 58% of the lands within a 50-mi (80-km) radius of the SEZ.

TABLE 9.4.22.1-1 Geographic Extent of the Cumulative Impacts Analysis by Resource Area: Proposed Riverside East SEZ

Resource Area	Geographic Extent
Land use	Eastern Riverside County
Specially Designated Areas and Lands with Wilderness Characteristics	Within a 25-mi (40-km) radius of the Riverside East SEZ
Rangeland Resources	Eastern San Bernardino and Riverside Counties
Recreation	All of San Bernardino and Riverside Counties
Military and Civilian Aviation	For Military Aviation, southeastern California and western Arizona For Civilian Aviation, eastern San Bernardino and Riverside Counties
Soil Resources	Areas within and adjacent to the Riverside East SEZ
Minerals	Eastern San Bernardino and Riverside Counties
Water Resources	
Surface Water	CRA, Colorado River, Palen Lake, Ford Dry Lake
Groundwater	Chuckwalla Valley and Palo Verde Mesa Basins
Air Quality and Climate	A 31-mi (50-km) radius from the center of the Riverside East SEZ within the Mojave Desert Air Basin
Vegetation, Wildlife and Aquatic Biota, Special Status Species	A 50-mi (80-km) radius from the center of the Riverside East SEZ, including portions of Riverside, San Bernardino, and Imperial Counties in California and La Paz and Yuma Counties in Arizona
Visual Resources	Viewshed within a 25-mi (40-km) radius of the Riverside East SEZ
Acoustic Environment (noise)	Areas adjacent to the Riverside East SEZ
Paleontological Resources	Areas within and adjacent to the Riverside East SEZ
Cultural Resources	Areas within and adjacent to the Riverside East SEZ for archaeological sites; viewshed within a 25-mi (40-km) radius of the Riverside East SEZ for other properties, such as traditional cultural properties
Native American Concerns	Valley areas and mountains within and adjacent to the Riverside East SEZ; viewshed within a 25-mi (40-km) radius of the Riverside East SEZ
Socioeconomics	A 50-mi (80-km) radius from the center of the Riverside East SEZ
Environmental Justice	A 50-mi (80-km) radius from the center of the Riverside East SEZ
Transportation	U.S. Highway 10; State Route 177; railroads running north-south, one on western and one on eastern portion of Riverside East SEZ.

9.4.22.2 Overview of Ongoing and Reasonably Foreseeable Future Actions

The future actions described below are those that are "reasonably foreseeable"; that is, they have already occurred, are ongoing, are funded for future implementation, or are included in firm near-term plans. Types of proposals with firm near-term plans are as follows:

- Proposals for which NEPA documents are in preparation or finalized;
- Proposals in a detailed design phase;
- Proposals listed in formal NOIs published in the *Federal Register* or state publications;
- Proposals for which enabling legislations has been passed; and
- Proposals that have been submitted to federal, state, or county regulators to begin a permitting process.

Projects in the bidding or research phase or that have been put on hold were not included in the cumulative impact analysis.

The ongoing and reasonably foreseeable future actions described below are grouped into two categories: (1) actions that relate to energy production and distribution, including potential solar energy projects under the proposed action (Section 9.4.22.2.1), and (2) other ongoing and reasonably foreseeable actions, including those related to mining and mineral processing, grazing management, transportation, recreation, water management, and conservation (Section 9.4.22.2.2). Together, these actions have the potential to affect human and environmental receptors within the geographic range of potential impacts over the next 20 years.

9.4.22.2.1 Energy Production and Distribution

Reasonably foreseeable future actions related to energy production and distribution and other major actions within a 50-mi (80-km) radius from the center of the Riverside East SEZ, which includes portions of Riverside, San Bernardino, and Imperial Counties in California, and La Paz and Yuma Counties in Arizona, are identified in Table 9.4.22.2-1 and described in the following sections. Future renewable energy facilities are expected to be the main contributors to potential future impacts in this area, because of favorable conditions in the area for their development, large acreages required, and potentially large quantities of water used. The area is otherwise largely undeveloped and would be expected to remain so in the absence of renewable energy development. Thus, this analysis focuses on renewable energy facilities and any other foreseeable energy large projects, nominally covering 500 acres or more or requiring amounts of water on the scale of utility-scale CSP.

TABLE 9.4.22.2-1 Reasonably Foreseeable Future Actions Related to Energy Development and Distribution and Other Major Actions near the Proposed Riverside East SEZ[a]

Description	Status	Resources Affected	Primary Impact Location
Renewable Energy Projects on Private or County Lands			
Rice Solar Energy, 150 MW power tower facility, 2,560 total acres (on private land)	In review; AFC filed with CEC Oct. 21, 2009; CEC comments on AFC sent Nov. 23, 2009.	Land use, visual, terrestrial habitats, wildlife, groundwater	About 15 mi (24 km) north of the eastern part of Riverside East SEZ, adjacent to and south of State Route 62
Tessera Solar, up to 500 MW dish engine facility (on county land)	County of Riverside awarded contract June 2009	Land use, visual, terrestrial habitats, wildlife, groundwater	Riverside County
Fast-Track Solar Energy Projects on BLM-Administered Land			
First Solar Desert Sunlight (CACA 48649), 550-MW PV facility; 4,410 disturbed acres	NOI to prepare an EIS issued on Jan. 13, 2010	Land use, visual, terrestrial habitats, wildlife, groundwater	Western part of Riverside East SEZ
Solar Millennium Palen Solar Project (CAC 48810), 484-MW solar trough; 5,200 total acres	NOI to prepare an EIS issued on Nov. 23, 2009	Land use, visual, terrestrial habitats, wildlife, groundwater	West-central part of Riverside East SEZ
Solar Millennium Blythe Solar Project (CACA 48811), 986-MW trough facility; 9,480 total acres[b]	NOI to prepare an EIS issued on Nov. 23, 2009	Land use, visual, terrestrial habitats, wildlife, groundwater	Eastern part of Riverside East SEZ
NextEra Genesis Ford Dry Lake Solar Project (CACA 48880), 250-MW trough facility; 4,640 total acres[b]	NOI to prepare an EIS issued on Nov. 23, 2009	Land use, visual, terrestrial habitats, wildlife, groundwater	Central part of Riverside East SEZ
Renewable Energy Projects			
Orresource Geothermal (CACA 6217, CACA 6218, CACA 17568)	Ongoing	Land use, terrestrial habitats, visual	About 50 mi (80 km) south of Riverside East SEZ, within the East Mesa Known Geothermal Resource Area
Geothermal Power Project (CACA 18092X)	Authorized	Land use, terrestrial habitats, visual	About 50 mi (80 km) south of Riverside East SEZ, within the East Mesa Known Geothermal Resource Area

TABLE 9.4.22.2-1 (Cont.)

Description	Status	Resources Affected	Primary Impact Location
Renewable Energy Projects (Cont.)			
Geothermal Power Project (CACA 29853X)	Authorized	Land use, terrestrial habitats, visual	About 45 mi (72 km) southwest of Riverside East SEZ
Transmission and Distribution			
Blythe Energy Project Transmission Line Modifications	Under way	Land use, terrestrial habitats, visual	Riverside County
Devers to Palo Verde No. 2	California portion authorized	Land use, terrestrial habitats, visual	Riverside County
Other Projects			
Cadiz Valley Dry Year Supply Project	Under review	Disturbed areas, terrestrial habitats along railroad ROW	Areas adjacent to ARZC Railroad ROW in southern portion of Iron Mountain SEZ, about 40 mi (64.3 km) north of Riverside East SEZ
Proposed West Chocolate Mountains Renewable Energy Evaluation Area	NOI to prepare an EIS issued on Feb. 10, 2010	Land use, visual, terrestrial habitats, wildlife, groundwater	About 20 mi (32 km) southwest of Riverside East SEZ
Eagle Crest Hydroelectric Plant	Draft license application submitted to FERC June 2009	Land use, surface water	Eagle Mountain Mine, near northwest portion of Riverside East SEZ
Grazing Lease Rice Valley Allotment	EA Issuance of 10-year Grazing Lease; Jan. 2007 (CA-660-EA06-55)	Land use, surface water	Riverside County

[a] Projects in later stages of agency environmental review and project development.

[b] Project approved. Updated information will be included in the Final EIS. See http://www.blm.gov/wo/st/en/prog/energy/renewable_energy/fast-track_renewable.html for details.

Renewable Energy Development

Several recent executive and legislative actions in California have addressed renewable energy development within the state. In November 2008, Governor Schwarzenegger signed E.O. S-14-08 to streamline California's renewable energy project approval process and increase the state's RPS to the most aggressive in the nation—at 33% renewable power by 2020. On September 15, 2009, the Governor issued a second E.O., now requiring that 33% of all electrical energy produced in the state be from renewable energy sources by the year 2020. The E.O. directed the CARB to adopt regulations increasing California's RPS to 33% by 2020.

In 2009, the California Legislature drafted bills requiring that electrical energy production meet a standard of 33% from renewable sources. On October 12, 2009, Governor Schwarzenegger vetoed two bills from the California Legislature on electrical energy generated by renewable sources in favor of an alternative plan that would remove limits on the amount of renewable power utilities could buy from other states (African American Environmentalist Association 2009).

Solar Energy. Table 9.4.22.2-1 lists one project on private land (Rice Solar Energy), one project on county land (Tessera Solar), and four foreseeable solar energy projects on public land, the so-called fast-track projects. Fast-track projects are those on public lands for which the environmental review and public participation process is under way and the applications could be approved by December 2010 (BLM 2010c). These projects are considered foreseeable because the permitting and environmental review processes are under way. The locations of the Rice and fast-track projects are shown on Figure 9.4.22.2-1. Other, more numerous, pending regular-track applications shown in the figure are discussed collectively at the end of this section.

