DRAFT FOR COMMENT: Agua Caliente SEZ: Resources, Impacts, & On-site Mitigation

In Yuma County in southwestern Arizona, Yuma Field Office – 2,550 developable acres, up to 408 MW generation capacity, assuming 80% development.
Sources: Draft and Final Restoration Design Energy Project (RDEP) EIS containing analysis for Agua Caliente SEZ (available at: http://www.blm.gov/az/st/en/prog/energy/arra_solar/DEIS.html) and Draft and Final Solar PEIS (available at: http://blmsolar.anl.gov/)

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Acoustics Section 4.2.12[4]	Direct: Increased noise levels during construction, operations, and decommissioning may be experienced but would not exceed regulatory levels. Indirect: Construction noise from the SEZ is not likely to adversely affect any of the nearby specially designated areas. Cumulative[5]: Nearest residents live in Hyder, approximately 7 mi (11 km) from the SEZ, thus cumulative noise effects during the construction or operation of solar facilities are unlikely. Data Gaps[6]: Refined modeling would be warranted along with background noise measurements during project-specific assessments.	Solar facilities must be located far enough away from residences, or include engineering and/or operational methods such that county, state, and/or federal regulations for noise are not exceeded. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Noise.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Limiting increases to less than a 10 dBA increase above ambient levels, and to not exceed local noise standards. Limiting the hours of daily activities, construction of noise barriers if needed and practicable, coordination with nearby residents. See programmatic and SEZ-specific design features.	Maybe (depends on technology)	No

[1] RDEP EIS assumes full development is equal to 80% build out for the renewable energy development areas (REDAs), including the Agua Caliente SEZ.

[2] Avoidance is accomplished by imposing spatial and/or temporal restrictions. Minimization is accomplished using programmatic and SEZ-specific design features (DFs) (as presented in the Records of Decision for the RDEP EIS and the Solar PEIS) and/or best management practices. Solar PEIS DFs are applicable to the Agua Caliente SEZ. (Note: In general only SEZ-specific DFs and SEZ-specific application of programmatic DFs are presented in this table.) Monitoring is planned to verify the implementation and effectiveness of design features. Additional avoidance measures could be introduced during the Solar Regional Mitigation Strategy process for identified unavoidable impacts

[3] Unavoidable impacts are those that cannot be adequately mitigated on-site by avoidance and/or minimization. Preliminary assessments are provided for comment.

[4] Section numbers are from the Final RDEP EIS.

[5] Chapter 5 of the Draft and Final RDEP addresses cumulative impacts, which consider ongoing and reasonably foreseeable activities in the vicinity of the SEZ such as wind, geothermal, mining, agricultural, and commercial development; new roads, traffic, and off-highway vehicle use; and infrastructure including transmission lines, pipelines, canals, fences, and communication systems. Largest cumulative impact consideration is presence of Agua Caliente Solar Project, a 250 MW operating solar photovoltaic (PV) facility, on private land located within the two halves of the SEZ.

[6] Data gaps have not been identified for all resources in this table. Additional data gaps may be identified during future SEZ- or project-specific assessments.

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Air Quality Section 4.2.1	**Direct:** Fugitive dust and equipment exhaust emissions during construction could result in exceedance of Ambient Air Quality Standards (AAQS) for particulate matter (PM) at SEZ boundaries. Specifically, 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$ concentrations could exceed AAQS at the SEZ boundaries and in the immediate surrounding areas during construction of solar facilities. High PM_{10} concentrations would be limited, however, to the immediate areas surrounding the SEZ boundary and would decrease quickly with distance. Generation of fugitive dust may result in exposure to respirable particulates and/or microbes (human health impacts). The majority of the soils on the SEZ have been characterized as having high potential for wind erosion. **Indirect:** Decreased visibility in nearby residential or specially-designated areas due to elevated PM levels from soil disturbance/grading during construction. **Cumulative:** Cumulative effects due to dust emissions would be greatest if multiple solar projects had overlapping construction periods. **Data Gaps:** Predicted 24-hour PM_{10} and 24-hour and annual $PM_{2.5}$ concentration levels not included in analysis. Monitoring for PM during all phases of development will be required to identify levels exceeding AAQS.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Air_Quality_Climate.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	All soil disturbance activities and travel on unpaved roads will be suspended during periods of high winds. A critical site-specific wind speed will be established based on soil properties determined during site characterization, and wind speed monitoring will be required at the site during construction, operation, and reclamation. Dust suppression measures will be implemented during all phases of development (construction, operations, and decommissioning). See programmatic and SEZ-specific design features.	Yes if site is graded	No, unless monitoring identifies high PM levels

