

Wah Wah Valley Solar Energy Zone: Impact Assessment Summary Table

In Beaver County in southwestern Utah, Cedar City Field Office - 5,873 acres (23.8 km²) developable acres; up to 940 MW generation capacity, assuming 80% development
 Source: Draft and Final Solar PEIS for Wah Wah Valley SEZ (available at: <http://blmsolar.anl.gov/sez/ut/wah-wah-valley/>)

Resource/Issue ¹	Wah Wah Valley Solar Energy Zone Impacts ²	On-site Mitigation ³		Residual Adverse Impacts? ⁴
		Avoidance	Minimization	
Acoustics Section 13.3.15 ⁵	<p>Direct: Activities during construction and/or operation of solar facilities with thermal energy storage could cause noise levels well above the EPA guideline of 55 dBA at the nearest residence located less than 100 ft from the northern SEZ boundary).</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 other 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 13.3.22.4 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 13.3.13</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 (99%) have been characterized as having moderate potential for wind erosion.</p> <p>Indirect: Decreased visibility at the nearest residence 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 within the SEZ had overlapping construction periods, or if construction occurs during periods when soil-disturbing agricultural activities are ongoing to the north of the SEZ.</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; 13.3.13 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 (7,517 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 597,000-1,776,000 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 13.3.17</p>	<p>Direct: Development may adversely affect cultural resources; however, further investigation is needed. The low density of sites recorded in basin interiors in this region suggests that the possibility of significant sites within the SEZ is low. Tribal representatives of the Confederated Tribes of the Goshute Reservation and the Paiute Indian Tribe of Utah stated that the Wah Wah Valley is part of a large ceremonial landscape that includes important geological features, such as the Wah Wah Mountains, Wallaces Peak, Wah Wah Springs, Sevier Lake, and important volcanic features.</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 in the non-development area as well as outside 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 1% of the SEZ has been surveyed for cultural resources. To help characterize the area surrounding the SEZ results of a records review and Class II sample survey of the SEZ 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 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 13.3.12</p>	<p>Direct: The Solar PEIS identified five BLM-listed sensitive plant species (Compact cat's-eye, frisco buckwheat, Jone's globemallow, Long-calyx milkvetch, and Money wild buckwheat) that may have suitable habitat within the SEZ. Since publication of the Solar PEIS, analysis by the BLM indicates that no suitable habitat for BLM-sensitive plant species is present within the SEZ. No Endangered Species Act (ESA) listed species or habitat occur on 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 to individuals and habitat could occur from surface runoff, dust, or accidental spills.</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>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.</p> <p>There are no known SSS plant species within the SEZ.</p>

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<p>Ecology: Vegetation Section 13.3.10</p>	<p>Direct: Development will adversely affect characteristic vegetation (e.g., shadscale, winterfat, greasewood, and bud sagebrush) through destruction and loss of habitat. Development will result in small impacts on the following land types which comprise the SEZ: Inter-Mountain Basins Semi-Desert Shrub Steppe and Inter-Mountain Basins Mixed Salt Desert Scrub. Sensitive habitats on the SEZ include ephemeral dry wash and playa habitats. Communities associated with playa habitats, greasewood flats communities, or other intermittently flooded areas down gradient from solar projects in the SEZ could be affected by ground-disturbing activities. 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: Impacts on plant communities associated with playa habitats, greasewood flats, or other intermittently flooded areas, or dry washes, within or near the SEZ could occur. Indirect impacts from groundwater use on plant communities in the region that depend on groundwater, such as riparian communities associated with springs, could also occur. 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 dry wash and playa habitats within the SEZ shall be avoided to the extent practicable, and any impacts should be minimized and mitigated in consultation with appropriate agencies. A buffer area shall be maintained around dry washes and playa habitats to reduce the potential for impacts.</p> <p>See 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 shall be used to minimize impacts on dry wash, playa, and greasewood flat habitats, including downstream occurrences, resulting from surface water runoff, erosion, sedimentation, altered hydrology, accidental spills, or fugitive dust deposition to these habitats. Appropriate buffers and engineering controls will be determined through agency consultation.</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 these native plant communities, special soil environments, and the ecosystem services they provide.</p>

