

Escalante Valley Solar Energy Zone: Impact Assessment Summary Table

In Iron County in southern Utah, Cedar City Field Office - 6,533 acres (26.4 km²) developable acres; up to 581 to 1,045 MW generation capacity, assuming 80% development
 Source: Draft and Final Solar PEIS for Escalante Valley SEZ (available at: <http://blmsolar.anl.gov/sez/ut/escalante-valley/>)

Resource/Issue ¹	Escalante Valley Solar Energy Zone Impacts ²	On-site Mitigation ³		Residual Adverse Impacts? ⁴
		Avoidance	Minimization	
Acoustics Section 13.1.15 ⁵	<p>Direct: Activities during construction and/or operation of solar facilities with thermal energy storage could cause noise levels exceeding background but below the EPA guideline of 55 dBA at the nearest residence (about 1.1 mi [1.8 km] to the northwest of the SEZ).</p> <p>Indirect: No specially designated areas are located within 5 mi (8 km) of the SEZ; therefore, construction noise from the SEZ would not adversely affect any specially designated areas.</p> <p>Cumulative⁶: If multiple facilities were to be constructed close to the SEZ, residents nearby could be affected by the cumulative noise generated, particularly during construction and/or at night when the noise is more discernible due to relatively low background levels.</p> <p>Data Gaps⁷: Refined modeling would be warranted along with background noise measurements during project-specific assessments.</p>	<p>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.</p> <p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Noise.pdf</p>	<p>Programmatic design features state that methods considered may include limiting the hours of daily activities, constructing noise barriers if needed and practicable, and coordinating with nearby residents.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<p>Maybe (depends on technology and engineering controls).</p> <p>Generally impacts from solar development are expected to be temporary, localized, and readily mitigated onsite.</p>

¹ Riparian vegetation and wild horses and burros have been evaluated and are not present in the vicinity of the SEZ.

² The impacts assessment assumed 80% of the SEZ area will be used for solar development.

³ These columns give examples of avoidance and minimization measures that are specified in the Record of Decision for the Final Solar PEIS and will be required. Additional avoidance and minimization measures proposed by the BLM Interdisciplinary Team are listed and should be evaluated through project-specific environmental analyses. Monitoring is planned to verify the implementation and effectiveness of avoidance and minimization measures.

⁴ Residual or unavoidable impacts are remaining effects that cannot be adequately mitigated onsite by avoidance and/or minimization.

⁵ Section numbers are the same in both the Draft and Final Solar PEIS.

⁶ Sections 13.1.22.4 of the Draft and Final Solar PEIS address 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 such as transmission lines and fences.

⁷ 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.

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<p>Air Quality Section 13.1.13</p>	<p>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, predicted 24-hour PM₁₀ 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 PM₁₀ concentrations would be limited, however, to the immediate areas surrounding the SEZ boundary and would decrease quickly with distance.</p> <p>Generation of fugitive dust may result in exposure to respirable particulates and/or microbes (human health impacts). Based on Wind Erosion Groups identified in the Solar PEIS, the majority of the soils on the SEZ (98%) have been characterized as having moderate potential for wind erosion.</p> <p>Indirect: Decreased visibility at nearest residences due to elevated PM levels from soil disturbance/grading during construction.</p> <p>Cumulative: Cumulative effects due to dust emissions would be greatest if multiple solar projects had overlapping construction periods.</p> <p>Data Gaps: Monitoring for PM during all phases of development will be required to ensure levels remain below AAQS..</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Air_Quality_Climate.pdf</p>	<p>Dust suppression measures will be implemented during all phases of development (construction, operations, and decommissioning).</p> <p>Re-vegetation of the SEZ with a BLM-approved seed mix to increase soil stability should be done as quickly as possible in disturbed areas. This will minimize dust emissions and PM levels.</p> <p>See other programmatic design features at URL under avoidance column.</p> <p>Also recommend evaluation of solar panel mounting and other disturbance minimizing technologies in project-level NEPA alternatives (e.g., no grading of the site, retention of maximum native vegetation, use of low emission vehicles, placing gravel on roads, use of "drive and crush" installation).</p>	<p>Maybe (if site is graded). Level of site grading and disturbance to native vegetation would be primary driver of residual impact for full build-out of SEZ.</p> <p>Impacts are not expected to result in noncompliance with National Air Quality Standards.</p>