- Rice Solar Energy. The proposed Rice Solar Energy Project would be a power tower facility with an output of 150 MW constructed on 1,410 acres (6 km^2) of a 2,560-acre (10-km^2) parcel on privately owned land in unincorporated eastern Riverside County, California (CEC 2009b). Access to the site would be from State Route 62 located just north of the site. The site is about 15 mi (24 km) north of the eastern portion of the Riverside East SEZ. Land surrounding the project site consists mostly of undeveloped open desert owned by the Federal Government and managed by the BLM.

  The facility would employ a liquid salt heat transfer and storage medium and a conventional steam turbine. Propane would be used for auxiliary heating, and no natural gas pipeline to the facility would be needed. The facility would use an air-cooled condenser (dry cooling). Water use during the proposed 2011 to 2013 (30-month) construction period would be 780 ac-ft/yr (0.96 million m^3/yr). Process water requirements for facility operations, commencing by the end of 2013, are estimated to be up to 180 ac-ft/yr (0.22 million m^3/yr), assuming an operating capacity factor of 37%. A mostly local construction workforce (averaging 280 workers) would be used. Operations and maintenance of the facility would employ an estimated 47 workers (CEC 2009b).

  Surveys found seven desert tortoises, along with shell-skeletal remains, burrows, egg shell fragments, and scat present on the project site, along the generator tie-line route, and within the 1-mi (1.6-km) wide zone surrounding the project site. In addition, Western burrowing owl, Mojave fringe-toed lizard, and loggerhead shrike were found to be present in or near the project

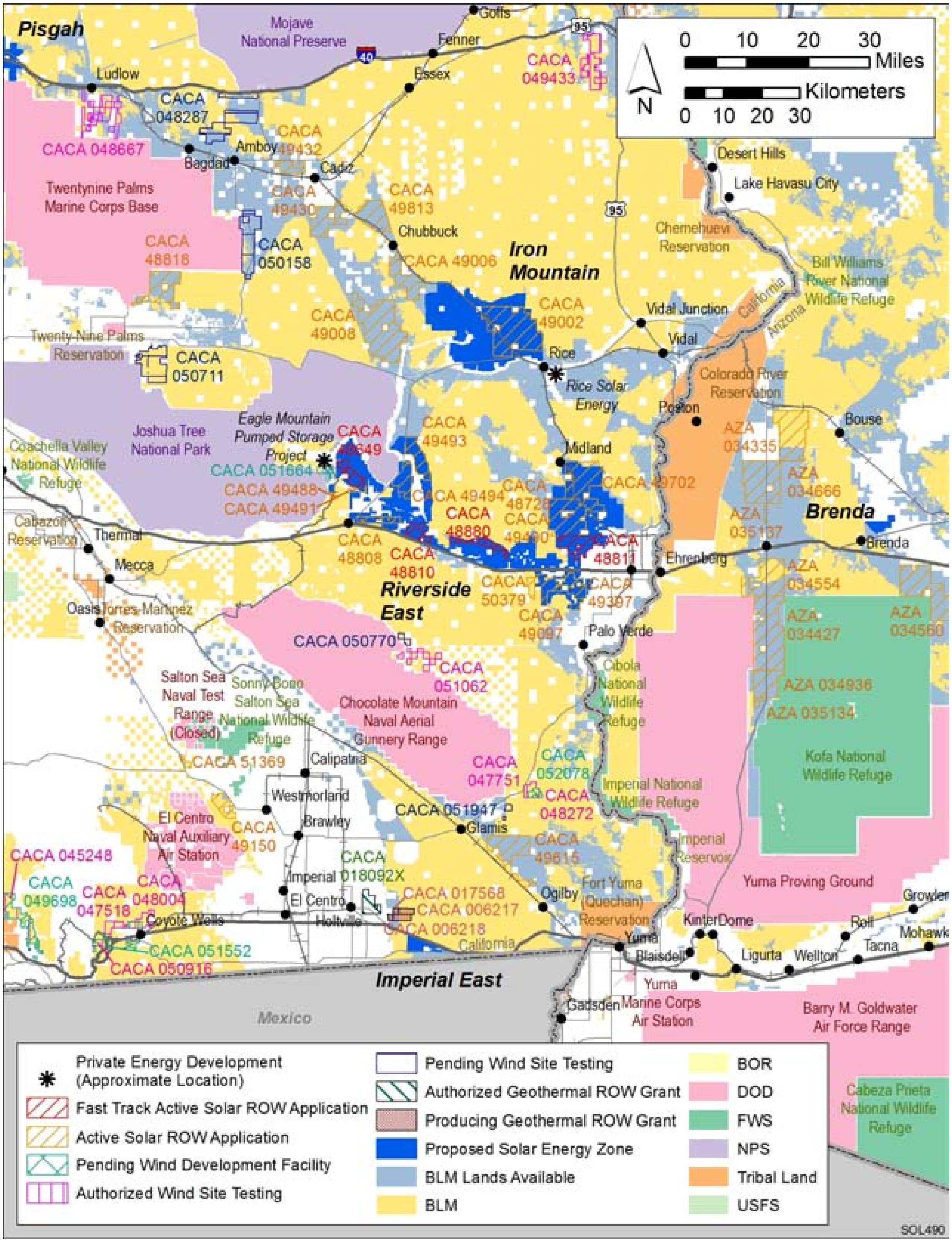

FIGURE 9.4.22.2-1 Location of Renewable Energy Proposals on Public Land within a 50-mi (80-km) Radius of the Proposed Riverside East SEZ

area. Several California-listed sensitive plant species were found on the project site or along the proposed transmission line ROW (CEC 2009a).

- *Tessera Solar on County of Riverside Land*. In June 2009, Tessera Solar was selected by the County of Riverside to develop solar energy projects on county-owned land at closed landfills and on undeveloped land adjacent to county airports (Electric Energy Online 2009).

  The solar projects would utilize the CSP dish engine (i.e., SunCatchers) technology and would develop as much as 500 MW of solar power on County of Riverside land. The company is currently analyzing the parcels of available land to determine the best location for the projects.

- *First Solar Desert Sunlight (CACA 48649).* This proposed fast-track project would use a thin-film PV technology in a facility with an output of 550 MW. The project site is located on approximately 9,480 acres (38.4 km^2) and would disturb up to 4,400 acres (17.8 km^2) of public land in Riverside County, California, approximately 6 mi (8 km) north of the community of Desert Center, California, and about 7 mi (11 km) north of the I-10 transmission corridor (BLM 2009e). The facility and most of the corridor for the project's 230-kV generation interconnection transmission line would be located in the western portion of the proposed Riverside East SEZ. The project would include the solar facility, an on-site substation, a 230-kV interconnection line , and a planned 230- to 500-kV Red Bluff Substation. The Red Bluff Substation would connect the project to the Southern California Edison (SCE) regional transmission grid.

  The proposed facility would have an estimated water requirement of 27 ac-ft/yr (33,000 m^3/yr) during its 2011 to 2013 construction period and only 4 ac-ft/yr (5,000 m^3/yr) thereafter for operation (BLM and CEC 2010a). On the basis of estimated employment levels for PV facilities (Section 9.4.19.2.2), construction of the facility would employ about 220 people, while operations would require an estimated 11 full-time employees.

- *Solar Millennium Palen Solar Project (CACA 48810).* This proposed fast-track project is a parabolic trough facility with an output of 484 MW. The project site would be on public land within the western portion of the proposed Riverside East SEZ, approximately 10 mi (16 km) east of Desert Center, California, adjacent to the I-10 transmission corridor. The proposed facility would occupy approximately 3,800 acres (15.4 km^2) within a proposed 5,200-acre (20.9-km^2) ROW. The facility would employ two adjacent and independent solar troughs with nominal output of 250 MW each. It would employ dry cooling and would require about 300 ac-ft/yr (0.37 million m^3/yr) of groundwater drawn from two on-site wells for mirror washing and other uses. Water requirements during the proposed construction period of 2011 to 2013 are estimated to be 480 ac-ft/yr (0.59 million m^3/yr). The project would disturb about 3,000 acres (12 km^2). The facility would connect to the planned Red Bluff substation, to be built approximately 10 mi (16 km) west of the project location. An auxiliary boiler would be fired with propane. An average of 566 workers would be employed during construction, and 134 full-time employees would be required for operations (BLM and CEC 2010a).

Special status species of concern include desert tortoise and Western burrowing owl. No desert tortoises and only low-quality tortoise habitat were observed during spring 2009 surveys. Cultural surveys have identified both prehistoric and historic cultural resources (BLM and CEC 2010a).

- *Solar Millennium Blythe Solar Project (CACA 48811).* This proposed fast-track project would be a parabolic trough facility with an output of 986 MW. The project site would be on public land within the eastern portion of proposed Riverside East SEZ, approximately 8 mi (13 km) west of Blythe, California, adjacent to the I-10 transmission corridor. The proposed facility would occupy approximately 9,480 acres (38.4 km^2) and disturb about 7,030 acres (28.5 km^2). The facility would employ four adjacent and independent solar troughs with nominal output of 250 MW each. It would employ dry cooling and would require about 600 ac-ft/yr (0.74 million m^3/yr) of groundwater drawn from two on-site wells for mirror washing and other uses. Water requirements during the proposed 2011 to 2015 construction period are estimated to be 620 ac-ft/yr (0.77 million m^3/yr). The facility would connect to a planned new substation, the Colorado River Substation, to be built approximately 5 mi (8 km) to the southwest of the project location. To supply auxiliary boilers, a 10-mi (16-km) long natural gas pipeline would be built to connect to an existing pipeline south of I-10; about 8 mi (13 km) of the line would be on the project ROW. An average of 604 workers would be employed during construction of the facility and 221 full-time employees would be required for operations (BLM and CEC 2010b).

