

Dry Lake SEZ: Resource Impacts, On-Site Mitigation, and Mitigation Priorities

Resource/Issue	Impacts	On-site Mitigation		Unavoidable Impacts? ¹	Warrant Off-site Mitigation?
		Avoidance	Minimization		
Soils/Erosion	<p>Direct: Soils in the SEZ likely to be impacted through compaction and erosion. Soil loss through sediment transport may occur. Loss of biotic soils and desert pavement.</p> <p>Indirect: Increased runoff into the Dry Lake basin may result in soil/sediment transport. Increased wind erosion caused by grading (if needed). Soil contamination from spills could occur.</p> <p>Cumulative²: Solar energy development would be a major contributor to cumulative impacts on soil from foreseeable development in the region.</p>	n/a ³	Require soil stabilization during construction and operation. Engineering options to minimize transport. Minimize the surface area that is graded and cleared of vegetation.	Yes	Yes , as a critical component of a functioning ecological system. Protection and/or restoration (off-site) will slow the regional decline in intact ecosystems in the region.
Wildlife	<p>Direct: Loss of habitat and connectivity (linkages) for several species of reptiles, mammals, birds, and invertebrates. Possible night sky impacts for birds.</p> <p>Indirect: Indirect impacts could occur from habitat loss or modification related to groundwater depletions, surface runoff, dust, noise, lighting, or accidental spills.</p> <p>Cumulative: Cumulative impacts to wildlife would occur; however, contributions to cumulative impacts from solar facilities within the SEZ would be relatively small. Many of the species would still have extensive habitat available within the region.</p>	n/a	Avoiding construction during nesting season for migratory birds, minimize disruptions during lambing season.	Yes	No (not directly). Wildlife habitat comes with a functioning ecosystem. Thus, off-site mitigation to protect and/or restore intact ecosystems in the region will slow the regional decline in wildlife habitat.
Special Status Species -	Direct: Six BLM sensitive species are known to occur or likely to occur in the SEZ (Gila monster, Mojave Desert	May be possible	Require construction only outside of migratory bird	Yes	Yes , where required by law. These Special Status

¹ Unavoidable impacts are those that cannot be adequately mitigated on-site by avoidance and/or minimization. Avoidance is accomplished by imposing spatial and/or temporal restrictions. Minimization is accomplished using design features and/or best management practices.

² For cumulative impact considerations, ongoing and reasonably foreseeable activities in the vicinity of the SEZ include wind and geothermal development, new roads, transmission lines, pipelines, canals, fences, communication systems, mining, agriculture, commercial development, aviation, road traffic, and OHV use.

³ n/a: not applicable.

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Animals	<p>Sidewinder, Ferruginous Hawk, Golden Eagle, Loggerhead Shrike, and LeConte's Thrasher), as well as the Federally-Threatened Mojave Desert Tortoise and migratory bird species protected under the MBTA. Loss of habitat and habitat connectivity (linkages) are the main concerns. Additional species may be identified within the SEZ through pre-disturbance surveys, for example, or outside of the SEZ, such as groundwater-dependent species, and would need to be addressed.</p> <p>Indirect: Indirect impacts could occur from habitat loss or modification related to groundwater depletions, surface runoff, dust, noise, lighting, or accidental spills.</p> <p>Cumulative: Solar energy development could be a contributor to cumulative impacts on some special status species (e.g., desert tortoise). Contributions to cumulative impacts owe to the large, continuous areas disturbed and disturbance from associated roads, transmission lines, and other infrastructure.</p>		breeding season. Desert tortoise minimization measures include: translocation/relocation, project fencing, education programs, perch deterrents, trash program, authorized biologists/monitors on site during construction, clearance surveys, educational signs, minimizing ground disturbance, no pooling of water (dust control), cover holes and trenches when not in use.		Species are by definition 'at risk' and warrant off-site mitigation. Protection and/or restoration (off-site) of similar habitat will slow the regional decline in intact ecosystems in the region, thereby also benefitting other special status species.
Vegetation	<p>Direct: Development will adversely affect characteristic vegetation (e.g., creosotebush, white bursage, cactus, yucca) through destruction and loss of habitat.</p> <p>Indirect: Loss of native vegetation due to dust deposition from construction and operations, increased surface water runoff and related erosion, or through the introduction of invasive species.</p> <p>Cumulative: Cumulative impacts on primary cover species would be small due to their abundance in the region and the relatively small portion of total lands required for solar development.</p>	n/a	Possible to minimize disturbance of existing vegetation for some technologies. Salvage cactus and yucca prior to disturbance.	Yes	Yes , as a critical component of a functioning ecological system. Protection and/or restoration will slow the regional decline in intact ecosystems.
Special Status Species - Vegetation	<p>Direct: While seven special status species are known to occur in the region, only one is known to occur within the SEZ: the Rosy two-tone beardtongue (<i>Penstemon bicolor</i> spp. <i>roseus</i>). The other 6 species are the Las Vegas</p>	May be possible	Salvage, seed banking, and pre-disturbance vegetation surveys	Yes	Yes , where required by law. These Special Status Species are by definition 'at risk' and warrant off-