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<p>Climate Change Section 5.11.4 of DPEIS for soil storage capacity; 13.1.13 for emissions avoided</p>	<p>Direct: Possible impact through loss of carbon storage capacity of the soil (estimated at 100 g carbon/m²). Preliminary calculations show loss of CO₂ storage capacity as 1.6 tons/acre/yr (8,362 tons/yr for SEZ full build-out), less than 1% of the CO₂ emissions avoided by operation of a solar facility (see below)</p> <p>Positive impact: Solar power generation reduces demand for energy from fossil fuels, and thereby reduces greenhouse gas emissions (from about 1,098,000-1,976,000 tons/yr CO₂ avoided at full build-out depending on technology).</p> <p>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).</p> <p>Data Gaps None identified.</p>	<p>See programmatic design features for vegetation at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>No. Impacts are likely to be positive. No mitigation likely needed.</p>

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<p>Cultural Section 13.1.17</p>	<p>Direct: Direct impacts on significant cultural resources could occur in the Escalante Valley SEZ. At least two of the five prehistoric sites previously recorded in the SEZ have been determined eligible for listing on the <i>National Register of Historic Places</i>. There is potential for significant historical sites in the SEZ.</p> <p>Indirect: Indirect impacts are possible on the Dominguez and Escalante Trail. 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 in the non-development area as well as outside of the SEZ. Visual impacts on the Old Spanish National Historic Trail could occur with solar energy development in the eastern portion of the SEZ. Approximately 60 sites have been recorded within 5 mi (8 km) of the SEZ.</p> <p>Cumulative: Eligible sites and cultural landscapes could be impacted in the SEZ and adjacent areas.</p> <p>Data Gaps: Less than 4% of the SEZ has been surveyed for cultural resources. To help characterize the area surrounding the SEZ, a records review, a Class II random sample survey of the SEZ, and identification of high-potential segments of the Old Spanish National Historic Trail, including a viewshed analysis from key points along the trail, are recommended to address data gaps for cultural resource impacts. A cultural landscape assessment will also inform impacts at a landscape scale.</p> <p>The Section 106 consultation process, including continuation of government-to-government consultation with tribes, must be completed at the project level and has the potential to result in additional information to consider.</p>	<p>Avoidance of significant resources clustered in specific areas, such as those in the vicinity of the dunes, is recommended.</p> <p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Cultural.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>Yes. Impacts on non-renewable resources are both irretrievable and irreversible.</p> <p>Procedures to handle inadvertent discoveries will be addressed in a monitoring and discovery plan developed during the right-of-way process.</p>

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<p>Ecology: Plant Special Status Species Section 13.1.12</p>	<p>Direct: Six BLM-listed sensitive plant species (Barneby Pink Egg Milkvetch, Compact cat's-eye, Jone's globemallow, Long-calyx milkvetch, Money wild buckwheat, and Munz Nevada Willowherb) may have suitable habitat within the SEZ. (Two of these are species that have been identified subsequent to the Solar PEIS.) However, since publication of the Solar PEIS, analysis by the BLM indicates that no Endangered Species Act (ESA)-listed plant species or BLM SSS have suitable habitat within the SEZ.</p> <p>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.</p> <p>Indirect: Indirect impacts on individuals and habitat outside of the SEZ could occur from surface runoff, dust, or accidental spills. There could be indirect impacts on the Sandhill goosefoot habitat. One additional BLM-listed sensitive plant species (Nevada willow herb) was identified with habitat within 5 mi (8 km) of the SEZ.</p> <p>Cumulative: There would be no cumulative impacts on special status plant species unless they are discovered during pre-disturbance surveys (cumulative impacts then might be due to habitat destruction and overall development and fragmentation of the area).</p> <p>Data Gaps: Although habitat for listed species has not been identified within the SEZ, pre-disturbance surveys are required to identify the presence and abundance of special status species.</p>	<p>Based on data from required pre-disturbance surveys, disturbance to occupied habitats would be avoided to the extent practicable.</p> <p>Avoiding or minimizing disturbance of pinyon-juniper and oak/mahogany woodlands in the area of direct effects could reduce impacts on the Munz Nevada Willowherb.</p> <p>See other programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>If avoidance is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation may be employed.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<p>No, unless special status plant species are discovered during pre-disturbance surveys. There are no known special status plant species within the SEZ.</p>