  Project construction would result in a direct loss of low- to moderate-quality habitat for desert tortoise over the project site and would fragment and degrade adjacent native plant and wildlife communities. The project could also promote the spread of invasive non-native plants and desert tortoise predators such as ravens. Five species of California-listed sensitive plant species are present. Habitat is also present for Western burrowing owl, loggerhead shrike, Le Conte's thrasher, black-tailed gnatcatcher, and California horned lark (BLM and CEC 2010b).

- *NextEra Genesis Ford Dry Lake Solar Project (CACA-4880).* This proposed fast-track project consists of two independent solar trough facilities using wet cooling with a total output of 250 MW. The project site would be located on public land within the central portion of the proposed Riverside East SEZ, approximately 20 mi (32 km) west of Blythe, California, north of I-10 and near Dry Lake, California. The proposed facility would occupy 4,640 acres (18.8 km^2) and directly affect 1,800 acres (7.3 km^2). The proposed facility would employ wet cooling and would require about 1,640 ac-ft/yr (2.0 million m^3/yr) of cooling water that would be obtained from on-site wells. Water requirements during the proposed construction period of 2011 to 2013 are estimated to be 870 ac-ft/yr (1.1 million m^3/yr). The facility would interconnect to the proposed Colorado River Substation via a 230-kV on-site switchyard and a new transmission line that would tie into the existing Blythe Energy Project transmission line. The new transmission line, natural gas line, and access road would be built in the same corridor that would exit the southern site boundary and extend about 7 mi (11 km) to the south. An average of 646 workers would be employed during construction of the facility and 40 to 50 full-time employees would be required for operations (BLM and CEC 2010c).

Biological surveys have identified a number of special status species, including Mojave and Colorado fringe-toed lizards, loggerhead shrike, Western burrowing owl, short-eared owl, prairie falcon, and northern harrier. While no live desert tortoise were found, burrows and bones were present on the site, and tracks and carcasses in the surrounding area. As many as 15 cultural resource sites would be directly affected by construction of the proposed Genesis Solar Energy Project (BLM and CEC 2010c).

- *Pending Solar ROW Applications on BLM-Administered Lands.* In addition to the four fast-track solar projects described above, a number of regular-track ROW applications for solar projects have been submitted to the BLM that would be located either within the Riverside East SEZ or within 50 mi (80 km) of the SEZ (BLM 2010b). Table 9.4.22.2-2 provides a list of all solar projects that had pending applications submitted to BLM as of March 2010. Figure 9.4.22.2-1 shows the locations of these applications.

  Within 50 mi (80 km) of the proposed Riverside East SEZ, there are 29 active solar applications. Within the boundaries of the Riverside East SEZ, there are 11 pending regular-track applications; they are administered through the Palm Springs-Southcoast Field Office.

  The likelihood of any of the regular-track ROW application projects actually being developed is uncertain but is generally assumed to be less than that for fast-track applications. The projects are all listed in Table 9.4.22.2-2 for completeness and as an indication of the level of interest in development of solar energy in the region. Some number of these applications would be expected to result in actual projects. Thus, the cumulative impacts of these potential projects are analyzed in their aggregate effects.

Wind Energy. Table 9.4.22.2-2 lists ROW grant applications for four pending authorization of wind testing, three authorized for wind site testing, and two wind development facilities within a 50-mi (80-km) radius of the proposed Riverside East SEZ. The actual development of all nine proposals is considered pending, however, since they await authorization of development of wind facilities. As shown in Figure 9.4.22.2-1, the locations of the applications lie generally northwest to southwest and within 30 mi (48 km) of the SEZ.

The likelihood of any of the regular-track wind projects actually being developed is uncertain; the projects are listed to give an indication of the level of interest in development of wind energy in the region. Most are in the wind testing stage, and Environmental Assessments necessary for project approval are being prepared.

Geothermal Energy. Imperial County is immediately south of the Riverside East SEZ and contains some of the most productive geothermal resource areas in the United States. Within the El Centro Field Office management area, 118,720 acres (480 km^2) is identified as having geothermal resource potential (BLM 2008b). This acreage is divided into seven KGRAs: Dunes, East Brawley, East Mesa, Glamis, Heber, Salton Sea, and South Brawley.

There are three producing and two authorized geothermal leases within a 50-mi (80-km) radius of the proposed Riverside East SEZ, as listed in Table 9.4.22.2-1 and shown in Figure 9.4.22.2-1. All of these leases are within Imperial County. The producing geothermal leases are about 50 mi (80 km) south of the SEZ and within the East Mesa KGRA. The producing leases CACA 6217, CACA 6218, and CACA 17568 are all owned by Orresource Geothermal. Of the authorized geothermal leases, CACA 29853X is located about 45 mi (72 km) southwest of the Riverside East SEZ and CACA 18092X is located about 50 mi (80 km) south.

Transmission and Distribution

Blythe Energy Project Transmission Line Modifications. Blythe Energy LLC is proposing transmission line modifications that would allow electrical output from Blythe Energy Project, a 520-MW natural gas-fired electric generating facility, to be delivered to the southern California International Standards Organization-controlled electrical transmission system. There are two components to the proposed BEP transmission line modifications:

- Buck to Julian Hinds transmission line component:
  - Upgrades to the Buck Substation.

    Installation of approximately 67 mi (108 km) of new 230-kV transmission line between the Buck Substation located adjacent to the Blythe Energy Project and the Julian Hinds Substation located approximately 60 mi (97 km) to the west.

TABLE 9.4.22.2-2 Pending Renewable Energy Project Applications on BLM-Administered Land within 50 mi of the Riverside East SEZ[a]

Serial No.	Project Name	Application Received	Size (acres[b])	MW	Technology	Field Office
Solar Applications						
AZA 034335	Boulevand Associates, LLC	June 8, 2007	24,221	500	CSP/Trough	Lake Havasu: Yuma
AZA 034427	Pacific Solar Invst., Inc. (Iberdrola)	Sept. 6, 2007	32,000	2,000	CSP/Trough	Yuma
AZA 034554	Nextlight Renewable Power, LLC	March 26, 2008	20,699	500	CSP/Trough	Yuma
AZA 034560	Nextlight Renewable Power, LLC	March 26, 2008	15,040	500	CSP/Trough	Yuma
AZA 034666	SolarReserve, LLC (Quartzsite)	May 27, 2008	25,204	100	CSP/Tower	Yuma
AZA 034936	Wildcat Quartzsite, LLC	Jan. 29, 2009	11,960	800	CSP/Tower	Yuma
AZA 035134	E-on Climate & Renewables (La Posa)	July 2, 2009	1,780	NA	NA	Yuma
AZA 035137	E-on Climate & Renewables (Castle Dome)	July 2, 2009	590	100	PV	Yuma
CACA 48728	FPL Energy	Jan. 31, 2007	20,608	250	CSP	Palm Springs-Southcoast
CACA 48808	Chuckwalla Solar, LLC	Sept. 15, 2006	4,099	200	PV	Palm Springs-Southcoast
CACA 48818	First Solar (Desert Opal)	Feb. 26, 2007	15,824	1,205	PV	Barstow
CACA 49002	Leopold Company, LLC	Apr. 2, 2007	35,466	4,100	CSP	Needles
CACA 49006	Boulevard Associates, LLC	May 14, 2007	12,046	1,000	CSP	Needles
CACA 49008	Boulevard Associates, LLC	May 14, 2007	35,639	1,000	CSP	Needles
CACA 49097	Bull Frog Green Energy, LLC	Oct. 1, 2008	6,634	2,500	PV	Palm Springs-Southcoast
CACA 49150	BCL & Associate, Inc.	July 17, 2007	5,464	500	PV	El Centro
CACA 49397	First Solar (Desert Quartzite)	Sept. 28, 2007	7,548	600	PV	Palm Springs-Southcoast
CACA 49430	Iberdrola Renewables, Inc.	Dec. 8, 2008	13,373	N/A	CSP	Needles
CACA 49432	PG&E	Sept. 24, 2007	5,315	800	Undecided	Needles
CACA 49488	EnXco, Inc.	Nov. 13, 2007	1,327	300	CSP	Palm Springs-Southcoast
CACA 49490	EnXco, Inc.	Nov. 13, 2007	20,608	300	CSP	Palm Springs-Southcoast
CACA 49491	EnXco, Inc.	Nov. 13, /2007	1,327	300	CSP	Palm Springs-Southcoast
CACA 49493	Solel, Inc.	March 27, 2008	8,750	500	CSP	Palm Springs-Southcoast
CACA 49494	Solel, Inc.	Nov. 6, 2007	7,317	500	CSP	Palm Springs-Southcoast
CACA 49615	Pacific Solar Investments, Inc.	Sept. 4, 2007	17,807	1,500	PV	El Centro
CACA 49702	Bull Frog Green Energy, LLC	June 1, 2008	22,717	2,500	PV	Palm Springs-Southcoast
CACA 49813	Iberdrola Renewables, Inc.	April 1, 2008	12,833	1,000	CSP	Needles
CACA 50379	Lightsource Renewables, LLC	Aug. 8, 2008	2,446	550	CSP	Palm Springs-Southcoast
CACA 51369	Invenergy Solar Development, LLC	Sept. 16, 2009	1,081	50	PV	El Centro

TABLE 9.4.22.2-2 (Cont.)

Serial No.	Project Name	Application Received	Size (acres[b])	MW	Technology	Field Office
Wind Applications						
Pending Wind Site Testing						
CACA 50158	Little Mountain Wind Power, LLC	May 12, 2008	15,000	– [c]	Wind	Needles
CACA 50711	Padoma Wind Power	March 17, 2009	23,829	–	Wind	Barstow
CACA 50770	–	–	–	–	Wind	–
CACA 51947	L.H. Renewables, LLC	March 10, 2010	9,069	–	Wind	El Centro
		Application Authorized				
Authorized Wind Site Testing						
CACA 47751	Renewergy, LLC	Jan. 23, 2007	11,187	–	Wind	El Centro
CACA 48272	Imperial Wind	Aug. 16, 2010	1,960	–	Wind	El Centro
CACA 51062	John Deere Renewables, LLC	April 29, 2009	6,256	–	Wind	El Centro
Pending Wind Developoment Facility						
CACA 51664	L.H. Renewables, LLC	Dec. 8, 2009	3,500	–	Wind	Palm Springs
CACA 52078	Imperial Wind	May 28, 2010	2,054	65	Wind	El Centro

[a] Information taken from pending and authorized wind energy projects listed on BLM California Desert District Web site (BLM 2010h) and downloaded from GeoCommunicator (BLM and USFS 2010b); total solar acres = 389,723 total solar MW = 24,137; total wind acres and MW not available.