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	<p>bearpoppy (<i>Arctomecon californica</i>), Beaver Dam breadroot (<i>Pediomelum castoreum</i>), threecorner milkvetch (<i>Astragalus geyeri</i> var. <i>triquetrus</i>), sticky buckwheat (<i>Eriogonum viscidulum</i>), Sticky ringstem (<i>Anulocaulis leiosolenus</i>), and white bearpoppy (<i>Arctomecon merriamii</i>) Development may result in a loss of plants and habitat. (Additional species may be identified within the SEZ through pre-disturbance surveys, for example, or outside of the SEZ, such as groundwater-dependent species, and would need to be addressed.) Impacts to species outside of but near the boundary of the SEZ should be considered.</p> <p>Indirect: Indirect impacts to individuals and habitat could occur from groundwater depletions, surface runoff, dust, or accidental spills.</p> <p>Cumulative: Solar energy development could contribute to cumulative impacts on some special status species (e.g., rosy two-tone beardtongue). Contributions to cumulative impacts owe to the large, continuous areas disturbed and disturbance from other infrastructure (e.g., roads, transmission lines).</p>				<p>site mitigation. Protection and/or restoration (off-site) of similar habitat will slow the regional decline in intact ecosystems in the region, thereby also benefitting other special status species.</p>
Visual Resources	<p>Direct: Development will adversely affect visual resources. The Solar PEIS identified moderate to strong visual impact to the following specially designated areas in the vicinity of the SEZ: Desert National Wildlife Refuge; Old Spanish National Historic Trail; Arrow Canyon WA; Muddy Mountains WA; and Nellis Dunes SRMA. Potential impact to night skies. There already is significant development in the SEZ resulting in existing visual impact.</p> <p>Indirect: None identified.</p> <p>Cumulative: Cumulative impacts to visual resources would occur.</p>	n/a	<p>Required design features include measures to reduce visual contrast. Impacts to visual resources could be minimized through selection of technologies with low height facilities.</p>	Yes	<p>Yes, as a valued human element. Protection and/or restoration of ecosystem intactness will slow the regional decline in visual resource quality.</p>
Specially Designated	<p>Direct: None - no specially designated areas (SDAs) within the SEZ.</p>	Some visual impacts avoidable	Required design features minimize contrast,	Maybe (for impacts to	Yes for ACEC. Migration and or translocation of

