

RECOMMENDED ADDITIONAL DATA COLLECTION DRY LAKE VALLEY NORTH SOLAR ENERGY ZONE

Introduction

The Solar PEIS provides in-depth data collection and environmental analysis for solar energy zones (SEZs). The primary purpose of this rigorous analysis is to provide documentation from which the BLM can tier future project authorizations, thereby limiting the required scope and effort of project-specific NEPA analyses in these priority areas. As part of the Solar Energy Program, the BLM committed to collecting additional SEZ-specific data and conducting additional analysis in order to more effectively facilitate future development in SEZs. In the Supplement to the Draft Solar PEIS (BLM and DOE 2011), the BLM presented an action plan for each SEZ; that action plan, with appropriate updates, was used as the basis for recommended additional data collection for the Dry Lake Valley North SEZ presented below. Action plans described useful additional data for individual SEZs and proposed data sources and methods for collecting that additional data. Additional data and analyses for SEZs will be publicly released through the Solar Energy Program Implementation Web Site (<http://blmsolar.anl.gov>) as they become available.

The Dry Lake Valley North SEZ has a total area of 25,069 acres (101.5 km²). It is located in Lincoln County in southeastern Nevada. The towns of Pioche and Caliente are about 15 mi (24 km) east of, and 15 mi (24 km) southeast of, the SEZ, respectively.

Additional Data Collection Recommended

Military and Civilian Aviation

The BLM should continue to consult with the U.S. Department of Defense regarding potential issues with military operations.

Minerals

Additional information to inform the Department of the Interior's decision on a proposed 20-year withdrawal of SEZ lands has been provided through six Mineral Reports addressing each SEZ (one report for each state in the study area). The Mineral Report for Nevada addresses the status of Minerals within the Dry Lake Valley North SEZ (BLM 2012).

Water Resources

The Final Solar PEIS provided a planning-level water resources inventory of the Dry Lake Valley basin, an assessment of ephemeral stream reaches sensitive to land disturbance, and a simplified one-dimensional groundwater modeling analysis of potential groundwater withdrawal impacts associated with solar development. The following additional data and actions would help further characterize potential impacts on water resources for the Dry Lake Valley

Dry Lake Valley North SEZ Data Needs

North SEZ. A more detailed discussion of each of these activities is included in the water resources action plan for the SEZs (Attachment A).

- Identify additional ephemeral stream channels and alluvial fan features for non-development areas through consultation with Nevada BLM, Nevada Division of Water Resources (NDWR), U.S. Environmental Protection Agency, and U.S. Army Corps of Engineers (USACE) with a focus on:
 - Dry Lake,
 - Coyote Wash and its tributaries,
 - Ephemeral stream channels/unnamed washes located throughout the SEZ (draining from Ely Springs Range, Robber Roost Hills, Highland Range, Black Canyon Range, the Bluffs, Chief Range and Burnt Springs Range toward Dry Lake), and
 - Alluvial fan features in the southeastern portion of the SEZ.
- Perform field surveys and hydrologic analyses to support jurisdictional water determinations and floodplain identifications, if USACE consultation suggests field surveys are needed. Tasks may include:
 - Surveying Dry Lake and ephemeral channels identified previously for surface elevations, high water marks, and sediment conditions; and
 - Conducting hydrologic rainfall-runoff-routing analyses to identify 100 year floodplain areas.
- Coordinate with the USACE (Sacramento District) regarding jurisdictional water determinations for the SEZ. Water features to be considered include:
 - Dry Lake and
 - Ephemeral stream channels within the SEZ.
- Identify 100-year floodplain non-development areas for the SEZ. This task would require coordination with the Federal Emergency Management Agency and the following agencies:
 - NDWR (Floodplain Management Program) and
 - Lincoln County.
- Monitoring and adaptive management for the SEZ should include the formation of a stakeholder committee to conduct long-term monitoring of water resources. This activity would entail:
 - Identifying key stakeholder agencies,
 - Discussing general features of a monitoring program, and
 - Working with the U.S. Geological Survey to develop groundwater monitoring well design and numerical groundwater models.
- Perform groundwater modeling analyses for the Dry Lake Valley basin to estimate potential impacts of full build-out on groundwater pumping scenarios (according to estimated, technology-specific water requirements): Tasks include:

Dry Lake Valley North SEZ Data Needs

- Develop a superposition-type groundwater model for the Dry Lake Valley basin; and
- Assess the potential for drawdown impacts on water levels in the basin, other groundwater users, the carbonate aquifer system, and surface water-groundwater connectivity.
(Note: This work is being conducted as a part of follow-on analyses for the Solar PEIS.)