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<p>Ecology: Invasive and Noxious Weeds Section 13.3.10</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>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 13.3.12</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 indicated that potentially suitable habitat for eleven BLM-sensitive special status animal species may be affected by solar development on the SEZ. However, since publication of the Solar PEIS, analyses by the BLM indicates that development on the SEZ could directly disturb three BLM-sensitive animal species (Western burrowing owl, golden eagle, and kit fox).</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>See other programmatic design features at URL under Avoidance column.</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 13.3.11.2</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 Partners in Flight (<http://www.partnersinflight.org/>).

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<p>Ecology: Terrestrial Wildlife, Big Game, and Non-Migratory Birds Section 13.3.11</p>	<p>Direct: Loss of habitat and connectivity for several species of amphibians, reptiles, 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. Impacts from noise on wildlife could occur, especially on bat species, if the SEZ is located near any bat roosts.</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>The inter-mountain basins big sagebrush shrubland cover type in the southeastern portion of the SEZ, which is the only identified suitable land cover for the elk and sagebrush vole in the SEZ, should be avoided.</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 programmatic design features at URL under Avoidance column.</p>	<p>Yes. Development of the Wah Wah Valley SEZ will likely impact up to 5,873 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 5,873 acres of general wildlife habitat.</p>
<p>Environmental Justice Section 13.3.20</p>	<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 13.2.9</p>	<p>Direct: Soil and vegetation removal associated with development of the SEZ could increase surface runoff, reduce infiltration/recharge, disrupt intermittent/ephemeral stream networks, and degrade water quality. Most intermittent/ephemeral streams within the SEZ have a low sensitivity to land disturbances. One channel in the western portion of the SEZ had moderate sensitivity, and channel reaches that drain the Wah Wah Mountains and just along the western edge of the SEZ have a high sensitivity to land disturbance and could disrupt groundwater recharge processes.</p> <p>Indirect: Indirect impacts from development on ephemeral and perennial surface water features could occur.</p> <p>Cumulative: Alterations to intermittent/ephemeral stream networks can alter groundwater recharge and runoff responses, which could impact the basin-scale water balance and increase sediment loads in runoff.</p> <p>Data Gaps: 100-year floodplains will need to be mapped. The Wah Wah Wash has been identified as a non-development area; additional associated floodplain areas could be additional non-development areas identified in the SRMS. There are probably other narrow floodplains associated with some of the smaller intermittent/ephemeral streams in the SEZ that should be avoided.</p>	<p>SEZ-specific programmatic design features require that all intermittent/ephemeral streams within the SEZ will be avoided to the extent practicable, and any impacts should be minimized and mitigated in consultation with appropriate agencies. A buffer area will be maintained around 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 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 other programmatic design features at URL under Avoidance column.</p>	<p>Yes. Hydrology is a basic component of the ecosystem. Surface disturbance from solar development would have residual impacts on surface hydrology with potential impacts on other resources.</p> <p>Solar development may alter watershed processes that can impact runoff responses, groundwater recharge, and ecological habitats</p>

