

## Draft - Milford Flats South Solar Energy Zone: Impact Assessment Summary Table

In Beaver County in southwestern Utah, Cedar City Field Office - 6,252 acres (25.3 km<sup>2</sup>) developable acres; up to 1,000 MW generation capacity, assuming 80% development  
 Source: Draft and Final Solar PEIS for Milford Flats South SEZ (available at: <http://blmsolar.anl.gov/sez/ut/milford-flats-south/>)

Resource/Issue <sup>1</sup>	Milford Flats South Solar Energy Zone Impacts <sup>2</sup>	On-site Mitigation <sup>3</sup>		Residual Adverse Impacts? <sup>4</sup>
		Avoidance	Minimization	
<b>Acoustics</b> Section 13.2.15 <sup>5</sup>	<p><b>Direct:</b> 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 southeast of the SEZ).</p> <p><b>Indirect:</b> 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><b>Cumulative<sup>6</sup>:</b> 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><b>Data Gaps<sup>7</sup>:</b> 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Noise.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Noise.pdf</a></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 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>

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

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

<sup>3</sup> 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.

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

<sup>5</sup> Section numbers are the same in both the Draft and Final Solar PEIS.

<sup>6</sup> Sections 13.2.22.4 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.

<sup>7</sup> 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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Air Quality Section 13.2.13	<p><b>Direct:</b> 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 PM<sub>10</sub> and 24-hour and annual PM<sub>2.5</sub> concentrations could exceed AAQS at the SEZ boundaries and in the immediate surrounding areas during construction of solar facilities. High PM<sub>10</sub> 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 Erodibility Groups identified in the Solar PEIS, the majority of the soils on the SEZ (93%) have been characterized as having moderate potential for wind erosion.</p> <p><b>Indirect:</b> Decreased visibility at nearest residences due to elevated PM levels from soil disturbance/grading during construction.</p> <p><b>Cumulative:</b> Cumulative effects due to dust emissions would be greatest if multiple solar projects had overlapping construction periods.</p> <p><b>Data Gaps:</b> Monitoring for PM during all phases of development will be required to ensure levels remain below AAQS.</p>	See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Air_Quality_Climate.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Air_Quality_Climate.pdf</a>	<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><b>Climate Change</b> Section 5.11.4 of DPEIS for soil storage capacity; 13.2.13 for emissions avoided</p>	<p><b>Direct:</b> Possible impact through loss of carbon storage capacity of the soil (estimated at 100 g carbon/m<sup>2</sup>). Preliminary calculations show loss of CO<sub>2</sub> storage capacity as 1.6 tons/acre/yr (8,003 tons/yr for SEZ full build-out), less than 1% of the CO<sub>2</sub> emissions avoided by operation of a solar facility (see below)</p> <p><b>Positive impact:</b> Solar power generation reduces demand for energy from fossil fuels, and thereby reduces greenhouse gas emissions (from about 1,050-191,000 tons/yr CO<sub>2</sub> avoided at full build-out depending on technology).</p> <p><b>Cumulative:</b> 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><b>Data Gaps</b> None identified.</p>	<p>See programmatic design features for vegetation at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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><b>Cultural</b> Section 13.2.17</p>	<p><b>Direct:</b> Development may adversely affect cultural resources; however, further investigation is needed. The Dominguez–Escalante Trail may have gone through or passed very close to the Milford Flats South SEZ, since there is relatively little potential for finding traces of the single pack trail itself, the potential for adverse effects on the trail is very low. The nearest well-documented site related to the Dominguez–Escalante Trail is Thermo Hot Springs.</p> <p><b>Indirect:</b> 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 Thermo Hot Springs South could occur with solar energy development in the SEZ, although the degree of visibility would depend on location and technology.</p> <p><b>Cumulative:</b> Eligible sites and cultural landscapes could be impacted in the SEZ and adjacent areas.</p> <p><b>Data Gaps:</b> Less than 2% of the SEZ has been surveyed for cultural resources. To help characterize the area surrounding the SEZ results of a records review and a Class II random 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Cultural.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Cultural.pdf</a></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><b>Ecology:</b> <b>Plant Special Status Species</b> Section 13.2.12</p>	<p><b>Direct:</b> The Solar PEIS identified four BLM-listed sensitive plant species (Compact cat's-eye, Jone's globemallow, Long-calyx milkvetch, and Money wild buckwheat) that may have suitable habitat within the SEZ. However, since publication of the Solar PEIS, analysis by the BLM indicates that no BLM-listed sensitive or Endangered Species Act (ESA)-listed 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><b>Indirect:</b> Indirect impacts on individuals and habitat could occur from surface runoff, dust, or accidental spills.</p> <p><b>Cumulative:</b> 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><b>Data Gaps:</b> 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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><b>Ecology: Vegetation</b> Section 13.2.10</p>	<p><b>Direct:</b> 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 Mixed Salt Desert Scrub, Inter-Mountain Basins Big Sagebrush Shrubland, and Inter-Mountain Semi-Desert Shrub Steppe. Sensitive habitats on the SEZ include ephemeral dry washes. 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><b>Indirect:</b> Loss of native vegetation, increased surface water runoff and related erosion, or through the introduction of invasive species. Indirect impacts on riparian communities along Beaver River could occur. Establishment of noxious weeds in the SEZ may result in their spreading to adjacent areas. Indirect impacts on wetlands could occur.</p> <p><b>Cumulative:</b> 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><b>Data Gaps:</b> 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 habitats within the SEZ be avoided to the extent practicable, and any impacts minimized and mitigated in consultation with appropriate agencies. A buffer area will be maintained around dry washes and riparian habitats to reduce the potential for impacts.</p> <p>See other programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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 these native plant communities, special soil environments, and the ecosystem services they provide.</p>