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<p>Ecology: Vegetation Section 13.1.10</p>	<p>Direct: Development will adversely affect characteristic vegetation (e.g., greasewood and sagebrush) through destruction and loss of habitat. Development will result in moderate impacts on the following land types which comprise the SEZ: Inter-Mountain Basins Mixed Salt Desert Scrub and Inter-Mountain Basins Active and Stabilized Dune. Sensitive habitats on the SEZ include sand dune, dry wash, and playa habitats. Development, including vegetation removal, land clearing, grading, and changes in surface water flow may alter soils and vegetation communities and result in the establishment of invasive species and noxious weeds within the SEZ.</p> <p>Indirect: Loss of native vegetation, increased surface water runoff and related erosion, or through the introduction of invasive species. Establishment of noxious weeds in the SEZ may result in their spreading to adjacent areas. Indirect impacts on wetlands could occur.</p> <p>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.</p> <p>Data Gaps: Direct impacts could still occur on unmapped wetlands within the developable areas of the SEZ.</p>	<p>SEZ-specific programmatic design features require that all playa, dry wash, and sand dune habitats, and sand transport areas be avoided to the extent practicable, and any impacts minimized and mitigated in consultation with appropriate agencies. A buffer area will be maintained around playas and dry washes to reduce the potential for impacts on these habitats on or near the SEZ.</p> <p>See other programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>SEZ-specific programmatic design features require that appropriate engineering controls be used to minimize impacts on dry wash, playa, greasewood flat, and dry lake habitats, including downstream occurrences, that result from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition on these habitats. Appropriate buffers, best management practices, and engineering controls will be determined through agency consultation.</p> <p>Programmatic design features for weed control state that methods considered may include avoiding travel through weed-infested areas; inspecting and cleaning vehicles and equipment; limiting ground disturbance; avoiding the creation of soil conditions that promote weed germination and establishment; and disposing of seed and plant parts.</p> <p>See other programmatic design features at URL under Avoidance column.</p> <p>Also recommend re-vegetation of the SEZ with a BLM-approved seed mix to increase soil stability as a plan of development feature to further minimize the amount of grading and surface disturbance and promote reduced dust emissions and PM levels.</p>	<p>Yes. Development would result in direct removal or disturbance of native plant communities, special soil environments, and the ecosystem services they provide.</p>

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<p>Ecology: Invasive and Noxious Weeds Section 13.1.10</p>	<p>Direct: 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.</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 and noxious species. Establishment of noxious weeds in the SEZ may result in their spreading to adjacent areas.</p> <p>Cumulative: Solar energy development could be a contributor to cumulative impacts on some vegetation communities, depending on the number and location of other developments in the region.</p> <p>Data Gaps: None identified.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>Programmatic design features for weed control state that methods considered may include avoiding travel through weed-infested areas; inspecting and cleaning vehicles and equipment; limiting ground disturbance; avoiding the creation of soil conditions that promote weed germination and establishment; and disposing of seed and plant parts.</p> <p>A Weed Management Plan should be developed and weed-free seed should be used to support re-vegetation efforts, control invasive and noxious species, and prevent increase in fires.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<p>Maybe. Onsite mitigation will reduce, but not eliminate, the potential for invasive and noxious species. The degree of disturbance creates a significant opportunity for the establishment of invasive and noxious species.</p>

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<p>Ecology: Animal Special Status Species Section 13.1.12</p>	<p>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. Impacts from noise on special status wildlife could also occur.</p> <p>Solar PEIS analyses identified potential suitable habitat for fifteen BLM-sensitive species and one ESA-listed threatened species (Utah prairie dog [<i>Cynomys parvidens</i>]). Since publication of the Solar PEIS, analysis by the BLM indicates that development on the SEZ could directly disturb individuals or populations of the Utah prairie dog as well as six of the BLM-sensitive animal species evaluated in the PEIS (bald eagle, golden eagle, Western burrowing owl, kit fox, pygmy rabbit, and the dark kangaroo mouse).</p> <p>Indirect: Indirect impacts on individuals and animal habitat outside of the SEZ could occur due to surface runoff, dust, noise, lighting, or accidental spills.</p> <p>Cumulative: There could be cumulative impacts on some special status animal species due to habitat destruction and overall development and fragmentation of the area.</p> <p>Data Gaps: Pre-disturbance surveys are required to identify the presence and abundance of special status species.</p>	<p>The steps outlined in the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances should be followed.</p> <p>Based on data from required pre-disturbance surveys, disturbance to suitable habitats would be avoided to the extent practicable.</p> <p>See other programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>If avoidance is not possible for some species, translocation of individuals from areas of direct effects or compensatory mitigation may be employed.</p> <p>Regarding avoidance and minimization onsite, consultation with the U.S. Fish and Wildlife Service and the Utah Division of Wildlife will be conducted to address the potential for impacts on the Utah prairie dog.</p> <p>Coordination with the USFWS and the UDWR will be conducted to address the potential for impacts on the greater sage-grouse. Coordination will identify an appropriate pre-disturbance survey protocol, avoidance measures, and any potential compensatory mitigation actions.</p> <p>See other programmatic design features at URL under Avoidance column.</p> <p>Install BLM-approved fencing to minimize impacts on the Utah prairie dog.</p>	<p>Yes. Animal SSS along with other wildlife represent a basic component of the ecosystem.</p> <p>Level of site grading and disturbance to native vegetation would be the primary driver of residual impact on functional habitat for full build out of the SEZ.</p>