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

[c] A dash indicates data not available.

- The proposed transmission line route would generally follow SCE‘s existing 500-kV Devers-Palo Verde transmission line.

- Transmission line structures would be concrete, single-pole structures.

- Upgrades to the Julian Hinds Substation.

- Buck to Devers-Palo Verde transmission line component:

  - Upgrades to Buck Substation.

  - Installation of approximately 7 mi (11 km) of a new 230-kV transmission line (initially operated at 161 kV) between the Buck Substation and SCE's existing Devers-Palo Verde 500-kV transmission line.

  - Transmission line structures would be concrete single-pole structures.

  - Construction of a new 161-kV to 500-kV substation at the point of interconnection with SCE's existing Devers-Palo Verde 500-kV transmission line (CEC 2010a).

The CEC Web site indicates that Blythe Energy is currently making the transmission line and substation modifications and expects construction to be completed in 2010 (CEC 2010a).

Devers to Palo Verde No.2. A second Devers-Palo Verde line has been proposed that will run adjacent to the existing line south of I-10 and the proposed Riverside East SEZ in an existing corridor. The 500-kV line would run 230 mi (370 km) following the existing Devers-Palo Verde 500-kV line from San Bernardino in California to the Harquahala Generating Station near the Palo Verde Nuclear Plant in Arizona. However, the Arizona Corporation Commission has denied the Arizona portion of the line. In California, the line would run a total of 153 mi (245 km) from the Colorado River Substation to the Devers Substation and end at Valley Substation. The CPUC approved the California portion of the line on Nov. 20, 2009 (CPUC 2009). Southern California Edison is expecting to begin construction of the California portion of the line in 2011 and have the line in service in 2013. Construction is pending ISO satisfaction with conditions for interconnection agreements, while the project still requires approval in a BLM ROD.

9.4.22.2.2 Other Actions

Other Foreseeable Actions

Cadiz Valley Dry-Year Supply Project. The Cadiz Valley Dry-Year Supply Project is a water storage and supply program that will provide southern California with as much as

150,000 ac-ft/yr (185 million m^3/yr) of water during years of droughts, emergencies, or other periods of urgent need by utilizing the aquifer system that underlies Cadiz's 35,000 acres (142 km^2) of land holdings in the Cadiz and Fenner Valleys of eastern San Bernardino County (Cadiz, Inc. 2008), about 40 mi (64 km) north of the western portion of the Riverside East SEZ. Historically, such dry periods occur in about 3 out of every 10 years. In any given dry year, this water would be enough to serve more than 1.2 million people. The project would involve taking water from the CRA during high rainfall years and storing it in aquifer systems to supply southern California's water needs during periods of severe drought (Cadiz Inc. 2008).

The project was the subject of congressional hearings in August 2009 regarding Cadiz, Inc.'s controversial proposal to use a 42-mi (68-km) long stretch of a Mojave railway line ROW for the water pipeline (Chance of Rain 2009). A portion of the water pipeline would cross the extreme southern part of the Iron Mountain SEZ, about 20 mi (32 km) north of the Riverside East SEZ.

Proposed West Chocolate Mountains Renewable Energy Evaluation Area. In a February 10, 2010, NOI in the *Federal Register*, the BLM El Centro Field Office announced its intent to prepare an EIS to consider an amendment to the California Desert Conservation Area Plan to identify whether 21,300 acres (86.2 km^2) of BLM-administered lands within the West Chocolate Mountains area should be made available for geothermal, solar, or wind energy development (BLM 2010a). The Evaluation Area lies about 20 mi (32 km) southwest of the proposed Riverside East SEZ in Riverside County, east of Niland and northeast of El Centro, California.

Eagle Crest Hydroelectric Plant. Eagle Crest Energy company proposes to construct and operate a 1,300-MW pumped storage hydroelectric plant at the Eagle Mountain Mine located near the northwest portion of the Riverside East SEZ about 10 mi (16 km) north of Desert Center. A draft license application for project approval was submitted to the FERC in June 2008 (Eagle Crest Energy 2008a). In September 2008, Eagle Crest Energy submitted a request to the California Water Resources Control Board for water qualification certification pursuant to Section 401 of the CWA (Eagle Crest Energy 2008b).

The pumped storage facility would be constructed at the old Eagle Mountain Mine site. The facility would use former mine pits (i.e., upper and lower reservoirs), which would be linked by subsurface tunnels to convey water through four reversible 325-MW turbines. Water would be pumped alternately to the upper storage reservoirs and released to the lower reservoirs. The lower reservoirs would initially be filled with 25,000 ac-ft (30.8 million m^3) of water. The system is estimated to lose some water to seepage and evaporation and require makeup water estimated at 2,400 ac-ft/yr (3.0 million m^3/yr).

Eagle Crest Energy would build transmission lines to convey power to a new substation that would in turn connect to the 500-kV Palo Verde-Devers transmission line located about 10 mi (16 km) from the project site (Eagle Crest Energy 2009).

Other Ongoing Actions

Mining. Several mining claims are active north of the eastern portion of the Riverside East SEZ. The BLM GeoCommunicator Database showed mining densities of 26 to 50 per section within the five townships in the northern portions of the eastern part of the SEZ. Two townships along the southern portion of the eastern part adjacent to I-10 have mine claim densities of 51 to 100 in each township. Mine claim densities in townships in the western part of the SEZ vary from 1 to 10 in the two townships located northwest of State Route 177. The locations of individual mine claims and their potential conflict with solar energy projects will require additional analysis by solar energy companies and by decision-makers prior to project approval. Developers may have to purchase mine claims in order to site solar energy facilities.

Grazing

- *Ten-Year Grazing Lease Rice Valley Allotment*. The BLM prepared an EA on a proposal for a 10-year lease on the Rice Valley Allotment to authorize sheep grazing on 74,740 acres (302 km^2) of public land located approximately 26 mi (42 km) northwest of Blythe in Riverside County (BLM 2007a).

9.4.22.3 General Trends

9.4.22.3.1 Population Growth

Table 9.4.22.3-1 presents recent and projected populations in the 50-mi (80-km) radius ROI (i.e., the ROI is Riverside County) and in California as a whole. Population in the ROI stood at 2,103,050 in 2008, having grown at an average annual rate of 3.8% since 2000. The growth rate for the ROI was higher than that for California (1.4%) over the same period.

The ROI population is expected to increase to 2,965,113 by 2021 and to 3,085,643 by 2023 (California Department of Finance 2010).

9.4.22.3.2 Energy Demand

The growth in energy demand is related to population growth through increases in housing, commercial floorspace, transportation, manufacturing, and services. With population growth expected in Imperial, Riverside, and San Bernardino Counties between 2006 and 2016, an increase in energy demand is also expected. However, the EIA projects a decline in per-capita energy use through 2030, mainly because of improvements in energy efficiency and the high cost of oil throughout the projection period. Primary energy consumption in the United States between 2007 and 2030 is expected to grow by about 0.5% each year; the fastest growth is projected for the RCI sector, which is expected to grow by about 0.5% (residential), 0.4% (commercial), and 0.1% (industrial) each year (EIA 2009).

TABLE 9.4.22.3-1 ROI Population for the Proposed Riverside East SEZ

Location	2000	2008[a]	Average Annual Growth Rate, 2000–2008 (%)	2021	2023
Riverside County	1,559,039	2,103,050	3.8	2,965,113	3,085,643
California	34,105,437	38,129,628	1.4	44,646,420	45,667,413

[a] Data are averages for the period 2006 to 2008.

Sources: U.S. Bureau of the Census (2009f); California Department of Finance (2010).

9.4.22.3.3 Water Availability

The Riverside East SEZ is located within the Mojave Desert, which is characterized by extreme daily temperature ranges with low precipitation and humidity (CDWR 2009); annual precipitation is between 4 and 6 in./yr (10 and 15 cm/yr) (CDWR 2003).

Palen Lake and Ford Dry Lake are located in the SEZ. Palen Lake is a wet playa having groundwater located near the surface and covering an area of 4,260 acres (17 km^2) with only 750 acres (3 km^2) within the boundaries of the SEZ. Ford Dry Lake is a dry lakebed covering 4,400 acres (18 km^2), most of which is within the SEZ boundaries. The primary surface water features within the proposed Riverside East SEZ are several ephemeral drainages coming off the surrounding mountains.

The SEZ is located within two groundwater basins: Chuckwalla Valley and Palo Verde Mesa. There are no restrictive structures between the two groundwater basins. The total thickness of the principal aquifer is on the order of 1,200 ft (366 m) (CDWR 2003), and the alluvium layer thickness is on the order of 100 to 150 ft (30 to 46 m) in the region of the SEZ (Metzger et al. 1973).

Groundwater recharge in the Chuckwalla Valley is by subsurface underflow and from direct infiltration of precipitation runoff. Estimates of natural recharge have not been quantified in the Chuckwalla Valley. Natural recharge is estimated to be 800 ac-ft/yr (987,000 m^3/yr) in the neighboring Palo Verde Mesa and the Cadiz Valley, which have similar climate and precipitation conditions (CDWR 2003). Recharge from precipitation runoff is not suspected to be significant given the limited precipitation in the region (Metzger et al. 1973).