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<p><b>Ecology: Invasive and Noxious Weeds</b> Section 13.2.10</p>	<p><b>Direct:</b> 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><b>Indirect:</b> 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><b>Cumulative:</b> 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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><b>Ecology:</b> <b>Animal Special Status Species</b> Section 13.2.12</p>	<p><b>Direct:</b> 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 analysis identified potential suitable habitat for one ESA listed threatened species (the Utah prairie dog [<i>Cynomys parvidens</i>]) and ten BLM-sensitive species may be present on the SEZ. Since publication of the Solar PEIS, analysis by the BLM indicates that development on the SEZ could directly disturb individuals or populations of three BLM-sensitive animal species (golden eagle, kit fox, and Western burrowing owl).</p> <p>Although Utah prairie dog colonies do not occur on the SEZ, a small portion of the SEZ is situated within 0.5 mi (3 km) from a Utah prairie dog colony. The portion of the SEZ that overlaps the 0.5 mi (3 km) Utah prairie dog buffer has been recommended for non-development in this SRMS. A greater sage grouse lek is located about 1.4 mi (2.3 km) from the southeastern border of the SEZ, and three small greater sage grouse general habitat management areas (GHMAs) are located at the boundaries of and within the SEZ on its east side. (The GHMA areas were identified subsequent to the Solar PEIS and thus were not excluded). The GHMA areas have been recommended as non-development areas in this SRMS.</p> <p><b>Indirect:</b> There could be indirect effects on one BLM-sensitive special status species, the long-billed curlew. 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><b>Cumulative:</b> 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><b>Data Gaps:</b> Pre-disturbance surveys are required to identify the presence and abundance of special status species, especially kit fox.</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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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 impacts on functional habitat for full build out of the SEZ.</p>

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<p><b>Ecology:</b>  <b>Migratory Birds</b>                      Section 13.2.11.2</p>	<p><b>Direct:</b> 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.<sup>8</sup></p> <p><b>Indirect:</b> Outside the SEZ, impacts could occur from habitat loss.</p> <p><b>Cumulative:</b> Impacts on migratory birds could occur; depending on the number and location of other developments in the region.</p> <p><b>Data Gaps:</b> 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>Avoiding or minimizing disturbance of woodland habitats (e.g., pinyon juniper, mixed conifer, oak) in the area of direct effects may reduce impacts on the ferruginous hawk (nesting), Lewis's woodpecker, and northern goshawk (nesting).</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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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>

<sup>8</sup> 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><b>Ecology:</b>  <b>Terrestrial Wildlife, Big Game, and Non-Migratory Birds</b>                      Section 13.2.11</p>	<p><b>Direct:</b> Loss of habitat and connectivity for several species of amphibians, reptiles, raptors, mammals, bats, and invertebrates.<sup>9</sup> 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><b>Indirect:</b> 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><b>Cumulative:</b> 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><b>Data Gaps:</b> 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>Avoiding or minimizing disturbance of woodland habitats (e.g., pinyon juniper, mixed conifer, oak) in the area of direct effects may reduce impacts on the ferruginous hawk (nesting), Lewis's woodpecker, and northern goshawk (nesting).</p> <p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf</a></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 Milford Flats South SEZ will likely impact up to 6,252 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 6,252 acres of general wildlife habitat.</p>
<p><b>Environmental Justice</b>                      Section 13.2.20</p>	<p><b>Direct:</b> 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><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> 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><b>Data Gaps:</b> None identified.</p>	<p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Environmental_Justice.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Environmental_Justice.pdf</a></p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>No.</p>