Ecological Resources

Vegetation and Plant Communities. The following additional data-gathering action would help further characterize potential impacts on vegetation and plant communities for the Dry Lake Valley North SEZ:

- Identify and map the location and areal extent of desert dry washes, playa, greasewood flat, and wetland habitats within the SEZ. Identify and map the location and areal extent of these habitats, as well as riparian communities, outside the SEZ that could be impacted by hydrologic changes, including groundwater elevations, and changes in water, sediment, and contaminant inputs associated with runoff. Such efforts could help determine habitat characteristics, including water source, hydrologic regime, and dominant plant species.

Wildlife. The following additional data-gathering actions would help further characterize potential impacts on wildlife resources for the SEZ:

- Conduct pre-disturbance surveys within the SEZ to determine the use of the SEZ as a movement/migratory corridor or as important habitat for elk, mule deer, and pronghorn.
- Identify and map the location and areal extent of wash and playa habitats within the SEZ. These areas are important habitat for a number of wildlife species.

Aquatic Biota. Investigations recommended under the water resources action plan would be useful in characterizing and protecting habitat available to aquatic biota. Washes and wetlands in the SEZ are typically dry and contain water only for brief periods following runoff from adjacent mountains. They may or may not contain aquatic biota; therefore, preliminary evaluations of these surface water features could be conducted to determine the potential for aquatic communities to be present.

Special Status Species. The following additional data-gathering actions would be useful in further characterizing and protecting habitat available to special status species:

- Conduct pre-disturbance surveys within the SEZ to determine the presence and abundance of those special status species that are (1) federally listed,

proposed for listing, or candidates for listing under the Endangered Species Act; (2) protected by the state of Nevada¹; or (3) designated as sensitive by the Nevada BLM State Office. These species are listed in Table 1. Surveys should focus on areas identified as potentially suitable, and the suitability of these habitats to support these special status species should be determined in the field. All field-determined suitable habitats for special status species should be mapped. Target species and survey protocols should be developed in coordination with the U.S. Fish and Wildlife Service (USFWS) and Nevada Department of Wildlife (NDOW).

The Draft Solar PEIS presents a table of special status species for which potential impacts need to be evaluated prior to development in the Dry Lake Valley North SEZ. The list of species presented in Table 11.4.12.1-1 of the Draft Solar PEIS also includes rare species (ranked in the State of Nevada as S1 or S2 or listed as a species of concern by the USFWS). No additional special status species were identified as potentially present in the SEZ in the Final Solar PEIS. On the basis of design features presented in the Final Solar PEIS, the potential for impacts on these additional species will also need to be addressed before development could occur in the SEZ.

- Identify and map the location and areal extent of desert playa and wash habitats within the area of direct effects, including habitat characteristics (such as water source, hydrologic regime, and dominant plant species) both within the habitat boundaries and in adjacent habitats. Species potentially associated with these habitats include Blaine fishhook cactus, Needle Mountains milkvetch, western snowy plover, Desert Valley kangaroo mouse, and Pahrangat Valley montane vole.

¹ State-protected species for the state of Nevada are those protected under *Nevada Revised Statutes* (NRS) 501.110 (animals) or NRS 527 (plants).

TABLE 1 Special Status Species That May Occur near the Dry Lake Valley North SEZ^a