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<p>Ecology: Migratory Birds Section 13.1.11.2</p>	<p>Direct: Loss of individuals, habitat, and connectivity for several species protected under the Migratory Bird Treaty Act. Noise, lighting, and vegetation clearing could impact migratory birds using the SEZ. There is potential for water birds to be attracted to solar fields (because they look like water) and collide with solar panels. Burning of wings in the solar radiation field between heliostats and power towers has been observed. There may also be impacts on night sky that may alter bird migratory behavior and habitat use. Priority migratory bird species that may occur on or near the SEZ include Brewers sparrow, Ferruginous hawk, Long-billed curlew, and Yellow-billed cuckoo.⁸</p> <p>Indirect: Outside the SEZ, impacts could occur from habitat loss.</p> <p>Cumulative: Impacts on migratory birds could occur; depending on the number and location of other developments in the region.</p> <p>Data Gaps: Additional research needed on solar development impacts on migratory birds, including whether birds are attracted to solar fields because they look like water. Impacts on migratory birds from construction noise would have to be considered on a project-specific basis.</p>	<p>The steps outlined in the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances should be followed.</p> <p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>Programmatic design features state that restrictions on timing and duration of activities in coordination with the BLM, USFWS, and other appropriate agencies will be considered to minimize impacts on nesting birds (especially passerines and listed species).</p> <p>See other programmatic design features at URL under Avoidance column.</p> <p>Also recommend implementation of technologies that minimize the amount of reflective surfaces, or alter how the surfaces are perceived by wildlife, that will reduce the "lake effect" in attracting migratory birds and other wildlife.</p>	<p>Yes. Some level of bird injury/fatality has been observed for all types of solar facilities (through collisions with equipment or from burns). Research is ongoing to quantify impacts and identify effective mitigation measures.</p>

⁸ Priority migratory bird species for the SEZ were determined based on those species discussed in (<http://www.partnersinflight.org/>).

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Ecology: Terrestrial Wildlife, Big Game, and Non-Migratory Birds Section 13.1.11	<p>Direct: Loss of habitat and connectivity for several species of amphibians, reptiles, raptors, mammals, bats, and invertebrates. Year-long crucial pronghorn habitat exists throughout the SEZ. 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 wildlife within the SEZ.</p> <p>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.</p> <p>Cumulative: Cumulative effects on some species could rise to a level of moderate, given the large acreages potentially disturbed and depending on the type, number, and location of other developments in the region.</p> <p>Data Gaps: Impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis.</p>	<p>The steps outlined in the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances should be followed.</p> <p>Ephemeral washes shall be avoided.</p> <p>Wetlands, washes, and riparian areas identified during site-specific surveys will be avoided to the extent practicable.</p> <p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</p>	<p>The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<p>Yes. Development of the Escalante Valley SEZ will likely impact up to 6,533 acres of wildlife habitat. Level of site grading and disturbance to native vegetation would be the primary driver of residual impacts on functional habitat for full build-out of SEZ.</p> <p>Little can be done onsite to mitigate the loss of up to 6,533 acres of general wildlife habitat.</p>
Environmental Justice Section 13.1.20	<p>Direct: Based on 2010 U.S. Census data, there are no low-income or minority populations within a 50-mile radius of the SEZ. However, at the individual block group level, there are seven low-income census block groups located in Iron County, within or in close proximity to Cedar City. No disproportionate adverse impacts related to solar energy development in the SEZ have been identified on those populations.</p> <p>Indirect: None identified.</p> <p>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 within the 50-mile geographic extent of effects.</p> <p>Data Gaps: None identified.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Environmental_Justice.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>No.</p>