<sup>9</sup> Wildlife species identified in the Solar PEIS that may be impacted (directly or indirectly) by solar development on the Milford Flats South SEZ include the following: Great Basin spadefoot, Great Plains toad, common sagebrush lizard, desert horned lizard, eastern fence lizard, greater short-horned lizard, long-nosed leopard lizard, tiger whiptail, gophersnake, nightsnake, wandering gartersnake, Bewick's wren, Brewer's sparrow, common raven, gray flycatcher, greater roadrunner, horned lark, Le Conte's thrasher, loggerhead shrike, rock wren, sage sparrow, sage thrasher, vesper sparrow, western kingbird, American kestrel, golden eagle, red-tailed hawk, rough-legged hawk, Swainson's hawk, turkey vulture, chukar, mourning dove, wild turkey, American black bear, cougar, elk, mule deer, pronghorn, American badger, black-tailed jackrabbit, coyote, desert cottontail, Brazilian free-tailed bat, desert woodrat, Great Basin pocket mouse, least chipmunk, little brown myotis, long-legged myotis, northern grasshopper mouse, sagebrush vole, western pipistrelle, and white-tailed antelope squirrel.

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<p><b>Hydrology:</b>  <b>Surface Water</b>                      Section 13.2.9</p>	<p><b>Direct:</b> Soil and vegetation removal associated with development of the SEZ could increase surface runoff, reduce infiltration/recharge, disrupt ephemeral stream networks, increase rates of sedimentation and erosion, and degrade water quality.</p> <p>Increased erosion and sedimentation may occur along the Minersville Canal which flows through the southern portion of the SEZ and several intermittent/ephemeral streams that cross the SEZ. The primary surface water feature near the SEZ is the Beaver River, approximately 6 mi (10 km) to the west. All intermittent/ephemeral streams crossing the SEZ have a low sensitivity to land disturbances. The SEZ is located in the Milford Area portion of the Escalante Desert groundwater basin.</p> <p><b>Indirect:</b> Indirect impacts from development and groundwater use on intermittent/ephemeral and perennial surface water features could occur.</p> <p><b>Cumulative:</b> Alterations to intermittent/ephemeral stream networks can alter groundwater recharge and runoff processes, which could impact the water budget and water quality.</p> <p><b>Data Gaps:</b> 100-year floodplains will need to be mapped. There are probably narrow floodplains associated with some of the intermittent/ephemeral streams in the SEZ that should be avoided.</p>	<p>SEZ-specific programmatic design features require that intermittent/ephemeral streams within the SEZ be avoided to the extent practicable, and any impacts 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 any 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf</a></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 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><b>Hydrology:</b>  <b>Groundwater</b>                      Section 13.2.9</p>	<p><b>Direct:</b> The SEZ is located in the Milford Area 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, and ecological habitats.</p> <p>Water rights are allocated by the Utah Division of Water Rights. Surface water rights are fully appropriated in the Escalante Desert Valley basin, and no new groundwater diversions are allowed because of the land subsidence and declining water table in the region.</p> <p><b>Indirect:</b> Groundwater withdrawals for solar energy facilities may affect other groundwater users.</p> <p><b>Cumulative:</b> Cumulative impacts on groundwater could occur when combined with other future developments in the region.</p> <p><b>Data Gaps:</b> 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 intermittent/ephemeral streams within the SEZ will be avoided to the extent practicable. A buffer area will be maintained around floodplains and intermittent/ephemeral streams to reduce the potential for impacts.</p> <p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Water.pdf</a></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 or minimized 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 to 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 13.2.2	<p><b>Direct:</b> Development of 80% of the SEZ could disturb 5,002 acres (20.2 km<sup>2</sup>). Within the SEZ there are ROWs for two energy pipelines, one transmission line, two roads, and one telecommunications line. There is a Section 368 designated energy corridor 2 mi (3 km) west of the SEZ and a county road passing along the northern edge of the SEZ that connects to State Highway 21 at Minersville, about 5 mi (8 km) east of the SEZ.</p> <p><b>Indirect:</b> Increased traffic and increased access to previously remote areas also could change the overall character of the landscape.</p> <p><b>Cumulative:</b> Projects within the SEZ would make only a small contribution to cumulative impacts because of its relatively small size.</p> <p><b>Data Gaps:</b> None identified.</p>	See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Lands_and_Realty.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Lands_and_Realty.pdf</a>	<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 13.2.6	<p><b>Direct:</b> The SEZ is not located under any MTRs or SUAs, and the closest military installation to the SEZ is the Desert Test Center, about 118 mi (190 km) north of the SEZ.</p> <p>The closest civilian municipal airports are the Milford and Beaver Municipal Airports, about 17 mi (28 km) and 23 mi (37 km) north and east, respectively, of the SEZ.</p> <p><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> None identified.</p> <p><b>Data Gaps:</b> None identified.</p>	See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Military_Civilian_Aviation.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Military_Civilian_Aviation.p df</a>	See programmatic design features at URL under Avoidance column.	No.