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Climate Change Section 5.11.4 of Draft Solar PEIS for soil storage capacity	**Direct:** Possible impact through loss of carbon storage capacity of the soil (estimated at 100 g carbon/m^2). Preliminary calculations show loss of CO_2 storage capacity as 1.6 tons/acre/yr (3,264 tons/yr for SEZ full build-out). **Positive impact**: Solar power generation reduces demand for energy from fossil fuels, and thereby reduces greenhouse gas emissions (emissions avoided not given in RDEP EIS, would be similar to emissions avoided for the similarly-sized Gillespie SEZ (i.e., from about 347,000-624,000 tons/yr CO_2 avoided at full build-out depending on technology). **Cumulative:** Over the long term the development of solar energy may contribute to reduced greenhouse gas emissions (if the development offsets electricity generation by fossil fuel plants). About 65% of electricity in AZ is produced in fossil fuel plants. Based on data from the Sonoran Desert Rapid Ecoregional Assessment (REA), the SEZ is situated in an area with moderate potential for future climate change (e.g., increased temperature, decreased precipitation, and changes in vegetation and habitat).	Maintaining native vegetation cover and soils and minimizing grading. See programmatic design features for vegetation at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	No	No

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Cultural Section 4.2.3	**Direct:** Development may adversely affect cultural resources; however, further investigation is needed. There is potential to physically impact prehistoric and historic sites and features. There could be impacts on views from the Juan Bautista de Anza National Historic Trail and the Sears Point Area of Critical Environmental Concern. **Indirect:** Erosion impacts on the cultural landscape outside of the SEZ resulting from land disturbances and modified hydrologic patterns; increased accessibility and potential for damage to eligible sites outside of the SEZ (if present). **Cumulative:** Dependent on whether eligible sites or landscapes are present and impacted in the SEZ and adjacent areas. There are large World War II military training ranges in and near the SEZ that have the potential to be affected. **Data Gaps:** Pre-development cultural inventory and evaluation is needed and will be completed, as part of the Section 106 consultation process.	Significant resources clustered in specific areas which retain sufficient integrity will be avoided. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Cultural.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	A memorandum of agreement (MOA) will be developed and executed (including implementation of a Historic Property Treatment Plan) if eligible sites are discovered within the SEZ. The MOA will specify how the eligible properties will be treated (avoided or mitigated to minimize impacts)[7]. See programmatic and SEZ-specific design features.	Yes	Yes

[7] On-site mitigation strategies to avoid cultural resources are preferred.

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Ecology: Vegetation and Riparian Areas; Invasive and Noxious Weeds Section 4.2.21	**Direct:** Development will adversely affect characteristic vegetation (e.g. creosote bush and white bursage) through destruction and loss of habitat. Development, including vegetation removal, land clearing, grading, changes in surface water flow, and dust deposition may alter soils and vegetation communities and result in the establishment of invasive species and noxious weeds within the SEZ. **Indirect:** Loss of native vegetation due to dust deposition from construction, operations, and decommissioning, increased surface water runoff and related erosion, or through the introduction of invasive species. Establishment of noxious weeds in the SEZ may result in spread of weeds to adjacent areas **Cumulative:** Solar energy development could be a contributor to cumulative impacts on some vegetation communities, depending on the type, number, and location of other developments in the region.	Dry wash, dry wash woodland, saguaro cactus, and ironwood (including those outside of washes) vegetation communities within the SEZ will be avoided to the extent practicable. A buffer area will be maintained around dry washes and dry wash woodland habitats to reduce the impact potential. Travel through weed-infested areas will be avoided; vehicles and equipment will be inspected and cleaned to avoid spread of weeds; ground disturbance will be limited, creation of soil conditions that promote weed germination and establishment will be avoided, seed and plant parts will be disposed of. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Appropriate engineering controls will be used to minimize impacts resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls will be determined through agency consultation. Yucca species and most agave and cactus species will be salvaged prior to land clearing and transplanted in accordance with Arizona Native Plant Law. Impacts will be minimized through development of a Weed Management Plan and use of weed-free seed to support re-vegetation efforts, control invasive species, and prevent increase in fires. See programmatic and SEZ-specific design features.	Yes	Yes, as a critical component of a functioning ecosystem