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<p>Hydrology: Surface Water Section 13.1.9</p>	<p>Direct: Soil and vegetation removal, associated with development of the SEZ could increase surface runoff, reduce infiltration/recharge, disrupt ephemeral stream networks increase sedimentation and erosion, and degrade water quality. Increased erosion and sedimentation may occur at the Dick Palmer Wash, an intermittent/ephemeral stream that flows north through the southwestern part of the SEZ. Part of a playa lake (designated as a wetland in the 2014 National Wetlands Inventory) located west of Table Butte in the southwestern portion of the SEZ (the area within the SEZ was identified as a non-development area in the Solar PEIS). The floodplains associated with major drainages have been mapped by Iron County. The Dick Palmer Wash has a floodplain that is 900'-2,000' wide where it crosses the SEZ, and this floodplain and can be recommended as a non-development area in the UT SRMS. There are probably narrow floodplains associated with a few smaller intermittent/ephemeral streams within the SEZ that should be avoided. High-intensity rainstorms have caused significant flooding and damage to populated areas in the past.</p> <p>The SEZ is within the Beryl-Enterprise Basin. Four intermittent/ephemeral channels within the Escalante Valley SEZ were classified as having low sensitivity to disturbance.</p> <p>Based on SWReGAP data, one occurrence of open water (mostly surrounded by Inter-Mountain Basins Semi-Desert Shrub Steppe) is located in the southwest portion of the SEZ, and two locations of open water occur in the eastern portion. These locations are likely small earthen livestock watering areas that have been constructed by building up berms to hold runoff or water pumped into the areas for short periods of time.</p> <p>Indirect: Indirect impacts from development and groundwater use on intermittent/ephemeral surface water features could occur.</p> <p>Cumulative: Alterations to intermittent/ephemeral stream networks can alter groundwater recharge and runoff processes which could impact the basin-scale water balance and increase sediments loads in runoff.</p> <p>Data Gaps: None identified.</p>	<p>SEZ-specific programmatic design features require that all intermittent/ephemeral streams within the SEZ will be avoided to the extent practicable. A buffer area will be maintained around wetlands, playas, and intermittent/ephemeral streams to reduce the potential for impacts.</p> <p>Programmatic design features require that contaminant spills in excess of reportable quantities will be immediately contained and reported as required under law. The operator will remove any contaminated soil and dispose of it in accordance with all applicable laws.</p> <p>See other programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf</p>	<p>Appropriate engineering controls will be used to minimize impacts from altered hydrologic regimes. Appropriate buffers, best management practices, and engineering controls will be determined through agency and stakeholder consultation.</p> <p>During site characterization, coordination and permitting with the Utah Division of Water Rights regarding Utah's Stream Alteration Program would be required for any proposed alterations to surface water features.</p> <p>See programmatic design features at URL under Avoidance column.</p>	<p>Yes. Hydrology is a basic component of the ecosystem. Reconfiguration of topography for solar development would have residual impacts on surface hydrology with potential impacts on other resources, including vegetation.</p> <p>Development may disrupt watershed processes that can impact runoff responses, groundwater recharge, and ecological habitats.</p>

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<p>Hydrology: Groundwater Section 13.1.9</p>	<p>Direct: The Escalante Valley SEZ is located in the Beryl-Enterprise portion of the Escalante Desert groundwater basin, Groundwater withdrawals for development may cause declines in groundwater elevations that can impact water availability for surface water features, vegetation, ecological habitats, and other groundwater users. Disturbance to intermittent/ephemeral stream channels in the Escalante Valley SEZ could potentially affect groundwater recharge. The area surrounding Table Butte has been identified as an important recharge area for the Beryl-Enterprise Basin.</p> <p>Surface water rights are fully appropriated in the Escalante Valley (Beryl-Enterprise basin), and no new groundwater diversions are allowed because of the land subsidence and declining water table in the region.</p> <p>Indirect: Groundwater withdrawals for solar energy facilities may affect other groundwater users.</p> <p>Cumulative: Cumulative impacts on groundwater could occur when combined with other future developments in the region.</p> <p>Data Gaps: If a solar application proposes substantial groundwater withdrawals, additional groundwater data collection and monitoring will be needed.</p>	<p>Groundwater analyses suggest that full build-out of wet-cooled technologies is not feasible.</p> <p>SEZ-specific programmatic design features require that all dry washes and playas within the SEZ will be avoided to the extent practicable. A buffer area will be maintained around wetlands, playas, and dry washes to reduce the potential for impacts.</p> <p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf</p> <p>Solar developers would need to obtain water right transfers, which are considered by the Utah Division of Water Rights on a case-by-case basis.</p>	<p>For mixed-technology development scenarios, any proposed wet-cooled projects should utilize water conservation practices.</p> <p>See programmatic design features at URL under Avoidance column.</p>	<p>Maybe. It is possible for impacts on groundwater aquifers to be avoided with the judicious evaluation of water rights change applications by the Utah Division of Water Rights.</p> <p>Solar developers should be prepared to purchase fully-utilized and senior water rights for their operations. These water rights will most likely be transferred from irrigation rights, and there is a significant amount of return recharge that can occur from irrigation. Therefore, to achieve a net-neutral effect on the water budget, a change application for solar development purposes may require the solar operators to acquire additional nonuse water rights beyond their operational needs. Any individual or organization (or combination) can protest these water rights change applications.</p>