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<p><b>Lands and Realty: Minerals</b> Section 13.2.8 and Section 13.2.24 of the Final PEIS</p>	<p><b>Direct:</b> There are no locatable mining claims or geothermal leases within the SEZ. There were two oil and gas leases UTU-82529 and UTU-82526 for the Milford Flat SEZ. These leases were terminated in 2011 and their casefiles were closed in 2012. While there are no geothermal leases within the SEZ, the area around it is considered to be potentially valuable for geothermal resources. A geothermal plant has been developed 3 mi (5km) southwest of 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><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> None identified.</p> <p><b>Data Gaps:</b> None identified.</p>	<p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Mineral_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Mineral_Resources.pdf</a></p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>No.</p>
<p><b>Lands and Realty: Transportation</b> Section 13.2.21</p>	<p><b>Direct:</b> Development will add traffic to existing roads serving the area. The volumes of traffic on regional corridors would be more than double the current values in most cases. Beryl Milford Road and State Routes 21, 129, and 130 provide regional traffic corridors near the SEZ. Local road improvements would be necessary on any portion of these roads that might be developed so as not to overwhelm the local access roads near any site access point(s). Thermal Road would also require upgrades. Potential existing site access roads would require improvements, including asphalt pavement.</p> <p><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> Cumulative impacts on traffic could occur with multiple developments in the region.</p> <p><b>Data Gaps:</b> None identified.</p>	<p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Transportation.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Transportation.pdf</a></p>	<p>Programmatic design features state that improvements to local roads to accommodate additional traffic should be considered.</p> <p>See other programmatic design features at URL under Avoidance column.</p>	<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>

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Lands with Wilderness Characteristics Section 13.2.3	<p><b>Direct:</b> The SEZ area was inventoried for wilderness characteristics and no lands with wilderness characteristics (LWC) were identified within the SEZ.</p> <p>There are two areas with wilderness characteristics within the SEZ 25-mi viewshed, the Granite Peak and Central Wah Wah wilderness characteristic inventory units. Outside sights and sounds should not have an impact on wilderness characteristics unless they are pervasive and omnipresent (BLM Manual 6310).</p> <p>Visibility is limited within LWC parcels, and significant other human development is visible near the SEZ.</p> <p><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> Development of solar facilities and other facilities may result in impacts on naturalness and solitude within lands with wilderness characteristics.</p> <p><b>Data Gaps:</b> None identified.</p>	<p>Programmatic design features include a requirement to consider options to avoid, minimize, and/or mitigate impacts to lands with wilderness characteristics (solitude and possibly naturalness) as part of the project-specific environmental impact analysis, in coordination with the BLM.</p> <p>See other programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf</a></p>	<p>BLM Manual 6310 states that human impacts outside the area will not normally be considered in assessing naturalness of an area. If, however, a major outside impact exists, it should be evaluated for its direct effects on the area.</p> <p>See programmatic design features at URL under Avoidance column.</p>	<p>No. Visibility is limited within LWC parcels, and significant other human development is visible near the SEZ.</p>
Livestock Grazing Section 13.2.4.1	<p><b>Direct:</b> The SEZ encompasses portions of three perennial grazing allotments (13% of the Minersville 4 allotment; 2% of the Minersville 5 allotment; and 10% of the Minersville 6 allotment). These allotments are used by nine permittees and support the production of 4,986 AUMs of forage per year; the Draft PEIS estimated that, if full buildout of the SEZ occurs, 360 of these AUMs could be lost to solar development in the SEZ. Grazing would be excluded from the areas developed for solar energy production as provided for in the BLM grazing regulation.</p> <p><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> Other development in the area of the SEZ could result in cumulative impacts on grazing.</p> <p><b>Data Gaps:</b> None identified.</p>	<p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Rangeland_Resources.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Rangeland_Resources.pdf</a></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><b>Native American Concerns</b> Section 13.2.18</p>	<p><b>Direct:</b> Tribal representatives 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 could result in visual impacts on Thermo Hot Springs.</p> <p><b>Indirect:</b> 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><b>Cumulative:</b> 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><b>Data Gaps:</b> 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Native_American_Concerns.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Native_American_Concerns.pdf</a></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><b>Paleontology</b> Section 13.2.16</p>	<p><b>Direct:</b> 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><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> Cumulative impacts are dependent on whether significant resources are found within the SEZ and in additional project areas in the region.</p> <p><b>Data Gaps:</b> 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Paleo.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Paleo.pdf</a></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><b>Public Access and Recreation</b> Section 13.2.5</p>	<p><b>Direct:</b> The area offers little potential for recreational use, largely because of the presence of confined hog-rearing operations on adjacent private lands. The area may be used by local residents 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><b>Indirect:</b> People seeking more rural or primitive surroundings for recreation may experience a reduction in recreational opportunities and/or a degraded recreational experience.</p> <p><b>Cumulative:</b> Multiple developments in the vicinity of the SEZ could cumulatively reduce recreational opportunities.</p> <p><b>Data Gaps:</b> None identified.</p>	<p>See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Public_Access_and_Recreation.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Public_Access_and Recreation.pdf</a></p>	<p>See programmatic design features at URL under Avoidance column.</p>	<p>No.</p>