Groundwater discharge in the Chuckwalla Valley is primarily by evapotranspiration at Palen Lake and subsurface underflow to the Palo Verde Mesa; the evapotranspiration rate at Palen Lake is unknown, and the subsurface underflow is estimated to be 400 ac-ft/yr (493,000 m^3/yr) to Palo Verde Mesa (CDWR 2003).

Groundwater withdrawal rates were 9,100 ac-ft/yr (11.2 million m^3/yr) in 1966 (CDWR 2003), and between 4,400 and 5,700 ac-ft/yr (5.4 million and 7.0 million m^3/yr) during dry and wet years occurring in the period 1998 to 2001 (CDWR 2005). The majority of groundwater withdrawals in the region of the proposed SEZ are for agricultural and domestic uses.

Groundwater surface elevations are routinely monitored in the Chuckwalla Valley and Palo Verde Mesa. Depth to groundwater ranges between 80 and 270 ft (24 and 82 m) below the surface across the Chuckwalla Valley and into the Palo Verde Mesa (USGS 2010b). Groundwater surface elevations have remained steady for several decades (USGS 2010c, monitoring wells 334438115211101, 333939114411501).

Groundwater well yields average 1,800 gpm (6,814 L/min) with a maximum of 3,900 gpm (14,760 L/min) in the Chuckwalla Valley. However, the majority of the groundwater extractions are clustered on the western and eastern edges of the valley around Desert Center and the Palo Verde Mesa. It is suspected that further groundwater development in this region may lead to declines in groundwater elevations (Metzger et al. 1973; Steinemann 1989).

In 2005, water withdrawals from surface waters and groundwater in Riverside County were 1.4 million ac-ft/yr (1.7 billion m^3/yr), of which 74% came from surface waters and 26% from groundwater. The largest water use category was municipal and domestic supply, at 519,000 ac-ft/yr (640 million m^3/yr). However, the majority of this water is used in the larger cities located in the western portion of Riverside County. Agricultural water uses accounted for 874,000 ac-ft/yr (1.1 billion m^3/yr), and industrial water uses on the order of 7,000 ac-ft/yr (8.6 million m^3/yr) (Kenny et al. 2009). The primary water use in the eastern portion of Riverside County relevant to the proposed Riverside East SEZ is for agriculture, representing 59 to 77% of total groundwater withdrawals during the dry and wet years, respectively, in the period 1998 to 2001 (CDWR 2005).

9.4.22.3.4 Climate Change

Global warming continues to affect many desert areas in the southwestern United States with increased temperature and prolonged drought during the past 20 to 30 years. A report on global climate change in the United States prepared on behalf of the National Science and Technology Council by the U. S. Global Research Program documents current temperature and precipitation conditions and historic trends, and projects impacts during the remainder of the twenty-first century through modeling using low and high scenarios of GHG emissions. The report summarizes the science of climate change and the recent and future impacts of climate change on the United States (GCRP 2009). The following excerpts from this report indicate that there has been a trend for increasing global temperature and decrease in annual precipitation in desert regions:

- Average temperature in the United States increased more than 2° F (1.1°C) over the period 1957 to 2007.

- Southern areas, particularly desert regions of southern Arizona and southeastern California, have experienced longer drought and are projected to have more severe periods of drought during the remainder of the twenty-first century. Much of the Southwest has experienced drought conditions since 1999. This period represents the most severe drought in 110 years.

- The incidence of wildfires in the western United States has increased in recent decades, partly because of increased drought.

- Temperature increases in the next 20 to 30 years are expected to be strongly correlated with past emissions of heat-trapping gases, such as carbon dioxide and methane.

- Many extreme weather events have increased both in frequency and intensity during the last 40 to 50 years. Precipitation and runoff are expected to decrease in the Southwest in spring and summer based on current data and anticipated temperature increases. Water use will increase over the next several decades as the population of southern California grows, resulting in trade-offs between competing uses.

- Climate project models also show a 10 to 20% decline in runoff in California and Nevada for the period of 2041 to 2060 compared with data from 1901 to 1970 used as a baseline.

- In the Southwest average temperatures increased about 1.5°F (0.8°C) in 2000 compared to a baseline period of 1960 to 1979. By the year 2020, temperatures are projected to rise 2 to 3°F (1.1 to 1.7°C) above the 1960 to 1979 baseline.

Increased global temperatures from GHG emissions will likely continue to exacerbate drought in the southern California deserts. The State of California has prepared several reports of climate change impact predictions through the remainder of the twenty-first century that address topics such as economics, ecosystems, water use/availability, impacts on Santa Ana winds, agriculture, timber production, and snowpack. The California climate change portal Web site (http://www.climatechange.ca.gov/publications/cat/index.html) lists the Climate Action Team reports that are submitted to the Governor and state legislature. These reports are included as final papers of the California Energy Commission's Public Interest Energy Research Program.

9.4.22.4 Cumulative Impacts on Resources

This section addresses potential cumulative impacts in the proposed Riverside East SEZ on the basis of the following assumptions: (1) because of the relatively large size of the proposed SEZ (more than 30,000 acres [121 km^2]), as many as three projects could be constructed at a time, and (2) maximum total disturbance over 20 years would be 162,317 acres (657 km^2) (80% of the entire proposed SEZ). For analysis, it is also assumed that no more than 3,000 acres

($12.1 km^2$) would be disturbed per project annually and 250 acres ($1.01 km^2$) monthly on the basis of construction schedules planned in current applications. An existing 500-kV transmission line runs east–west along I-10 and parallel to the southern SEZ boundary and a 230-kV line passes through the far western section of the SEZ; therefore, for this analysis, the impacts of construction and operation of new transmission lines outside of the SEZ were not assessed. Regarding site access, because I-10 passes along the southern edge of the SEZ and there are several exits from I-10 as it passes by and through the SEZ, no major road construction activities outside of the SEZ would be needed for development to occur in the SEZ.

Cumulative impacts in each resource area that would result from the construction, operation, and decommissioning of solar energy development projects within the proposed SEZ when added to other past, present, and reasonably foreseeable future actions described in the previous section are discussed below. At this stage of development, because of the uncertainties of the future projects in terms of location within the proposed SEZ, size, number, and the types of technology that would be employed, the impacts are discussed qualitatively or semi-quantitatively, with ranges given as appropriate. More detailed analyses of cumulative impacts would be performed in the environmental reviews for the specific projects in relation to all other existing and proposed projects in the geographic areas.

9.4.22.4.1 Lands and Realty

Although the proposed Riverside East SEZ lies adjacent to the highly developed I-10 corridor, which includes a number of major transmission lines, roads, pipelines, and other infrastructure, much of the land within the proposed SEZ exhibits a rural character (Section 9.4.2.1). The SEZ contains only BLM-administered land, but numerous parcels of private land are scattered throughout the SEZ or are located in near proximity. One section of state land is surrounded by the SEZ.

Development of the SEZ would introduce a highly contrasting industrialized land use into an area that is largely rural. In addition, numerous other renewable energy projects are proposed within a 50-mi (80-km) radius of the Riverside East SEZ. As shown in Table 9.4.22.2-2 and Figure 9.4.22.2-2, as many as 33 solar projects and 9 wind projects have pending applications within this distance, with ROW applications for solar projects alone totaling more than 400,000 acres ($1,600 km^2$), including more than 30,000 acres ($120 km^2$) for six advanced solar proposals on private and public land (Section 9.4.22.2.1). As a result of the potential and likely development of other renewable energy projects and accompanying transmission lines, roads, and other infrastructure within the geographic extent of effects, the character of a large portion of the California Desert could be dramatically changed. The contribution to cumulative impacts of utility-scale solar projects on public lands on and around the Riverside East SEZ could be significant, particularly if the SEZ is fully developed with solar projects. Development of the public lands for solar energy production may also result in similar development on the state and private lands in the immediate vicinity of the SEZ.

Construction of utility-scale solar energy facilities within the SEZ would preclude use of those areas occupied by the solar energy facilities for other purposes. The areas that would be occupied by the solar facilities would be fenced, and access to those areas by both the general public and wildlife would be eliminated.

9.4.22.4.2 Specially Designated Areas and Lands with Wilderness Characteristics

The proposed Riverside East SEZ is located in the CDCA and surrounded by specially designated areas, including Joshua Tree NP, seven designated Wilderness Areas, and seven ACECs: Corn Springs, Alligator Rock, Chuckwalla DWMA, Chuckwalla Valley Dune Thicket, Desert Lily Preserve, Mule Mountains, and Palen Dry Lake (Section 9.4.3.1). Construction of utility-scale solar energy facilities within the SEZ in combination with potential development of other renewable energy projects and associated infrastructure would have the potential for contributing to the adverse visual impacts on these specially designated areas. Development of the SEZ, especially full development, would be a dominant factor in the viewshed from large portions of one or more of these areas.

Solar development both of the Riverside East SEZ and the Iron Mountain SEZ (which is about 25 mi [40 km] north), together with the Rice Solar Energy and Tessera Solar facilities on private land, would combine to adversely affect wilderness values in the Palen-McCoy, Rice Valley, Big Maria Mountains, Chuckwalla Mountains, and Little Chuckwalla Mountains WAs and in Joshua Tree NP. As of February 2010, 15 solar project applications were pending in the SEZ, including four fast-track solar applications, covering about 65% of the SEZ that, in combination with projects within a 50-mi (80-km) radius, likely will result in cumulative effects, particularly visual impacts, on sensitive areas.

9.4.22.4.3 Rangeland Resources

No livestock grazing now occurs in the SEZ; therefore, solar development of the area would not contribute to any cumulative effects on livestock grazing. Likewise, since SEZ is not located within either an HA or HMA, there would be no contribution to any adverse effects on wild horses or burros.