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Areas	<p>Indirect: Moderate to strong visual contrasts would be experienced in several SDAs in the vicinity of the SEZ. These impacts could include adverse visual effects on the viewshed of these areas (including impacts on the night sky viewing), reduced recreation use, fragmentation of biologically linked areas, and loss of public access. The Coyote Springs ACEC is located to the west of the SEZ – Designated to protect desert tortoise habitat.</p> <p>Cumulative: Increased development and visual clutter in general in the surrounding areas, reduced local and regional visibility due to construction-related air particulates, light pollution, road traffic, and impacts on wildlife and plants could cumulatively impact SDAs.</p> <p>Data Gaps: Additional analysis may be required to determine if the Coyote Springs ACEC would be impacted by SEZ development.</p>	if a height restriction is imposed.	reducing impacts on surrounding SDAs.	tortoise at Coyote Springs ACEC from potential hydrology changes) Yes for visual impacts.	tortoises to the Coyote Springs ACEC will increase density, thus increasing mortality risk. On the ground mitigation measures, such as extending tortoise fencing along Highway 93, could minimize the risk. Unknown at this time for visual impacts. On-site mitigation measures may be adequate for protecting the resource.
Military	<p>Direct: The SEZ is located under the path of military aircraft flying between Nellis Air Force Base (AFB) and the Nevada Test and Training Range. The SEZ is in an air force bailout zone. The Air Force has stated that glare, thermal effects, structure height of greater than 250 ft., lighting of structures, and transmission lines could adversely affect operations.</p> <p>Indirect: None identified.</p> <p>Cumulative: Cumulative impacts could occur from general development in the region because of general infringement on formerly wide-open spaces.</p>	n/a	Coordinate with military on a project-specific basis; impose height restrictions on development in the SEZ.	Yes	No. Mitigation of impacts to military operations must be handled on a project-specific basis; there is no effective regional mitigation approach.
Native American Concerns	<p>Direct: Consultation with the Southern Paiute Tribe has identified potential concerns with respect to the cultural importance of any loss of plant and/or animal species. Other issues may be identified through consultation with affected Tribes. There are Tribal concerns with water drawdown and its effect on the entire hydrologic system,</p>	To be determined through government-to-government consultation.	To be determined through government-to-government consultation.	Yes (for hydrology impacts of non-PV technologies and for habitat loss)	Unknown at this time. BLM resource specialists conclude that impacts to hydrology and habitat can be adequately mitigated on and off-site. However,

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	<p>including ultimate effect on plants and animals (see indirect). The Salt Song Trail and another spiritual trail may approach or pass through the SEZ and could experience direct disturbance, visual, and/or noise impacts.</p> <p>Indirect: Impacts on the mesquite grove north of the SEZ if water availability and quality are reduced, and general habitat loss with vegetation clearing and water reduction that could affect species and ecosystem health.</p> <p>Cumulative: Overall impacts to the regional landscape and ecosystem health.</p>				consultation will determine whether mitigation for Native American concerns is warranted.
Invasive/ Noxious Weeds	<p>Direct: Development may alter soils and vegetation communities and result in the establishment of noxious weeds.</p> <p>Indirect: None identified.</p> <p>Cumulative: Cumulative impacts from establishment of weeds could occur with multiple developments in the region; contributions from solar facilities within the SEZ likely to be relatively small.</p>	Avoid travel through weed-infested areas; inspect and clean vehicles and equipment to avoid spread of weeds; limit ground disturbance, avoid creating soil conditions that promote weed germination and establishment, dispose of seed and plant parts.	Minimize impacts through development of a Weed Management Plan; use weed-free seed to support re-vegetation efforts.	Maybe	No. On-site mitigation measures were determined to be adequate for protecting against the establishment and/or spread of invasive and/or noxious weeds. Further, the protection and/or restoration of intact ecosystems (off-site) will slow the decline in the spread of invasive and/or noxious weeds in the region.

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Hydrology (Water/ Watershed/ Water Quality)	<p>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. Development may alter ephemeral stream channels that can impact flooding and debris flows during storms, groundwater recharge, ecological habitats, and riparian vegetation communities. A hydrologic basin model has been completed, showing that the water is over-allocated, but not over-pumped at this time. New withdrawals within the basin could result in the impacts listed above. Impacts to recharge expected to be minimal because the recharge occurs in the mountains that surround basin. Better understanding of groundwater conditions and threshold for impacts could be an incentive for development.</p> <p>Indirect: None identified.</p> <p>Cumulative: Impacts will be constrained by the limited availability of water rights, and via oversight by state and local water authorities. Large drawdowns due to solar energy demands are not expected given state and local oversight of groundwater supplies and fully allocated supplies in most regions. However, pressure on water supplies will continue to grow from multiple demands.</p>	n/a	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. Required measures should also minimize sheet flow.	Maybe	<p>Groundwater: No. BLM will review all applications to validate net neutral water use (i.e., groundwater purchased from holders of currently-used existing senior water rights).</p> <p>Surface Hydrology: No (not directly). While there may be impacts to surface hydrology, protection and/or restoration of intact ecosystems (off-site) will slow the regional decline in hydrologic function.</p>
Riparian	<p>Direct: Development may alter ephemeral stream channels that can impact flooding and debris flows during storms, groundwater recharge, ecological habitats, and riparian vegetation communities. Reductions to the connectivity of these areas with existing surface waters and groundwater could limit water availability and thus alter the ability of the area to support vegetation and aquatic species. Reduced overall stability of the natural landscape.</p> <p>Indirect: None identified.</p>	Prohibit development in major washes	Require engineering controls on surface water runoff/erosion	Maybe	<p>No (not directly). While there may be impacts to riparian systems, protection and/or restoration of intact ecosystems (off-site) will slow the regional decline in riparian system function.</p>