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Socioeconomics Section 13.2.19	<p><b>Direct:</b> 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 224 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 2.3%</p> <p><b>Indirect:</b> From 92 to 1,215 indirect construction jobs and 4 to 113 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><b>Cumulative:</b> 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><b>Data Gaps:</b> None identified.</p>	See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Socioeconomics.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Socioeconomics.pdf</a>	<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 13.2.7	<p><b>Direct:</b> 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 Thermosprings-Taylorflat, moderately saline Kunzler complex, and the Thermosprings-Sevy complex, which together make up about 76% of the soil coverage. Biological soil crusts are likely present.</p> <p>Soil contamination from spills could occur.</p> <p><b>Indirect:</b> 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><b>Cumulative:</b> 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><b>Data Gaps:</b> Projects will be monitored for soil losses from erosion which may result from rapid runoff from disturbed areas.</p>	See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Soil_Geologic_Hazards.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Soil_Geologic_Hazards.pdf</a>	<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 6,252 acres of soil. Avoidance (not developing some areas) will reduce the acreage and soil stabilization measures can reduce soil erosion post disturbance.</p>
Specially Designated Areas Section 13.2.3	<p><b>Direct:</b> There is one specially designated area (SDA) within 25 miles of the SEZ: the Old Spanish National Historic Trail, however, it is not within the SEZ viewshed.</p> <p><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> None identified.</p> <p><b>Data Gaps:</b> None identified.</p>	See programmatic design features at <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/SDAs_and_LWC.pdf</a>	See programmatic design features at URL under Avoidance column.	No.

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<p><b>Visual</b> Section 13.2.14</p>	<p><b>Direct:</b> The SEZ is in an area of low scenic quality, with numerous cultural disturbances already present.</p> <p>The closest community (Minersville) is approximately 5 mi (8 km) from the SEZ, and from viewpoints within Minersville, strong visual contrasts could be observed from power towers within the SEZ; otherwise, weak visual contrasts from solar development within the SEZ are expected where the SEZ is visible within the community.</p> <p>The community of Milford is approximately 12 mi (19 km) from the SEZ and from viewpoints within Milford, strong visual contrasts could be observed from power towers within the SEZ; otherwise, weak visual contrasts from solar development within the SEZ are expected where the SEZ is visible within the community.</p> <p>Development will adversely impact visual resources and night skies.</p> <p><b>Indirect:</b> None identified.</p> <p><b>Cumulative:</b> 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><b>Data Gaps:</b> It is known that there are multiple solar facilities within the area and 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 <a href="http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Visual.pdf">http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Visual.pdf</a></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>Yes. Power tower development within the SEZ could be plainly visible from the communities of Minersville and Milford. Lighting from solar facilities in the SEZ would also be visible at night from these areas. As a result, there would be residual visual impacts (direct and cumulative) to these visually sensitive areas.</p>