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<p>Hydrology: Groundwater Section 13.3.9</p>	<p>Direct: Groundwater withdrawals for development may cause declines in groundwater elevations that can impact water availability for other groundwater users. Groundwater for the SEZ is contained in a basin-fill aquifer overlaying a regional-scale carbonate rock aquifer system.</p> <p>The Wah Wah Valley is under the jurisdiction of the Utah Division of Water Rights and is located in Policy Area 69 (Wah Wah Valley and Sevier Lake). It is the responsibility of the Utah Division of Water Rights to evaluate water rights applications in accordance with their mission statement "to provide order and certainty in the beneficial use of Utah's water." Any individual or organization (or combination) can protest water rights applications.</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. Two pending groundwater applications have the potential to withdraw substantial groundwater quantities.</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>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf</p> <p>Water rights are allocated by the Utah Division of Water Rights. 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. Any individual or organization (or combination) can protest water rights applications.</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 or minimized.</p> <p>The limited information on groundwater resources in Wah Wah Valley has prompted the U.S. Department of the Interior to initiate a groundwater investigation to assess potential impacts on groundwater resources in this region. Solar operators with substantial water needs should be prepared to contribute to this investigation to improve the forecasting of the impacts of groundwater pumping on the basin.</p>

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Lands and Realty: Rights of Way Section 13.3.2	<p>Direct: Development of 80% of the SEZ could disturb 5,873 acres (23.8 km²). The SEZ partially overlaps a Section 368 federally designated energy corridor. This existing corridor will be used primarily for the siting of transmission lines and other infrastructure such as pipelines. The existing corridor will be the preferred location for any transmission development that is required to support solar development and future transmission grid improvements related to the build-out of the Wah Wah Valley SEZ. State Route 21, an existing ROW, goes through the northern portion of the SEZ.</p> <p>The northern boundary of the SEZ is immediately adjacent to a ranch home place, ranch buildings, and a feedlot and the access road to the ranch is within the SEZ.</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	Development may need to be restricted in the northern portion of the SEZ near the ranch development on private land to provide a buffer between private land developments and solar energy facility development. See programmatic design features at URL under Avoidance column. Recommend that priority consideration should be given to utilizing existing roads to provide construction and operational access to the SEZ.	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 13.3.6	<p>Direct: There are no identified military or civilian aviation uses in near proximity to the SEZ. The southeastern boundary of the Utah Test and Training Range is about 5 mi (8 km) northwest of the SEZ.</p> <p>The closest civilian municipal airport is the Milford Municipal Airport located 23 mi (37 km) east.</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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<p>Lands and Realty: Minerals Section 13.3.8 and Section 13.3.24 of the Final PEIS</p>	<p>Direct: There are no known locatable minerals within the SEZ. There were geothermal leases located southeast of the SEZ, but they are now closed. No geothermal development has occurred within or near the SEZ. The SEZ also encompasses a Beaver County sand and gravel free use permit and a small BLM administrative site. 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>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Mineral_Resources.pdf</p>	<p>See programmatic design features at URL under Avoidance column.</p>	No.
<p>Lands and Realty: Transportation Section 13.3.21</p>	<p>Direct: Development will add traffic to existing roads serving the area. The volume of traffic on State Route 21 and other regional corridors would be more than double the current values near the SEZ. Existing site access roads (including a road in the southwest portion of the SEZ) could require improvements, including asphalt pavement.</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>	<p>See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Transportation.pdf</p>	<p>Programmatic design features state that improvements to local roads to accommodate additional traffic should be considered.</p> <p>See programmatic design features at URL under Avoidance column.</p>	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.
<p>Lands with Wilderness Characteristics. Section 13.3.3</p>	<p>Direct: None – there are no lands with wilderness characteristics within the SEZ.</p> <p>Indirect: Two wilderness inventory units, the Central Wah Wah Mountains and the North Wah Wah are within 25 mi (40 km) of the SEZ, but they would not be impacted. Outside sights and sounds should not have an impact on wilderness characteristics unless they are pervasive and omnipresent. (BLM Manual 6310)</p>	<p>Programmatic design features include a requirement to consider options to avoid, minimize, and/or mitigate impacts to lands with wilderness characteristics as part of the project-specific environmental impact analysis, in coordination with the BLM.</p> <p>See other 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>	No.