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Lands and Realty: Rights of Way Section 13.1.2	<p>Direct: Development of 80% of the SEZ could disturb 5,226 acres (21.1 km²). There are existing ROWs for two small electric lines and for a railroad. There is a 2-mi (3-km) wide Section 368 (of the Energy Policy Act of 2005) designated energy corridor about 4 mi (6 km) southeast of the area. There are two lines, the Sigurd-to-Red Butte 345-kv transmission line and a 500-kv line, within the Section 368 corridor (about 4.5-7 miles away). There is a 138-kv line going into the WECCO substation approximately 12 miles away. The IPP (500-kv DC line) and a gas pipeline also are within that Section 368 corridor.</p> <p>Indirect: Increased traffic and increased access to previously remote areas also could change the overall character of the landscape.</p> <p>Cumulative: Projects within the SEZ would make only a small contribution to cumulative impacts because of its relatively small size.</p> <p>Data Gaps: None identified.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Lands_and_Realty.pdf	<p>Priority consideration should be given to utilizing existing roads to provide construction and operational access to the SEZ.</p> <p>See programmatic design features at URL under Avoidance column.</p>	No. By regulation, any new activity must occur in deference to existing rights. Thus, potential impacts have been avoided.
Lands and Realty: Military and Civilian Aviation Section 13.1.6	<p>Direct: No military training routes or special use airspace are located above the SEZ. The SEZ is not identified as a DoD consultation area in the BLM's land records.</p> <p>The closest civilian municipal aviation facility is the Cedar City Regional Airport, about 30 mi (48 km) east-southeast of the Escalante Valley SEZ.</p> <p>Indirect: None identified.</p> <p>Cumulative: None identified.</p> <p>Data Gaps: None identified.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Military_Civilian_Aviation.pdf	See programmatic design features at URL under Avoidance column.	No.

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Resource/Issue ¹	Escalante Valley Solar Energy Zone Impacts ²	On-site Mitigation ³		Residual Adverse Impacts? ⁴
		Avoidance	Minimization	
Lands and Realty: Minerals Section 13.1.8 and Section 13.1.24 of the Final PEIS	<p>Direct: There are no locatable mining claims or geothermal leases within the SEZ. There are no active/authorized oil and gas leases in the SEZ. The SEZ has been withdrawn from mineral entry for a period of 20 years, precluding impacts from many types of mining activities.</p> <p>Indirect: None identified.</p> <p>Cumulative: None identified.</p> <p>Data Gaps: None identified.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Mineral_Resources.pdf	See programmatic design features at URL under Avoidance column.	No.
Lands and Realty: Transportation Section 13.1.21	<p>Direct: Development will add traffic to existing roads serving the area. Beryl Milford Road and Lund Highway provide regional traffic corridors for the SEZ. Local road improvements would be necessary on any portion(s) of Beryl Milford Road and Lund Highway that might be developed so as not to overwhelm the local access roads near any site access point(s). Potential existing site access roads would require improvements, including asphalt pavement.</p> <p>The Union Pacific Railroad serves the area. The main line connecting Las Vegas and Salt Lake City runs just to the northwest of the SEZ. The railroad has a rail stop in Lund, about 4 mi (6 km) directly north of Escalante Valley SEZ, where Beryl Milford Road and Lund Highway meet. A rail spur breaks away from the main line at Lund, passing to the southeast on its way to Cedar City. This spur passes through the northeastern edge of the SEZ.</p> <p>Indirect: None identified.</p> <p>Cumulative: Cumulative impacts on traffic could occur with multiple developments in the region.</p> <p>Data Gaps: None identified.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Transportation.pdf	Programmatic design features state that improvements to local roads to accommodate additional traffic should be considered. See other programmatic design features at URL under Avoidance column.	No. Through a combination of avoidance, design features, and the establishment of alternative access routes to these areas, the potential impacts can be adequately mitigated onsite.
Lands with Wilderness Characteristics Section 13.1.3	<p>There are no inventory units within the SEZ or adjacent to the SEZ which were identified as having wilderness characteristics.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf	See programmatic design features at URL under Avoidance column.	No.

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Livestock Grazing Section 13.1.4.1	<p>Direct: The entire Escalante Valley SEZ is included in the Butte allotment (about 20% of the allotment area includes these SEZ lands). Grazing is currently authorized for the allotment, and it is used by two permittees and supports the production of 541 animal unit months (AUMs) of forage per year. These AUMs are allocated to cattle. Grazing would be excluded from the areas developed for solar energy production as provided for in the BLM grazing regulation.</p> <p>Indirect: None identified.</p> <p>Cumulative: Other development in the area of the SEZ could result in cumulative impacts on grazing.</p> <p>Data Gaps: Need additional information on forage quality of the Butte allotment.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Rangeland_Resources.pdf</p>	<p>Programmatic design features state that consideration should be given to maintenance or relocation of range improvements and fencing, and access to water and water rights.</p> <p>See programmatic design features at URL under Avoidance column.</p>	<p>Maybe. For grazing impacts, depends on mitigation measures implemented on the basis of project-level NEPA.</p> <p>Residual impacts to be evaluated based on locations of development within the SEZ and project-level NEPA.</p>