9.4.22.4.4 Recreation

The Riverside East SEZ is quite flat, but it does offer diverse recreational opportunities, especially during cooler months. Those opportunities include back country driving, camping, rockhounding, hunting, and seasonal nature hikes. The area has been traditionally used by the residents of Desert Center, Blythe, and urban areas to the west. It is anticipated there would not be a significant loss of recreational use caused by development of the Riverside East SEZ, although some users would be displaced.

When SEZ development is considered in combination with other potential renewable energy development within the region, a potential would exist for cumulative visual impacts on recreational users of the specially designated areas surrounding the SEZ (Section 9.4.22.4.2).

There is substantial potential for loss of wilderness and scenic values throughout the California Desert wherever solar and wind energy development encroaches on wilderness or on other currently undeveloped areas. Cumulative impacts on recreational use associated with the loss of wilderness values and general open desert scenery also could occur. While the effects cannot be quantified, desert users might avoid areas dominated by industrial-type solar facilities. This situation could result a fundamental change in the way the California Desert has been traditionally used.

9.4.22.4.5 Military and Civilian Aviation

The proposed Riverside East SEZ is located under eight MTRs, which are part of a very large, interconnected system of military aircraft training routes throughout the southwest. The development of any solar energy or transmission facilities that encroach into the airspace of MTRs could create safety issues and could interfere with military training activities. While the military has indicated that some portions of this SEZ are compatible with its existing use regardless of the proposed heights of solar facilities, while other portions should have height limits, and some areas may be incompatible with existing military use. Potential solar development occurring throughout the region, which is currently largely undeveloped, could result in small cumulative effects on the system of MTRs. Such effects would be limited by mitigations developed in consultation with the military.

Two civilian aviation facilities lie within 2 mi (3.2 km) of the SEZ and operations could be affected by solar facilities. In particular, fight operations at the Blythe Airport could be affected by facility structures and transmission lines, glint and glare, electromagnetic interference, bird attraction, and turbulence from thermal plumes above air-cooled condensers at the adjacent Blythe Solar Power Project (CACA 48811). While these effects may be low individually (CEC 2010c), small cumulative impacts on the Blythe Airport could result.

9.4.22.4.6 Soil Resources

Ground-disturbing activities (e.g., grading, excavating, and drilling) during the construction phase of a solar project, including any associated transmission lines, would contribute to soil loss due to erosion. Construction of new roads within the SEZ or improvements to existing roads would also contribute to soil erosion. During construction, operations, and decommissioning of the solar facilities, worker travel and other road use would also contribute to soil loss. These losses would be in addition to losses occurring as a result of disturbance caused by other users in the area, including from potential construction of several other renewable energy facilities, and recreational users, such as off-road vehicle enthusiasts. As discussed in Section 9.4.7.3, programmatic design features would be implemented to minimize erosion and loss of soil during the construction, operation, and decommissioning phases of the solar facilities and any associated transmission lines. Landscaping of solar energy facility areas could alter drainage patterns and lead to increased siltation of surface water streambeds, in addition to that caused by other development activities. Altering drainage patterns would in turn impact vegetation in washes and associated habitats supported by existing flows. Even with the expected design features in place, cumulative impacts from the disturbance of several large sites and connecting linear facilities in the vicinity could be significant.

9.4.22.4.7 Minerals (Fluids, Solids, and Geothermal Resources)

Currently, there are seven mining claims but no geothermal or oil and gas leases within the SEZ. It is assumed there would be no cumulative effect on mineral resources. The SEZ is still open for discretionary mineral leasing, including leasing for oil and gas and other leasable minerals.

9.4.22.4.8 Water Resources

The water requirements for development and operation of various utility-scale solar energy technologies on the proposed SEZ are described in Section 9.4.9.2. If the SEZ is fully developed over 80% of its available land area, the amount of water needed during the peak construction year for the various solar technologies evaluated would be 4,541 to 6,732 ac-ft (5.6 to 8.3 million m^3). The amount of water needed during decommissioning would be similar to or less than the amount used during construction. During operations, the amount of water needed for all solar technologies evaluated would range from 914 to 488,000 ac-ft/yr (1.1 to 603 million m^3/yr), with PV representing the lower end of this range. Since the availability of groundwater (the primary water resource available to solar energy facilities in the SEZ) is limited, it would not be feasible to obtain the upper end of the water requirements range. Assuming the maximum historical groundwater withdrawal rate of 9,100 ac-ft/yr (11.2 million m^3/yr) from the underlying groundwater basins is dedicated to solar energy production, the amount of wet-cooled trough or tower solar technology that could be built would be limited to on the order of 1,800 MW, or only about 5% of SEZ capacity if unlimited water was available. For dry-cooling options, about 12,800 MW could be produced, or about 39% and 71% of the estimated SEZ capacity for trough and tower technologies, respectively. Sustainable groundwater yields might represent even lower theoretical energy yields from these technologies. Conversely, PV development would have minimal impacts on groundwater sources, while dish engine technologies could be fully developed without exceeding recharge rates, particularly if water conservation measures were taken for mirror washing.

As of February 2010, 15 solar project applications were pending in the SEZ, including four fast-track solar applications, covering about 65% of the SEZ (Figure 9.4.22.-1). Impacts on the Chuckwalla Valley and Palo Verde Mesa groundwater basin would be large if several projects were built using wet-cooling trough or tower technologies. Water use is sustainable only if development in the proposed SEZ emphasizes deployment of PV and dish engine facilities and if deployment of trough and tower facilities is limited to the eastern portion of the proposed SEZ.

The development of the six advanced solar proposals identified within the geographic extent of effects (Section 9.4.22.2.1) could draw up to 8,000 ac-ft (9.9 million m^3/yr) of water to support construction during the period 2011–2013, and up to 2,700 ac-ft/yr (3.3 million m^3/yr) during the following operational period of approximately 30 years. Four of these projects, the four fast-track solar applications, are located within the proposed Riverside East SEZ and would draw from the Chuckwalla Valley and Palo Verde Mesa groundwater basin. In addition, the Eagle Crest pumped storage project would withdraw an initial 25,000 ac-ft (30.8 million m^3) from the Chuckwalla Valley basin and require makeup water of 2,400 ac-ft/yr (3.0 million m^3/yr) over its operating life. Some of the makeup water represents water lost to seepage back into the basin. The Rice Solar Energy Project, with construction water use of 780 ac-ft/yr (0.96 million m^3/yr) and operational water use of 180 ac-ft/yr (0.22 million m^3/yr), likely would not affect groundwater at the Riverside East SEZ, because the SEZ does not lie over the Rice Valley basin, which is separated from the Palo Verde Mesa basin by the Big Maria Mountains to the north (Section 9.4.9.1.2). Likewise, the several pending solar energy project proposals for locations off-site within 50 mi (80 km) of the SEZ, including those to the north in the Iron Mountain SEZ (Figure 9.4.22.2-1), if approved, would likely draw from other groundwater basins and thus not contribute significantly to cumulative impacts within the Riverside East SEZ. Therefore, cumulative impacts on groundwater basins underlying the Riverside East SEZ from currently foreseeable projects would be minimally greater than the impacts from solar energy development within the SEZ. Similarly, potential effects on surface waters and wetlands from drawdown of groundwater underlying the Riverside East SEZ would likely not extent to locations of other potential off-site solar projects.

The small quantities of sanitary wastewater that would be generated during the construction and operation of utility-scale solar energy facilities within the Riverside East SEZ in combination with similarly small volumes from other foreseeable projects would not be expected to strain available sanitary wastewater treatment facilities in the general area of the SEZ. Blowdown water from cooling towers for wet-cooled technologies would be treated within a project site (e.g., in settling ponds) and injected into the ground, released to surface water bodies, or reused, and thus would not contribute cumulative impacts to any nearby treatment systems.

9.4.22.4.9 Vegetation

The proposed SEZ is in a transitional area that includes many species associated with the Mojave and Sonoran Deserts within the Sonoran Basin and Range ecoregion, which supports creosotebush (*Larrea tridentata)*-bur sage (*Ambrosia dumosa*) plant communities with large areas of palo verde (*Cercidium microphyllum*)-cactus shrub and saguaro cactus (*Carnegiea gigantea*) communities. The western portion of the SEZ is within the Mojave Basin and Range ecoregion, which is characterized by broad basins and scattered mountains. Thirty-seven wetlands are located entirely or in part within the SEZ, with a total of 3,807 acres (15.4 km^2), while 113 wetlands are located within the indirect impact area within 5 mi (8 km) of the SEZ. Most wetlands are of the intermittent or ephemeral type.

Desert dry washes in the SEZ support woodlands that include ironwood, smoketree, and blue palo verde. An ironwood forest, identified by BLM as a Unique Plant Assemblage, occurs in the upper reaches of McCoy Wash. If utility-scale solar energy projects were to be constructed within the SEZ, all vegetation within the footprints of the facilities would likely be removed during clearing and grading of land. Vegetation communities primarily affected would be the Sonora-Mojave Creosotebush-White Bursage Desert Scrub cover type. Solar development could result in large impacts on North American Warm Desert Active and Stabilized Dune; moderate impacts on Sonora-Mojave Creosotebush-White Bursage Desert Scrub, North American Warm Desert Volcanic Rockland, North American Warm Desert Wash, North American Warm Desert Pavement, North American Warm Desert Playa, Sonora-Mojave Mixed Salt Desert Scrub, Developed, Open Space—Low Intensity, and North American Warm Desert Riparian Mesquite Bosque; and small impacts on the remaining cover types. Sand dune, playa, mixed salt desert scrub (primarily associated with Ford Dry Lake), and dry wash communities are important sensitive habitats in the region.

Numerous other renewable energy projects are proposed within a 50-mi (80-km) radius of the Riverside East SEZ. As many as 33 solar projects and 9 wind projects have pending applications within this distance, with ROW applications for solar applications alone totaling more than 400,000 acres (1,600 km^2), including more than 30,000 acres (120 km^2) for five of six advanced solar proposals on private and public land (Section 9.4.22.2.1). Depending on the actual development of renewable energy projects within and outside the SEZ and accompanying transmission lines, roads, and other infrastructure within the geographic extent of effects, cumulative impacts on certain cover types could be significant, particularly those that favor the basin flats, which are suitable for solar facilities. As other projects and transmission lines are added, natural corridors and safe germination sites may be lost; this would be detrimental to plant populations and ecosystem stability in the region.