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Ecology: Terrestrial Wildlife and Aquatic Biota Section 4.2.6	**Direct:** Loss of habitat and connectivity for several species of amphibians, reptiles, mammals, bats, and invertebrates. Ground disturbance, fugitive dust generated by project activities, lighting, vegetation clearing, spread of invasive species, accidental spills, harassment, and impacts on ephemeral washes could impact terrestrial wildlife within the SEZ. Impacts from noise on wildlife could occur, especially on bat species, if the SEZ is located near any bat roosts. **Indirect:** Outside the SEZ, impacts could occur from habitat loss or modification, increased human presence in the area, surface runoff, dust, noise, lighting, or accidental spills. **Cumulative:** Cumulative effects on some species could occur depending on the type, number, and location of other developments in the region. **Data Gaps:** Impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis, especially for bat species.	Development will avoid wetlands, washes, and riparian areas identified during site-specific surveys. The fencing around the solar energy development should not block the migratory corridors of mammals, particularly big game species. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Big game habitat will be managed in coordination with Arizona Game and Fish Department management objectives and BLM Land Use Plan objectives. See programmatic and SEZ-specific design features.	Yes	Yes

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Ecology: Migratory Birds Section 4.2.6	**Direct:** Loss of habitat and connectivity) for several species. Noise, lighting, and vegetation clearing could impact migratory birds using the SEZ. There is potential for birds to be attracted to solar fields (because they look like water) and impact with solar panels. Burning of wings in the solar radiation field between heliostats and power towers has been observed. There may also be impacts to night sky that may alter bird migratory behavior and habitat usage. Priority migratory bird species that may occur on or near the SEZ include Albert's towhee, Arizona Bell's vireo, Gila woodpecker, gilded flicker, LeConte's thrasher, Lincoln's sparrow, and Sprague's pipit.[8] **Indirect:** Outside the SEZ, impacts could occur from habitat loss or modification related to onsite disturbances (noise, lighting, habitat fragmentation). **Cumulative:** Impacts to migratory birds could occur; depending on the type, number, and location of other developments in the region. **Data Gaps:** Additional research needed on solar development impacts on migratory birds. Impacts on migratory birds from construction noise would have to be considered on a project-specific basis.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	Yes	Yes

[8] Priority migratory bird species for the SEZ were determined based on those species discussed in the Yuma RMP and the distribution of Arizona Natural Heritage Program tracked species and USFWS Birds of Conservation Concern in the Arizona Habimap tool (http://www.habimap.org/).

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Ecology: Plant Special Status Species Section 4.2.19	**Direct:** No Endangered Species Act (ESA)-listed plant species have been identified that have suitable habitat within the SEZ. Ground disturbance, land clearing and grading, fugitive dust generated by project activities, and the spread of invasive species may result in loss of special status plant species habitat, if present, and might result in loss of individual plants. There is one BLM sensitive plant species that has the potential to occur within the SEZ: Schott wire lettuce. **Indirect:** Indirect impacts to individuals and habitat could occur from surface runoff, dust, or accidental spills. **Cumulative:** There could be cumulative impacts on some special status plant species due to habitat destruction and overall development and fragmentation of the area. **Data Gaps:** Pre-disturbance surveys are required to identify the presence and abundance of special status species.	Based on data from pre-disturbance surveys, disturbance to occupied habitats would be avoided to the extent practicable. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	If avoidance is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation may be employed. See programmatic and SEZ-specific design features.	Maybe	Yes, if special status plant species or their habitat are present in SEZ