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	<p>Cumulative: Cumulative impacts to riparian areas could occur with multiple developments in the region; contributions from solar facilities within the SEZ likely to be relatively small.</p>				
Cultural	<p>Direct: Development may adversely affect cultural resources. Although surveys have not been completed, most known sites are not eligible; BLM does not expect many newly discovered sites to be eligible. Mormon Road/Old Spanish Trail is eligible and goes through the SEZ, but it is not the Congressional National Historic Trail route. A trail with spiritual significance, if in the SEZ, may be impacted by an existing road network.</p> <p>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).</p> <p>Cumulative: None expected, but dependent on whether any eligible sites are found and impacted in the SEZ.</p> <p>Data Gaps: Cultural inventory and evaluation to be completed.</p>	<p>Conduct pre-development surveys. If eligible sites are discovered, it is likely that impacts could be avoided or mitigated on-site.</p> <p>Prohibit development on the Old Spanish Trail/Mormon Road.</p>	<p>Require surveys before ground disturbing activities. Develop and execute a Memorandum of Agreement (MOA) if eligible sites are discovered within the SEZ.</p>	Maybe	<p>No. Risk of resource loss is low. On-site mitigation measures were determined to be adequate for addressing known cultural resources. Implementing the required protection measures as established in the MOA may result in off-site mitigation measures if significant resource values are discovered during the pre-development survey.</p>
Acoustics	<p>Direct: Increased noise levels during construction and operations (note: Solar PEIS analyses do not predict exceedance of noise guideline levels in residential areas during construction or operations).</p> <p>Indirect: None identified.</p> <p>Cumulative: Few cumulative noise impacts would occur.</p> <p>Data Gaps: Project-specific assessment of impacts to wildlife and/or cultural resources (Old Spanish NHT) needed.</p>	n/a	<p>Limiting the hours of daily activities, construction of noise barriers if needed and practicable, coordination with nearby residents.</p>	No	n/a

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Air Quality	<p>Direct: Emissions from construction vehicles would not result in exceedance of air quality standards. Positive impact: Solar power generation reduces demand for energy from fossil fuels, and thereby reduces greenhouse gas emissions.</p> <p>Indirect: Elevated particulate levels may be caused by soil disturbance/grading during construction or operations; this could also result in decreased visibility near the I-15 & Hwy 93 junction.</p> <p>Cumulative: Emissions from solar facilities are low and are not expected to contribute to local or regional air pollution problems.</p>	n/a	Monitor for particulates during construction and operations. Require dust suppression measures be implemented during construction and operations.	No	n/a
Environmental Justice	<p>Direct: There are minority and/or low income populations within 50 miles, but they are more than 10 miles away and views of the SEZ are restricted. No adverse impacts are anticipated.</p> <p>Indirect: None identified.</p> <p>Cumulative: Contributions from solar development would likely be small, due to the sparse population near the SEZ, the generally low level of health and environmental impacts identified, and the availability of effective mitigation.</p>	n/a	n/a	No	n/a
Fire	<p>Direct: There is the potential for wildfires started by construction and/or operations, also for wild land fire occurring on adjacent lands impacting solar facilities or infrastructure.</p> <p>Indirect: Increased risk due to operation of internal combustion engine vehicles and equipment in dry desert environments or if invasive species are allowed to become established within the facility's footprint due to improper vegetation management.</p>	n/a	Require fire safety and emergency response plan, including fuel inventory, to be developed and executed during construction and operations, including fire/fuel breaks and design features to help minimize risk.	No	n/a