In addition, the cumulative effects of fugitive dust generated during the construction of solar facilities along with other activities in the area, such as transportation and recreation, could increase the dust loading in habitats outside a solar project area. Increased dust loading could result in reduced productivity or changes in plant community composition. Programmatic design features would be implemented to reduce the impacts from solar energy projects and thus reduce the overall cumulative impacts on plant communities and habitats.

9.4.22.4.10 Wildlife and Aquatic Biota

As many as 173 species of amphibians (2 species), reptiles (31 species), birds (100 species), and mammals (40 species) occur in and around the proposed Riverside East SEZ (Section 9.4.11). The construction of utility-scale solar energy projects in the SEZ and of any associated transmission lines and roads in or near the SEZ would have impacts on wildlife through habitat disturbance (i.e., habitat reduction, fragmentation, and alteration), wildlife disturbance, loss of connectivity between natural areas (e.g., habitat fragmentation and blockage of dispersal corridors for bighorn sheep and desert tortoise), and wildlife injury or mortality. In general, affected species with broad distributions and occurring in a variety of habitats would be less affected than species with a narrowly defined habitat within a restricted area. Programmatic design features include pre-disturbance biological surveys to identify key habitat areas used by wildlife, followed by avoidance or minimization of disturbance to those habitats (e.g., Ford Dry Lake and Palen Lake).

Up to 33 other solar projects and 9 wind projects have pending applications within 50 mi (80 km) of the SEZ, while the proposed Iron Mountain SEZ about 25 mi (40 km) to the north.

ROW applications for solar projects alone total more than 400,000 acres (1,600 km^2), including over 30,000 acres (120 km^2) for five of six advanced solar proposals on private and public land (Section 9.4.22.2.1). Depending on the actual development of renewable energy projects within and outside the SEZ and of accompanying transmission lines, roads, and other infrastructure within the geographic extent of effects, cumulative impacts on some wildlife species could be significant, particularly those species with habitats or migratory routes in the basin flats, which are suitable for solar facilities.

While many of the wildlife species have extensive habitat available within the affected counties, in cases where projects are closely spaced, the cumulative impact on a particular species could be moderate to large. Programmatic design features would be implemented to reduce the impacts from solar energy projects and thus reduce the overall cumulative impacts on wildlife. However, even with mitigations in place, cumulative impacts could be moderate within the geographic extent of effects.

No perennial or intermittent streams occur within the proposed Riverside East SEZ, but numerous dry washes are inundated after rain events; both Palen Lake and Ford Dry Lake are intermittent and rarely have standing water. Temporary ponding may occur in Palen Lake. Similarly, wetlands within the SEZ are intermittently flooded, so surface water is usually absent but may be present for variable periods. Consequently, no aquatic habitat or communities are likely to be present for an extended time within the SEZ. The intermittent wetlands and dry lakes present within and around the SEZ could be affected by runoff of water and sediment from the SEZ, especially if ground disturbance occurred near Palen Lake. However, with programmatic design features in place, the potential for indirect impacts on aquatic habitats and organisms within the region is small. Within the geographic extent of effects (50-mi [80 km] radius), water taken from perennial surface water features could affect water levels and, as a consequence, aquatic organisms in those water bodies. Thus, there would be small cumulative impacts on aquatic biota and habitats resulting from solar development in the region. Similarly, increased future demand on groundwater for multiple uses, including solar power development within the SEZ, could affect surface water levels outside of the SEZ and, as a consequence, could affect aquatic organisms in those water bodies.

9.4.22.4.11 Special Status Species (Threatened, Endangered, Sensitive, and Rare Species)

Thirty special status species are known to occur within the affected area of the Riverside East SEZ. Of these species, the Coachella Valley milkvetch is listed as endangered, and the desert tortoise is listed as threatened under the ESA; nine are listed as BLM-designated sensitive; and the remaining 19 species are considered rare. Numerous additional species occurring on or in the vicinity of the SEZ are listed as threatened or endangered by the states of California or Arizona or are listed as a sensitive species by the BLM. Potential mitigation measures that could be used to reduce or eliminate the potential for cumulative effects on these species from the construction and operation of utility-scale solar energy projects within the geographic extent of effects include avoidance of habitat, translocation of individuals, and minimization of erosion, sedimentation, and dust deposition.

Numerous reasonably foreseeable future actions could occur within the geographic extent of effects of the proposed Riverside East SEZ, including 33 solar and 9 wind applications for projects that would cover up to 400,000 acres (1,600 km^2). A number of sensitive species have been identified within the boundaries of the six advanced solar proposals covering 30,000 acres (120 km^2), including the four fast-track solar energy proposals within the proposed Riverside East SEZ (Section 9.4.22.2.1). These species include the federally or state-listed desert tortoise, Mojave fringe-toed lizard, Colorado fringe-toed lizard, Western burrowing owl, short-eared owl, prairie falcon, northern harrier, loggerhead shrike, California horned lark, desert kit fox, and several California-listed sensitive plant species.

In addition, the proposed Iron Mountain SEZ is about 25 mi (40 km) north of the Riverside East SEZ. Many special status species with potential habitat impacts from solar development are common to both the Riverside East and Iron Mountain SEZs, including the desert tortoise and Mojave fringe-toed lizard. However, projects in these and other areas would employ design features to reduce or eliminate the impacts on protected species as required by the ESA and other applicable federal and state laws and regulations.

Depending on the number and size of other projects that will actually be built within the next 20 to 30 years within the geographic extent of effects, there could be cumulative impacts on protected species due to habitat destruction and overall development and fragmentation of the area. Habitats that are particularly at risk are those in basin flats, which are suited for solar development. Together, several new solar facilities and the other associated actions would have a cumulative impact on wildlife. Where projects are closely spaced, the cumulative impact on a particular species could be moderate to large.

9.4.22.4.12 Air Quality and Climate

While solar energy generates minimal emissions compared with fossil fuel–generated energy, the site preparation and construction activities associated with solar energy facilities would produce some emissions, mainly particulate matter (fugitive dust) and emissions from vehicles and construction equipment. When these emissions are combined with those from other projects near solar energy facilities or when they are added to natural dust generated by winds and windstorms, the air quality in the general vicinity of the projects could be temporarily degraded. For example, particulate matter (dust) concentration at or near the SEZ boundaries could at times exceed state or federal ambient air quality standards. Generation of dust from construction activities can be partially controlled by implementing aggressive dust control measures, such as increased watering frequency or road paving or treatment, and/or sound practices such as minimizing activities under unfavorable meteorological conditions.

Several other renewable energy projects are proposed or planned within the air basin shared by Riverside East (Section 9.4.22.2.1 and Figure 9.4.22.2-1), while the proposed Iron Mountain SEZ is about 25 mi (40 km) north. Concurrent construction of solar facilities at the two SEZs could have cumulative impacts. Four fast-track proposed projects lie in the Riverside East SEZ, while a total of 33 solar and 9 wind proposals are pending within 50 mi (80 km) of the Riverside East SEZ. The fast-track projects have overlapping construction schedules for the period 2011 to 2013. These projects in combination with others with pending applications could produce periods of elevated particulate emissions in the affected area.

Over the long term and across the region, the development of solar energy may have beneficial cumulative impacts on the air quality and atmospheric values in southern California by offsetting the need for energy production with fossil fuels, which results in higher levels of emissions. As discussed in Section 9.4.13, air emissions from operating solar energy facilities are relatively minor, while the displacement of criteria air pollutants, VOCs, TAPs, and GHG emissions currently produced from fossil fuels could be relative large. For example, if the Riverside East SEZ is fully developed (80% of its acreage) with solar facilities, the quantity of pollutants avoided could be as large as 54% of all emissions from the current electric power systems in California (Section 9.4.13.2.2).

9.4.22.4.13 Visual Resources

The proposed Riverside East SEZ is within the Mojave basin and range physiographic province, typified by small, rocky mountain ranges with jagged peaks alternating with talus slopes and desert floor. The proposed SEZ site is in the flat plains of the Chuckwalla (including the McCoy Wash area east of the McCoy Mountains) and Palen Valley floors, with the strong horizon line and several mountain ranges surrounding the valley being the dominant visual features. The VRI values for the SEZ and immediate surroundings are VRI Class II, indicating high relative visual values; Class III, indicating moderate relative visual values; and Class IV, indicating low relative visual values. The inventory indicates moderate scenic quality for the Chuckwalla Valley and high sensitivity for the SEZ lands near Joshua Tree NP and for the Class II area in the southeastern portion of the SEZ, based on heavy recreational use, the presence of a BLM scenic highway and historic trails, and proximity to congressionally designated wilderness and areas of critical environmental concern.

Development of utility-scale solar energy projects within the SEZ would contribute to the cumulative visual impacts in the general vicinity of the SEZ and in the Chuckwalla and Palen valleys. However, the exact nature of the visual impacts and the design features that would be appropriate would depend on the specific project locations within the SEZ and on the solar technologies used. Such impacts and potential design features would be considered in visual analyses conducted for specific future projects. In general, large visual impacts on the SEZ would be expected to occur as a result of the construction, operation, and decommissioning of utility-scale solar energy projects. These impacts would be expected to involve major modification of the existing character of the landscape and would likely dominate the views for some nearby observers. Additional impacts would occur as a result of the construction, operation, and decommissioning of related facilities, such as access roads and electric transmission lines.

Because of the large size of utility-scale solar energy facilities, the large number of pending applications on public lands in the area, and the generally flat, open nature of the proposed SEZ, some lands outside the SEZ would also be subjected to visual impacts related to the construction, operation, and decommissioning of utility-scale solar energy development.