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Resource/Issue ¹	Wah Wah Valley Solar Energy Zone Impacts ²	On-site Mitigation ³		Residual Adverse Impacts? ⁴
		Avoidance	Minimization	
Livestock Grazing Section 13.3.4.1	<p>Direct: Up to 5,741 acres (23 km²) of the Wah Wah Lawson grazing allotment (4% of the allotment) could be impacted from grazing with small potential impacts on one permittee. The permittee has indicated that because of the location of the SEZ, he will encounter difficulties with watering his livestock.</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 allotments.</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 13.3.18</p>	<p>Direct: Tribal representatives of the Confederated Tribes of the Goshute Reservation and the Paiute Indian Tribe of Utah stated that the Wah Wah Valley is part of a large ceremonial landscape that includes important geological features, such as the Wah Wah Mountains, Wallaces Peak, Wah Wah Springs, Sevier Lake, and important volcanic features. They believe that solar energy development within the SEZ will adversely affect rock art sites, water sources, culturally important geological features, and traditional plant, mineral, and animal resources. Development will directly affect cultural important plant and animal resources because it will likely require grading of the project area. Development within the Wah Wah Valley SEZ may affect the spiritual connection both tribes have to water and magma, through <i>Puha</i>, especially for developments near spiritual water sources, such as Wah Wah Springs, and any prominent volcanic feature located within the SEZ. Indian Graves Peak was identified as the location of Native American burials. Visual impacts on Wah Wah Springs would occur with solar energy development in the SEZ, although the degree of visibility would depend on location and technology.</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 issues of Native American concern.</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>Compensatory programs of mitigation could be implemented to provide access to and/or deliberately cultivate patches of culturally significant plants, like the Indian ricegrass fields present within the Wah Wah Valley SEZ, on other public lands nearby where tribes have ready access.</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>

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<p>Paleontology Section 13.3.16</p>	<p>Direct: The SEZ is potential fossil yield classification (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 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>
<p>Public Access and Recreation Section 13.3.5</p>	<p>Direct: The area offers little potential for recreational use, although it is likely that local residents use it for general recreational purposes. Recreational users would be excluded from any portions of the SEZ developed for solar energy production, but impacts on recreational use are anticipated to be low.</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 13.3.19	<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 124 to 1,641 direct construction jobs and 11 to 213 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 1.9%.</p> <p>Indirect: From 89 to 1,176 indirect construction jobs and 4 to 115 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	See programmatic design features at URL under Avoidance column. Additionally, onsite mitigation could include requiring developers to secure agreements for local government services as a condition of "Notice to Proceed."	<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 13.3.7	<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 silty clay loams, fine sandy loams, and sandy clay loams of the Siltcliffe Series, the Siltcliffe-Hiko Springs-Dera complex, the Siltcliffe-Thermosprings complex, the Dera-Lynndyl complex, and the Dera Series, which together make up a 97% of the soil coverage at the site. 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 5,873 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 13.3.3</p>	<p>Direct: Two Wilderness Study Areas, Wah Wah Mountains and King Top, are about 6 and 25 mi (10 and 40 km), respectively, from the nearest boundary of the SEZ.</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 three solar projects on private land within 25 miles from the Wah Wah Mountains Wilderness Study Area. 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>No. Residual impacts will be evaluated based on locations of development within the SEZ and project level NEPA.</p>
<p>Visual Section 13.3.14</p>	<p>Direct: The SEZ is in an area of low scenic quality. Development could cause moderate levels of visual contrast as observed from the Wah Wah Mountains WSA at distances between 5 and 10 mi (8 and 16 km) from the SEZ. A very small portion of the King Top WSA is within the viewshed of the SEZ, but it is too far away to be affected significantly by visual impacts resulting from solar development within the SEZ. The closest community is more than 25 mi (40 km) from the SEZ, and therefore is likely to experience minimal or no 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 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.</p> <p>Data Gaps: It is known that there are three solar projects on private land that are within 25 miles from Wah Wah Mountains Wilderness Study Area, 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>No.</p>