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	Cumulative: None identified.				
Hazardous Waste	Direct: Potential risk of release of hazardous substances during construction and operation. Indirect: None identified. Cumulative: No or low level of cumulative impacts would occur.	n/a	Require a hazardous materials safety and emergency response plan be developed and executed during construction and operations.	No	n/a
Lands & Realty	Direct: There are many existing right-of-way grants within the SEZ that must be accommodated by solar development. Development may require additional transmission and/or substation capacity. Indirect: Impacts due to altering uses on public, state, and private lands in the vicinity of the SEZ. Examples could include conversion of land in and around local communities from open space or other uses to provide services and housing for employees who move to the region in support of solar energy development. Increased traffic and increased access to previously remote areas also could change the overall character of the landscape. These impacts would be analyzed at the project-specific level. Cumulative: Cumulative impacts due to changing land use could occur with multiple developments in the region; contributions from solar facilities within the SEZ likely to be relatively minor.	Where proposed development intersects existing rights-of-way, analyze compatibility and adjust development boundaries as necessary to achieve compatibility.	Complete a traffic impact analysis. Notify adjacent land owners of proposed projects.	No	n/a
Minerals	Direct: There are existing mining claims and two active mine authorizations within the SEZ – the mill site is of most concern with respect to limiting solar development. Existing mining claims may adversely affect solar development. Indirect: None identified.	No leasing in areas with existing mining and mill-site claims.	n/a	No	n/a

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	<p>Cumulative: None identified.</p> <p>Data Gaps: Need to identify the size of the exclusions in the mining claims.</p>				
Paleontological	No paleontological resources or the geologic conditions associated with such resources are known to occur within the SEZ. Thus, the potential for direct, indirect, and cumulative impacts to paleontological resources is low. However, if certain geological formations or paleontological resources are found within the SEZ, potential impacts to these resources may occur.	Conduct surveys if determined necessary. If it is found that geological formations with potential for significant paleontological resources are present, they could potentially be avoided.	If resources are discovered, protect, document, and excavate the site as directed by BLM.	No	n/a
Livestock Grazing	None -- there are no active grazing allotments in or near the SEZ.	n/a	n/a	No	n/a
Recreation (includes Travel Management Areas)	<p>Direct: Development may preclude current recreational activities that occur within the SEZ boundary: OHV use, shooting practice, etc. Development may preclude the use of existing access routes to public lands to the west of the SEZ – one road provides the only access for sheep hunting and access to the Arrow Canyon Wilderness Area.</p> <p>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, displacing people who are seeking more rural or primitive surroundings for recreation. Changes in character of surrounding undeveloped lands to an industrialized character can result in impacts to the visual landscape, impacts on vegetation, and displacement of wildlife</p>	n/a	Maintain access to the Arrow Canyon WA hunting areas.	No	n/a

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	species resulting in reduction in recreational opportunities and/or degraded recreational experience. Cumulative: Multiple developments could cumulatively reduce recreation opportunities in the vicinity of the SEZ; contributions from facilities within SEZ likely to be small.				
Socioeconomics	Direct: Positive impacts to local economy as a result of expenditures of wages and salaries and the collection of state sales and income taxes. Possible adverse impacts from need for procurement of goods and services required for project construction and operation (e.g., police, fire-fighters, schools for services to new area workers). Because employment would be low relative to regional employment, impacts would be minor. Indirect: Impacts from project wages and salaries, and tax revenues subsequently circulating through the economy would be minor. Cumulative: Cumulative impacts for all development would likely be minor; the increase in cumulative economic activity would benefit the economies of the affected localities.	n/a	Require developers to secure agreements for local government services as a condition of a Notice to Proceed.	No	n/a
Transportation	Direct: Development may prevent access to public lands to the west of the SEZ. 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; because of the small number of workers contributions from solar facilities within the SEZ likely to be relatively small.	n/a	Maintain or reroute the existing access road to the dry lake bed north of the SEZ; maintain access to Arrow Canyon recreational areas. Coordinate any potential impacts to RS-2477 roads with Clark County.	No	n/a
Wild Horses and Burros	None – no wild horse or burro herds exist in or near the SEZ. The SEZ is not in a Herd Management Area.	n/a	n/a	No	n/a

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Wilderness & Lands with Wilderness Characteristics	None – there are no designated wilderness areas or lands with wilderness characteristics within or adjacent to the SEZ. Because of extensive existing development within the SEZ (roads, power lines, pipelines, active mill-site, electrical sub-station, and natural gas-fired power plant), the area lacks wilderness characteristics.	n/a	n/a	No	n/a