Potential impacts would include night sky pollution, including increased skyglow, light spillage, and glare. Some of the affected lands outside the SEZ would include potentially sensitive scenic resource areas, including large portions of the mountain ranges surrounding the Chuckwalla Valley and some neighboring valleys, including Ward and Rice Valleys, and the Pinto Basin, which could be subject to visual impacts associated with solar energy development within the SEZ. The magnitude of visual impacts on these sensitive areas would range from minimal to major. Visual impacts resulting from solar energy development within the SEZ would be in addition to visual impacts caused by other potential projects in the area, such as other solar facilities on private lands, transmission lines, and other renewable energy facilities, including windmills. The presence of new facilities would normally be accompanied by increased numbers of workers in the area, traffic on local roadways, and support facilities, all of which would add to cumulative visual impacts.

As many as 33 other solar projects and 9 wind projects have pending applications on public lands within 50 mi (80 km) of the proposed Riverside East SEZ, including 15 solar applications within the SEZ. In addition, the proposed Iron Mountain SEZ is about 25 mi (40 km) north of the Riverside East SEZ. While the overall extent of cumulative effects of renewable energy development in the area would depend on the number of projects actually built, it may be concluded that these projects could transform the general visual character of the landscape from primarily rural desert to more commercial-industrial. Because of the topography of the region, solar facilities, located in flat basins, would be visible at great distances from sensitive viewing locations in the surrounding mountains. Also, the facilities would be located near major roads, thus the facilities would be viewable by motorists. However, some portions of major roads where solar energy facilities would be located, including I-10, are currently visually affected by transmission line corridors, towns, and other infrastructure, as well as the road system itself.

In addition to cumulative visual impacts associated with views of particular future facilities, as additional facilities are added, several projects might become visible from one location or in succession as viewers move through the landscape, such as driving on local roads. In general, the new facilities would vary in appearance, and depending on the number and type of facilities, the resulting visual disharmony could exceed the visual absorption capability of the landscape and add significantly to the cumulative visual impact. Thus, the overall cumulative visual impacts in the region from solar and wind energy development would be significant.

9.4.22.4.14 Acoustic Environment

The areas around the proposed Riverside East SEZ and in Riverside County in general are relatively quiet. Existing noise sources include road traffic, railroad traffic, aircraft flyovers, agricultural activities, and activities and events at nearby residences. A number of residences are scattered along the SEZ boundaries, while population centers with schools include Desert Center, located at the southwestern edge of the SEZ, and Blythe, located about 5 mi (8 km) east of the eastern SEZ boundary. During construction of solar energy facilities, construction equipment could increase the noise levels over short periods during the day. After the facilities are constructed and begin operating, there would be little or minor noise impacts from any of the technologies, except for solar dish engine facilities and parabolic trough or power tower facilities using TES. It is possible that residents could be cumulatively affected by more than one solar or other development built in or near the SEZ, particularly at night when the noise is more discernable due to relatively low background levels. However, such cumulative impacts are unlikely due the expected wide separation of facilities and the sparse population of the region.

9.4.22.4.15 Paleontological Resources

The potential for impacts on significant paleontological resources at the Riverside East SEZ as a whole is relatively unknown, but the potential is high in some areas. Further, the specific sites selected for future projects would be surveyed if determined necessary by the BLM, and any paleontological resources encountered would be avoided or mitigated to the extent possible. A similar process would be employed at other facilities constructed in the area, and no significant cumulative impacts on paleontological resources are expected.

9.4.22.4.16 Cultural Resources

The proposed Riverside East SEZ is located in a transitional area between the Colorado Desert to the south and the Mojave Desert to the north. The area of the SEZ was important as a source of seasonal resources to surrounding Native American groups and includes important trails that connect them. Some trails have spiritual significance, while the surrounding mountains are regarded as sacred, with some peaks having special status. Other culturally important features include caves, rock formations, and springs. Revered locations included panels of rock art, ancestral settlements, arranged-rock sites, and burial or cremation areas. Direct impacts on significant cultural resources during site preparation and construction activities could occur in the proposed Riverside East SEZ. However, further investigation would be needed, including a cultural resource survey of the entire area of potential effects to identify archaeological sites, historic structures and features, and traditional cultural properties in project areas. Numerous cultural surveys have been conducted in the vicinity of the SEZ, including surveys at project sites within the SEZ with fast-track applications (Section 9.4.22.2.1) and have identified a number of prehistoric and historic sites at the project locations. It is possible that the development of utility-scale solar energy projects in the proposed Riverside East SEZ and of other projects likely to occur in the area could contribute cumulatively to cultural resource impacts, in particular along the I-10 corridor. However, historic properties would be avoided or mitigated to the extent possible, in accordance with state and federal regulations. Similarly, through ongoing consultation with the California SHPO and appropriate Native American governments, it is likely that many adverse effects on significant resources within the geographic extent of effects could be mitigated to some extent. Some visual and landscape scale impacts may not be mitigable to the satisfaction of all interested parties. The increment of adverse effects from solar energy development on the overall cumulative effect on cultural resources would depend on the nature of the resources affected and could be significant.

9.4.22.4.17 Native American Concerns

All federally recognized Tribes with traditional ties to the area of the proposed Riverside East SEZ have been contacted so that they could identify their concerns regarding solar energy development. The concerns of Native Americans, including the Serrano, Cahuilla, Quechan, Mohave, and Chemehuevi, over other energy development projects in the region have been documented. The Chemehuevi and NALC have expressed concerns over the Salt Song Trail, and the Quechan Indian Tribe of the Fort Yuma Reservation stressed the importance of evaluating impacts on landscapes as a whole within their Tribal Traditional Use Area. Solar development within the SEZ could have adverse effects on these and other Native American concerns even after mitigations are applied. It is further possible that the development of utility-scale solar energy projects in the SEZ, when added to other potential projects likely to occur in the area, including renewable energy projects outside the SEZ, could contribute cumulatively to visual impacts on their traditional landscape and the destruction of other resources in the valley important to Native Americans. Continued discussions with the area Tribes through government-to-government consultation is necessary to effectively consider and address the Tribes' concerns related to solar energy development in the region.

9.4.22.4.18 Socioeconomics

Solar energy development projects in the proposed Riverside East SEZ could cumulatively contribute to socioeconomic effects in the immediate vicinity of the SEZ and in the surrounding multicounty ROI. The effects could be positive (e.g., creation of jobs and generation of extra income, increased revenues to local governmental organizations through additional taxes paid by the developers and workers) or negative (e.g., added strain on social institutions such as schools, law enforcement agencies, and health care facilities). Impacts from solar development would be most intense during facility construction, but of greatest duration during operations. Construction in the Riverside East SEZ and at other new projects in the area, including other renewable energy projects, would temporarily increase the number of workers in the area needing housing and services. The number of workers involved in the construction of solar projects in the proposed Riverside East SEZ alone could range from about 400 to 5,200 in the peak construction year, depending on the solar technology being developed, with solar PV facilities at the low end and solar trough facilities at the high end. The total number of jobs created in the area could range from approximately 1,200 (solar PV) to as high as 16,000 (solar trough).

Cumulative socioeconomic effects in the ROI from construction of solar facilities would occur to the extent that multiple construction projects of any type were ongoing simultaneously. It is a reasonable expectation that this condition would occur within a 50-mi (80 km) radius of the SEZ occasionally over the 20-year or more solar development period. Six anticipated projects with advanced proposals, including four fast-track projects located within the Riverside East SEZ, would employ up to 2,300 construction workers during the period 2011 to 2013 (Section 9.4.22.2.1). This number of workers could place a modest short-term strain on local resources in this sparsely populated area.

Annual impacts during the operation of solar facilities would be less, but could last 20 to 30 years, and could combine with those from other new projects in the area. The number of workers needed at the solar facilities within the SEZ would range from 350 to 7,100, with approximately 500 to 11,700 total jobs created in the region. In addition, approximately 460 operation workers are estimated for the five of six projects with advanced proposals in the area (Section 9.4.22.2.1). Population increases resulting from renewable energy development within 50 mi (80 km) of the Riverside East SEZ would contribute to general population growth experienced in the region in recent years. The overall socioeconomic impacts would be positive, through the creation of additional jobs and income. The negative impacts, including some short-term disruption of rural community quality of life, would not be considered large enough to require specific design features.

9.4.22.4.19 Environmental Justice

Environmental impacts associated with solar facilities within the proposed Riverside East SEZ potentially affecting minority and low-income populations include noise and dust during the construction of solar facilities; noise associated with solar project operations; the visual impacts of solar facilities and transmission lines; access to land used for economic, cultural, or religious purposes; and effects on property values. However, such effects from solar development within the proposed Riverside East SEZ would be small and would not be expected to contribute to cumulative impacts on minority and low-income populations with the 50-mi (80-km) geographic extent of effects.

9.4.22.4.20 Transportation

During construction activities, up to 1,000 workers could be commuting to a single construction site at the SEZ, which would be less than 10% of the current traffic on I-10 near the SEZ. Should up to three large projects with approximately 1,000 daily workers each be under development simultaneously, an additional 6,000 vehicle trips per day could be added to I-10, an approximate 30% increase, which could have small to moderate impacts on traffic flow during peak commute times.

Further, if construction occurred concurrently in the proposed Riverside East and Iron Mountain SEZs, which are about 25 mi (40 km) apart and both served by State Route 177/62, the increase in traffic during shift changes could be significant. Local road improvements may be necessary near site access points. Any impacts during construction activities would be temporary. The impacts could be mitigated to some degree by having different work hours within an SEZ or between the two SEZs. Traffic increases during operation would be reduced because of the lower number of workers needed to operate solar facilities and would have a smaller contribution to cumulative impacts.

9.4.23 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 PEIS. It is likely that at the time of publication of this 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 PEIS.

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