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Ecology: Animal Special Status Species Section 4.2.19	**Direct**: Ground disturbance, land clearing and grading, and fugitive dust generated by project activities would result in loss of special status animal species habitat, if present, and might result in loss of individual animals. There is one ESA-listed species that may occur on or near the SEZ, the lesser long-nosed bat.[9] However, the USFWS has determined that effects to lesser long-nosed bat potential foraging habitat as a result of SEZ development would be extremely unlikely and discountable due to the distance of the SEZ from any known roost locations (>50 miles). Nine BLM sensitive species may occur on or near the SEZ (Cactus ferruginous pygmy-owl, golden eagle, Le Conte's Thrasher, western burrowing owl, California leaf-nosed bat, Pale Townsend's big-eared bat, and Yuman desert fringe-toed lizard). Impacts from noise on wildlife could occur, specifically on the lesser long-nosed bat. No Category 1, 2, or 3 desert tortoise habitat has been identified within the SEZ; however, Category 3 desert tortoise habitat occurs outside the SEZ to the north and northwest. Desert tortoises may still occur in lower quality habitat on the SEZ where they may be directly impacted by solar development. The SEZ is within the non-essential experimental population area for the Sonoran pronghorn. **Indirect:** Indirect impacts could occur from habitat loss or modification related to habitat fragmentation, surface runoff, dust, noise, lighting, or accidental spills. **Cumulative:** There could be cumulative impacts on some special status animal species due to habitat destruction and overall development and fragmentation of the area. **Data Gaps:** Pre-disturbance surveys are required to identify the presence and abundance of special status species.	Compliance with the Bald & Golden Eagle Protection Act would be ensured and Eagle Take Guidance would be followed (if necessary). Based on data from pre-disturbance surveys, disturbance to suitable habitats will be avoided to the extent practicable. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Regarding avoidance and minimization onsite, consultation with the U.S. Fish & Wildlife Service will be conducted to address the potential for impacts on ESA- listed and proposed species and to identify mitigation measures for implementation. If avoidance is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation may be employed. See programmatic and SEZ-specific design features.	Yes	Yes

[9] Based on ESA Section 7 consultation with the USFWS. Development of the SEZ was determined unlikely to affect endangered or non-essential experimental populations of Sonoran pronghorn.

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Environmental Justice Section 4.2.5	**Direct:** There are minority populations within 25 miles (40 km) of the SEZ, so any adverse impacts of solar projects could affect these populations. No low-income populations were identified within this area. Farm workers live near Hyder seasonally. **Indirect:** None identified. **Cumulative:** Contributions from solar development in the SEZ would likely be small and would not be expected to significantly contribute to cumulative impacts on minority populations.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Environmental_Justice.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	If possible, public relations materials should be available in Spanish due to the large Hispanic population in the area. See programmatic and SEZ-specific design features.	Maybe	Maybe

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Hydrology: Surface Water Section 4.2.23	**Direct:** Land clearing, land leveling, vegetation removal, and spills and runoff associated with development of the SEZ could increase surface runoff, reduce infiltration/recharge, cause loss of ephemeral stream networks, cause a reduction in evapotranspiration rates, increase sediment transport (by water), change sediment transport (by wind), and degrade water quality. Based on an evaluation of data in the Sonoran Desert Rapid Ecoregional Assessment, ephemeral drainages with high potential for water erosion occur on the SEZ. **Indirect:** Indirect impacts from development on ephemeral and perennial surface water features could occur. **Cumulative**: Alterations to ephemeral stream networks can alter groundwater recharge and surface runoff processes potentially impacting the basin-scale water balance and water quality aspects of water features receiving surface runoff. **Data Gaps:** Project siting and design will need to consider impacts to the stream channels and washes located in the SEZ.	Any projects impacting a wash or stream channel that are classified as a a jurisdictional water of the US will require coordination/permitting through the US Army Corps of Engineers. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Required measures should minimize sheet flow. See programmatic and SEZ-specific design features.	Yes	Maybe