| Common Name | Scientific Name | Listing Status ^b | Habitat ^c |
|---|--|-----------------------------|--|
| Plants | | | |
| Blaine fishhook cactus^d | <i>Sclerocactus blaneii</i> | BLM-S; NV-P | Endemic to southeastern Nevada and southwestern Utah on alkaline substrates and volcanic gravels in valley bottoms. Elevation ranges between 5,100 and 5,300 ft. ^e There are only three known occurrences of this species. One of these occurrences is located in the Dry Lake Valley. About 20,150 acres ^f of potentially suitable habitat occurs within the SEZ region. |
| Eastwood milkweed | <i>Asclepias eastwoodiana</i> | BLM-S | Endemic to Nevada on public and private lands in Esmeralda, Lander, Lincoln, and Nye Counties in open areas on a wide variety of basic (pH usually >8) soils, including calcareous clay knolls, sand, carbonate, or basaltic gravels, or shale outcrops, generally barren and lacking competition. Frequently in small washes or other moisture-accumulating microsites at elevations between 4,700 and 7,100 ft. Known to occur on the SEZ. About 413,100 acres of potentially suitable habitat occurs within the SEZ region. |
| Long-calyx milkvetch | <i>Astragalus oophorus</i> var. <i>lonchocalyx</i> | BLM-S | Regionally endemic to the Great Basin in western Utah and eastern Nevada in pinyon-juniper woodlands, sagebrush, and mixed shrub communities at elevations between 5,800 and 7,500 ft. Nearest recorded occurrence is 8 mi ^g east of the SEZ. About 4,351,850 acres of potentially suitable habitat occurs within the SEZ region. |
| Needle Mountains milkvetch | <i>Astragalus eurylobus</i> | BLM-S | Gravel washes and sandy soils in alkaline desert and arid grasslands at elevations between 4,250 and 6,250 ft. Nearest recorded occurrence is 15 mi southeast of the SEZ. About 39,650 acres of potentially suitable habitat occurs within the SEZ region. |
| Pioche blazingstar | <i>Mentzelia argillicola</i> | BLM-S | Endemic to Nevada on dry, soft, silty clay soils on knolls and slopes with sparse vegetation consisting mainly of sagebrush. Nearest recorded occurrence is from Patterson Wash, approximately 12 mi east of the SEZ. About 2,869,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Tiehm blazingstar | <i>Mentzelia tiehmii</i> | BLM-S | Endemic to Nevada on hilltops of white soil, sparsely vegetated white calcareous knolls and bluffs with scattered perennials. Nearest recorded occurrence is from the White River, approximately 7 mi west of the SEZ. About 2,326,100 acres of potentially suitable habitat occurs within the SEZ region. |
| Birds | | | |
| Golden eagle | <i>Aquila chrysaetos</i> | BLM-S | An uncommon to common permanent resident and migrant in southern Nevada. Habitat includes rolling foothills, mountain areas, and desert shrublands. Nests on cliff faces and in large trees in open areas. About 4,900,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Ferruginous hawk | <i>Buteo regalis</i> | BLM-S | Winter resident in grasslands, sagebrush and saltbrush habitats, as well as the periphery of pinyon-juniper woodlands. Nests in tall trees or on rock outcrops along cliff faces. Known to occur in Lincoln County, Nevada. About 2,071,600 acres of potentially suitable habitat occurs within the SEZ region. |

Dry Lake Valley North SEZ Data Needs

TABLE 1 (Cont.)