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<p>Native American Concerns Section 13.1.18</p>	<p>Direct: The Southern Paiutes have expressed concerns over potential impacts on important resources such as food plants, medicinal plants, plants used in basketry, plants used in construction, large and small game animals, birds, and sources of clay, salt, and pigments. Tribal representatives believe that solar development could affect identified and unidentified archaeological sites, water sources, culturally important geological features, and traditional plant, mineral, and animal resources, and could result in visual impacts on the Thermo Hot Springs, Table Butte, Sulfur Spring, Mountain Spring Peak, and the Indian Peak Range, which contains Eagle Rock. Possible visual impacts could occur to Parowan Gap. Development may affect the spiritual connection both tribes have to water and Puha. This is especially true for developments near spiritual water sources such as Sulfur Spring and Thermo Hot Springs and any prominent volcanic feature located within the SEZ. Development will directly affect culturally important plant and animal resources as it will likely require the grading of the project area. It is unlikely that avoidance of all resources would be possible.</p> <p>Indirect: General habitat loss with vegetation clearing and water reduction that could affect species and ecosystem health. Presence of a larger number of outsiders in the area would increase the chance that the cultural importance of the area would be degraded by more foot and motorized traffic.</p> <p>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.</p> <p>Data Gaps: Government-to-Government consultation for projects will be required to determine specific issues of Native American concern.</p>	<p>Avoidance of significant resources clustered in specific areas, such as those in the vicinity of the dunes, is recommended.</p> <p>The following SEZ-specific programmatic design features for avoidance will be required:</p> <p>Known human burial sites and rock art (panels of petroglyphs and/or pictographs) will be avoided. Where there is a reasonable probability of encountering undetected human remains and associated funerary objects by a solar project, the BLM will carry out discussions with Indian tribes before the project is authorized, in order to provide general guidance on the treatment of any cultural items that might be exposed.</p> <p>Visual intrusion on sacred sites will be avoided to the extent practicable.</p> <p>Springs and other water sources that are or may be sacred or culturally important will be avoided to the extent practicable. Culturally important plant and wildlife species will be avoided to be extent practicable.</p> <p>See other programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Native_American_Concerns.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>Yes. Consultation on project applications will determine whether regional mitigation for Native American Concerns is warranted.</p> <p>Potentially significant sites and landscapes in the vicinity of the SEZ associated with Table Butte, Eagle Rock (Doctor Rock), Parowan Gap, and Thermo Hot Springs, as well as important water sources, clay and rock resources, ceremonial areas and healing places, and traditionally important plant and animal species, should be considered and discussed during consultation.</p>

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Paleontology Section 13.1.16	<p>Direct: The SEZ is PFYC Class 2 indicating that the potential for the occurrence of significant fossil material is low. Important resources could exist; if identified, they would need to be managed on a case-by-case basis</p> <p>Indirect: None identified.</p> <p>Cumulative: Cumulative impacts are dependent on whether significant resources are found within the SEZ and in additional project areas in the region.</p> <p>Data Gaps: A more detailed assessment of the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted for a specific project. The BLM Regional Paleontologist may have additional information regarding the paleontological potential of the SEZ and be able to verify the potential fossil yield classification (PFYC) of the SEZ as Class 2.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Paleo.pdf</p>	<p>Programmatic design features require that the BLM 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.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<p>No. Design features will reduce the risk that any paleontological resources that are discovered will be destroyed.</p>
Public Access and Recreation Section 13.1.5	<p>Direct: The area would not be expected to attract recreational visitors from outside the area; however, it may be used by local residents for general outdoor recreation, including backcountry driving and OHV use, recreational shooting, and small and big game hunting. Public access through areas developed for solar power production could be lost unless access routes were identified and retained.</p> <p>Indirect: People seeking more rural or primitive surroundings for recreation may experience a reduction in recreational opportunities and/or a degraded recreational experience.</p> <p>Cumulative: Multiple developments in the vicinity of the SEZ could cumulatively reduce recreational opportunities.</p> <p>Data Gaps: None identified.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Public Access and Recreation.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>No.</p>