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Hydrology: Water Quality and Groundwater Availability Section 4.2.23	**Direct:** Groundwater withdrawals for development may cause declines in groundwater elevations that can impact water availability for surface water features, vegetation, ecological habitats, regional groundwater flow paths, and other groundwater users in the basin. The SEZ is located in the Lower Gila Basin. **Indirect:** Groundwater withdrawals for solar energy facilities have the potential to affect other groundwater users in the basin. **Cumulative:** Cumulative impacts on groundwater could occur when combined with other future developments in the region.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Impacts related to water consumption could be minimized through selection of technologies with low water requirements. Impacts to on-site recharge can be mitigated with engineered facilities such as detention basins to allow infiltration to occur. See programmatic and SEZ-specific design features.	Maybe[10]	Maybe
Lands & Realty Section 4.2.8	**Direct:** Development of the SEZ could disturb 2,550 acres (10.3 km^2). Development may require additional transmission and/or substation capacity. The SEZ is adjacent to a 290-MW PV solar facility in operation on private land. The large-capacity Hassayampa to North Gila transmission line passes within 0.5 mile of the southern end of the SEZ, and a new parallel 500-kv transmission line is expected to be in service by late 2014. **Indirect**: None identified. **Cumulative**: Projects within the SEZ would make only a small contribution to cumulative impacts because of its relatively small size.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Lands_and_Realty.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	No	No

[10] Unavoidable adverse impacts are possible if groundwater is used. However, wet-cooling was not considered a feasible option in the Solar PEIS ROD; a hybrid cooling system could be feasible and is the reason for the "maybe" entry for the impacts assessment.

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Livestock Grazing Section 4.2.9	The SEZ is within the former Palomas Grazing Allotment. That allotment was made unavailable to livestock grazing in the January 2010 Yuma Field Office Resource Management Plan revision, as was the White Wing Allotment adjacent to the SEZ. There are no expected impacts to livestock grazing from solar development within the SEZ.	Not applicable	Not applicable	No	No
Military & Civilian Aviation	**Direct:** The SEZ is within the visual corridor of a military training route with a 300-foot (91-m) above-ground-level operating limit. Additionally, the Barry M. Goldwater Air Force Range is approximately 13 miles (21 km) south of the SEZ. The U.S. Army Yuma Proving Ground is approximately 7.5 miles (12 km) west of the SEZ. The development of any solar energy or transmission facilities that encroach into military airspace could interfere with military training activities. **Indirect:** None identified. **Cumulative:** Solar development occurring throughout the region, which is largely undeveloped, could result in small cumulative effects on the system of military training routes. Such effects would be limited by mitigations developed in consultation with the military.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Military_Civilian_Aviation.pdf	See programmatic design features.	Maybe	No

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Minerals Section 4.2.4	**Direct:** There are no documented proven oil and gas reserves in the SEZ. No high or moderate temperature geothermal resources exist in the SEZ, and there are no geothermal leases. There are no active mining claims within the SEZ, nor are there any active mines. The SEZ is in an area open for the disposal of salable minerals and is designated as having moderate potential for salable minerals, including sand, gravel, aggregate, cinders, decorative rock, and building stones. The BLM plans to withdraw the SEZ from mineral entry for a period of 20 years, precluding impacts from many types of mining activities, pending completion of a supporting environmental assessment. **Indirect:** None identified. **Cumulative**: None identified.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Mineral_Resources.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	No	No

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Native American Concerns Section 4.2.11	**Direct:** Concerns include noise, air quality, and visual resources. The SEZ is less than 10 mi from the Sears Point Area of Critical Environmental Concern, a significant Native American heritage site. There may be visual, aural, or atmospheric intrusions. Traditional resource gathering areas may be impacted. Removal of cultural resources is a concern to tribes. **Indirect:** General habitat loss with vegetation clearing and water reduction that could affect species and ecosystem health. **Cumulative:** Development of solar energy facilities in combination with the development of other planned and foreseeable projects in the area would likely reduce the traditionally important plant and animal resources available to the tribes. Although some of these plant species are abundant, any level of impact may be of concern for the tribes. **Data Gaps**: Government-to-government consultation for projects will be required to determine issues of Native American concern.	Known human burial sites and rock art (panels of petroglyphs and/or pictographs) will be avoided. The BLM will consult with Indian tribes regarding the potential for unanticipated human remains and associated cultural items (as defined under the Native American Graves Protection and Repatriation Act) before a solar project is authorized. The purpose will be to discuss general guidance on treatment of cultural items. Springs and other water sources that are or may be sacred or culturally important, culturally important plant and wildlife species, and visual intrusion on sacred sites will be avoided to the extent practicable. See programmatic design features http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Native_American_Concerns.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	Yes	Unknown at this time. Consultation on project applications will determine whether regional mitigation for Native American concerns may be warranted

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Paleontology Section 4.2.13	**Direct:** The SEZ includes 10 acres with geological units assigned to Potential Fossil Yield Classification Class 3; there are no Class 4 or 5 units within the SEZ. **Indirect:** None identified. **Cumulative**: Cumulative impacts would be dependent on whether significant resources are found within the SEZ and in additional project areas in the region. **Data Gaps**: A more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted for a specific project.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Paleo.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	The BLM will be notified immediately upon discovery of fossils. Work will be halted at the fossil site and continued elsewhere until qualified personnel, such as a paleontologist, can visit the site. He/she will determine if the site is significant and make recommendations for collection or other resource protection, if warranted. The use of training/education programs to reduce the amount of inadvertent destruction on paleontological sites could reduce the occurrence of human-related disturbance to nearby sites. See programmatic and SEZ-specific design features.	No	No

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Public Access and Recreation Sections 4.2.15 & 4.2.20	**Direct:** The SEZ is used for OHV use, camping, and hunting. Development may preclude current recreational activities that occur within the SEZ boundary and potentially require rerouting of access to the Yuma East Special Recreation Management Area located to the north. **Indirect**: Indirect effects on recreation use would occur primarily on lands near the solar facilities and would result from the change in the overall character of undeveloped BLM-administered lands to an industrialized, developed area. People who are seeking more rural or primitive surroundings for recreation may have reduced or degraded recreational experiences. **Cumulative**: Multiple developments in the vicinity of the SEZ could cumulatively reduce recreational opportunities.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Public_Access_and_Recreation.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Access to the Palomas Harquahela Road must be maintained or rerouted to maintain access to the Yuma East SRMA. Consideration will be given to replacement of lost OHV route acreage. See programmatic and SEZ-specific design features.	Yes	Yes

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Socioeconomics Section 4.2.16	**Direct**: Impacts to local economy as a result of expenditures of wages and salaries and the collection of state sales and income taxes. Development in the SEZ would create temporary construction jobs and permanent operations jobs. (The number of jobs would depend on the solar technology used, and would likely be similar to the numbers estimated for the similarly sized Gillespie SEZ (i.e., 92 to 1,218 direct construction jobs and 5 to 91 direct operations jobs; least for PV; most for parabolic trough facilities). Adverse impacts could occur due to the need for services for new workers during project construction and operation (e.g., housing, police, firefighters). **Indirect**: The number of jobs would depend on the solar technology used, and would likely be similar to the numbers estimated for the similarly sized Gillespie SEZ (i.e., from 196 to 2,600 indirect construction jobs and 1 to 59 indirect operations jobs). Impacts from project wages and salaries, and tax revenues subsequently circulating through the economy would be minor. **Cumulative:** Cumulative impacts from the presence of large numbers of construction workers could place a short-term strain on local resources. Cumulative impacts during operations would be positive through the creation of additional jobs and income; negative impacts during operations are expected to be small.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Socioeconomics.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	No	No