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Socioeconomics Section 13.1.19	<p>Direct: Impacts on local economy as a result of expenditures of wages and salaries and the collection of state sales and income taxes. From 127 to 1,682 direct construction jobs and 12 to 232 direct operations jobs could be created (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). Development of the SEZ would require an in-migration of workers and their families, which could increase the ROI population by up to 0.4%.</p> <p>Indirect: From 137 to 1,836 indirect construction jobs and 4 to 148 indirect operations jobs could be created. Impacts from project wages and salaries, and tax revenues subsequently circulating through the economy would be minor.</p> <p>Cumulative: Impacts overall 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, are expected to be small. The in-migration of workers and their families from development of all three SEZs could increase the combined ROI population by up to 1.39%.</p> <p>Data Gaps: None identified.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Socioeconomics.pdf	<p>See programmatic design features at URL under Avoidance column.</p> <p>Additionally, onsite mitigation could include requiring developers to secure agreements for local government services as a condition of "Notice to Proceed."</p>	<p>No. Generally positive impacts expected. Actual impacts will depend on where in-migration workers decide to relocate.</p> <p>No shared revenue to state and local government from federal land rental and MW usage fees under current federal law and regulations.</p>

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Soils/Erosion Section 13.1.7	<p>Direct: Impacts on soil resources would occur mainly as a result of ground-disturbing activities (e.g., grading, excavating, and drilling), especially during construction of a solar project. 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 within the SEZ are predominantly the silt loams of the Bullion-Antelope Springs complex, the Bullion-Berent complex, the Bullion Series, and the Bullion-Taylorflat complex. These soils are very deep and well drained, with high surface runoff potential and moderately high permeability (although the smectitic silt loams of the Bullion Series tend to have low permeability). Biological soil crusts are likely present.</p> <p>Soil contamination from spills could occur.</p> <p>Indirect: Disturbance of soil can lead to introduction of invasive species. Elevated PM levels offsite could result from soil disturbance/ grading activities during construction.</p> <p>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.</p> <p>Data Gaps: Projects will be monitored for soil losses from erosion which may result from rapid runoff from disturbed areas.</p>	See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Soil_Geologic_Hazards.pdf	<p>Programmatic design features state the following:</p> <p>Contaminant spills in excess of reportable quantities will be immediately contained and reported as required under law. The operator will remove any contaminated soil and dispose of it in accordance with all applicable laws.</p> <p>Re-vegetation of the SEZ with a BLM-approved seed mix to increase soil stability should be done as quickly as possible in disturbed areas.</p> <p>Operators will minimize the construction of new roads by utilizing existing roads as much as possible.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<p>Yes. Soils represent a basic component of the ecosystem. Solar development on the SEZ is expected to result in a residual loss of sensitive soils and soil functions.</p> <p>Little can be done to mitigate the loss of up to 6,533 acres of soil. Avoidance (not developing some areas) will reduce the acreage and soil stabilization measures can reduce soil erosion post disturbance.</p>

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<p>Specially Designated Areas Section 13.1.3</p>	<p>Direct: There are two specially designated areas (SDAs) within 25 miles of the SEZ: the Old Spanish National Historic Trail and the Three Peaks Special Recreation Management Area (SRMA). Impacts could include adverse visual effects on the Old Spanish National Historic Trail.</p> <p>Indirect: None identified.</p> <p>Cumulative: Development of solar facilities and other facilities may result in cumulative effects, particularly visual impacts, on SDAs. When several projects are 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.</p> <p>Data Gaps: It is known that there are fifteen solar projects on private land within 25 miles from Three Peaks SRMA, and eighteen solar facilities that are within 25 miles of the Old Spanish National Historic Trail. A visual analysis has not been completed to determine the threshold for cumulative impacts.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>Maybe. Residual impacts will be evaluated based on locations of development within the SEZ and project level NEPA.</p>

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<p>Visual Section 13.1.14</p>	<p>Direct: The SEZ is in an area of low scenic quality. Utility-scale solar energy development within the SEZ is unlikely to cause even moderate visual impacts on highly sensitive visual resource areas, the closest of which is more than 6 mi (10 km) from the SEZ. The closest community (Newcastle) is about 15 mi (24 km) from the SEZ and is likely to experience minimal visual impacts from solar development within the SEZ. Development will adversely impact visual resources and may impact night skies.</p> <p>Indirect: None identified.</p> <p>Cumulative: When several projects are 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.</p> <p>Data Gaps: It is known that there are fifteen solar projects on private land that are within 25 miles from Three Peaks SRMA, and eighteen solar facilities that are within 25 miles of the Old Spanish National Historic Trail, development in the SEZ may add to the cumulative impact. A visual analysis has not been completed to determine the threshold for cumulative impacts.</p>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Visual.pdf</p>	<p>Beyond those required for basic facility and company identification for safety, navigation, and delivery purposes, use of commercial symbols or signs and associated lighting on buildings and other structures should be avoided.</p> <p>See programmatic design features at URL under Avoidance column.</p>	<p>Maybe.</p>