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Soils/Erosion Section 4.2.17	**Direct:** Impacts on soil resources would occur mainly as a result of ground-disturbing activities (e.g., grading, excavating, and drilling), especially during construction. These include removal of topsoil, soil compaction, soil horizon mixing, soil erosion and deposition by wind, soil erosion by water and surface runoff, sedimentation, and soil contamination. Soils in the SEZ are dominated by the Ligurta-Cristobal complex, with 2 to 6 percent slopes, which comprise 1,880 acres, 74% of the SEZ. Areas of desert pavement are present. According to the Sonoran Desert Rapid Eco-Regional Assessment, the majority of the soils on the SEZ have high potential for wind erosion. Therefore, increased wind erosion is likely if grading is needed. **Indirect**: Disturbance of soil can lead to introduction of invasive species and impediments to native seed germination. **Cumulative:** Cumulative impacts would occur from the disturbance of several renewable energy projects, connecting linear facilities, and other projects in the vicinity of the SEZ, but would be limited through application of design features.	Ground disturbance in areas with intact biological soil crusts and desert pavement will be avoided to the extent practicable. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Soil_Geologic_Hazards.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Construction crews should be educated to stay on designated roads and minimize the construction of new roads to minimize soil disturbance and compaction. See programmatic and SEZ-specific design features.	Yes	Yes, basic component of ecosystem

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Specially Designated Areas and Lands with Wilderness Characteristics Section 4.2.18	**Direct:** Specially designated areas (SDAs) within 25 miles (40 km) of the SEZ could be visually impacted by solar development. Depending on the solar technology, moderate to strong visual contrasts could be experienced within the Yuma East Undeveloped Special Recreation Management Area (SRMA) 1.1 mi (1.8 km) northwest of the SEZ, within the Gila River Valley Undeveloped SRMA 1.7 mi (2.7 km) south, along the Juan Batista de Anza National Historic Trail and in the Sears Point Core portion of the Sears Point Area of Critical Environmental Concern (ACEC), both areas within about 5 mi (8km) south and southeast of the SEZ, and in the Gila River Terraces and Lower Gila Historic Trails ACEC (13 mi to the east of the SEZ). Impacts could include adverse visual effects on the viewshed (including impacts on the night sky viewing) and potential fragmentation of biologically linked areas. There are 140 acres with wilderness characteristics not managed to maintain those characteristics within the SEZ. Solar development would diminish both the nature of these lands and opportunities for solitude and primitive or unconfined recreation to the degree that these characteristics may cease to exist. The result may be a reduction in total acres of lands with wilderness characteristics. **Indirect:** None identified. **Cumulative:** Development of solar facilities and other facilities may result in cumulative effects, particularly visual impacts, on SDAs. **Data Gaps:** Additional analysis may be required to determine if visual impacts could occur in SDAs within the viewshed of the SEZ.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	Maybe	Maybe

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Transportation	**Direct:** Palomas Road is approximately 0.5-mile south of the SEZ. Routes in the SEZ are classified as digital linear features or non-motorized routes and usage is documented as light. Impacts are expected to be minor. Development will add traffic to existing roads serving the area. **Indirect:** None identified. **Cumulative**: Cumulative impacts to traffic could occur with multiple developments in the region. **Data Gaps:** Additional data on nearby roads and potential traffic volume during construction/operation is needed.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Transportation.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	Local roads would require improvements to accommodate additional traffic. See programmatic and SEZ-specific design features.	No	No
Visual Section 4.2.22	**Direct:** The Visual Resource Inventory (VRI) value for the SEZ is VRI Class III, indicating moderate visual values. Development will adversely impact visual resources and may impact night skies. However, the visual resource management class is IV and allows for development. **Indirect:** None identified. **Cumulative:** If several projects become visible from one location, or in succession as viewers move through the landscape (such as driving on local roads), these cumulative impacts may make the area less visually appealing.	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Visual.pdf and SEZ-specific design features in the RDEP ROD, Table B-4.	See programmatic and SEZ-specific design features.	Yes	Yes

Resource/Issue	Impacts[1]	On-site Mitigation[2]		Unavoidable Adverse Impacts?[3]	May Warrant Regional Mitigation?
		Avoidance	Minimization		
Wild Horses and Burros Section 4.2.24	The Agua Caliente SEZ is 17 miles (27 km) or more from any wild horse and burro Herd Management Areas managed by the BLM. Solar energy development within the SEZ would not directly or indirectly affect wild horses and burros.	Not applicable.	Not applicable.	No	No