| Common Name | Scientific Name | Listing Status ^b | Habitat ^c |
|---------------------------|--|-----------------------------|---|
| Birds (Cont.) | | | |
| Gray vireo | <i>Vireo vicinior</i> | BLM-S | An uncommon summer resident in arid environments such as pinyon-juniper, chaparral, and desert shrublands. Builds open-cup nests of plant material in forked branches of shrubs or small trees. About 1,625,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Loggerhead shrike | <i>Lanius ludovicianus</i> | BLM-S | A common winter resident in lowlands and foothills in southern Nevada. Prefers open habitats with shrubs, trees, utility lines, or other perches. Highest density occurs in open-canopied foothill forests. About 5,000,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Long-eared owl | <i>Asio otus</i> | BLM-S | An uncommon yearlong resident in southern Nevada. Occurs in desert shrubland environments in proximity to riparian areas such as desert washes. Nests in trees using old nests from other birds or squirrels. About 4,870,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Prairie falcon | <i>Falco mexicanus</i> | BLM-S | Year-round resident in open habitats in mountainous areas, steppe, grasslands, or cultivated areas. Typically nests in well-sheltered ledges of rocky cliffs and outcrops. Known to occur in Lincoln County, Nevada. About 1,690,150 acres of potentially suitable habitat occurs within the SEZ region. |
| Swainson's hawk | <i>Buteo swainsoni</i> | BLM-S; NV-P | Summer breeding resident in the SEZ region in savannas, open pine-oak woodlands, grasslands, and cultivated lands. Nests in solitary trees, bushes, or small groves. Known to occur in Lincoln County, Nev. About 2,114,200 acres of potentially suitable habitat occurs within the SEZ region. |
| Western burrowing owl | <i>Athene cunicularia hypugaea</i> | BLM-S | Summer breeding resident in open grasslands and prairies, as well as disturbed sites such as golf courses, cemeteries, and airports. Nests in burrows constructed by mammals (especially prairie dogs and badgers). Known to occur in Lincoln County, Nevada. About 3,159,500 acres of potentially suitable habitat occurs within the SEZ region. |
| Western snowy plover | <i>Charadrius alexandrinus nivosus</i> | BLM-S; NV-P | Summer breeding resident on alkali flats around reservoirs and sandy shorelines. Nearest recorded occurrence is from the Adams-McGill Reservoir, approximately 23 mi northwest of the SEZ. About 66,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Mammals | | | |
| Big brown bat | <i>Eptesicus fuscus</i> | BLM-S | Occurs throughout the southwestern United States in various habitat types. Uncommon in hot desert environments, but may occur in areas in close proximity to water sources such as lakes and washes. Roosts in buildings, caves, mines, and trees. About 2,673,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Brazilian free-tailed bat | <i>Tadarida brasiliensis</i> | BLM-S | A fairly common year-round resident in southern Nevada. Occurs in a variety of habitats, including woodlands, shrublands, and grasslands. Roosts in caves, crevices, and buildings. About 4,120,000 acres of potentially suitable habitat occurs |

Dry Lake Valley North SEZ Data Needs

TABLE 1 (Cont.)

| Common Name | Scientific Name | Listing Status ^b | Habitat ^c |
|-------------------------------------|---|-----------------------------|---|
| | | | within the SEZ region. |
| California myotis | <i>Myotis californicus</i> | BLM-S | A common year-round resident in southern Nevada. Occurs in a variety of habitats, including desert, chaparral, woodlands, and forests. Roosts primarily in crevices, but will also use buildings, mines, and hollow trees. About 2,550,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Desert Valley kangaroo mouse | <i>Microdipodops megacephalus albiventer</i> | BLM-S; NV-P | Endemic to central Nevada in desert areas at playa margins and in dune habitats. Known to occur on the SEZ in association with the dry lake along the southwestern portion of the SEZ. About 1,257,700 acres of potentially suitable habitat occurs within the SEZ region. |
| Fringed myotis | <i>Myotis thysanodes</i> | BLM-S; NV-P | Year-round resident in a wide range of habitats including lowland riparian, desert shrub, pinyon-juniper, and sagebrush habitats. Roosts in buildings and caves. Known to occur in Lincoln County, Nevada. About 4,645,300 acres of potentially suitable habitat occurs within the SEZ region. |
| Hoary bat | <i>Lasiurus cinereus</i> | BLM-S | The most widespread North American bat species occurs throughout southern Nevada in various habitat types. Occurs in habitats such as woodlands, foothills, desert shrublands, and chaparral. Roosts primarily in trees. About 2,100,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Long-legged myotis | <i>Myotis volans</i> | BLM-S | Common to uncommon year-round resident in southern Nevada. Uncommon in desert and arid grassland environments. Most common in woodlands above 4,000-ft elevation. Forages in chaparral, scrub, woodlands, and desert shrublands. Roosts in trees, caves, and crevices. About 2,730,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Nelson's bighorn sheep | <i>Ovis canadensis nelsoni</i> | BLM-S | Visually open, steep rocky terrain in mountainous habitats of the eastern Mojave and Sonoran Deserts. Rarely uses desert lowlands, but may use them as corridors for travel between mountain ranges. Known to occur in Lincoln County, Nevada. About 1,771,100 acres of potentially suitable habitat occurs within the SEZ region. |
| Pahranagat Valley montane vole | <i>Microtus montanus fucosus</i> | BLM-S; NV-P | Endemic to Lincoln County, Nevada, where it is restricted to springs in the Pahranagat Valley. Within that area, isolated populations utilize mesic montane and desert riparian patches. Nearest recorded occurrence is from Pahranagat Creek, approximately 27 mi southwest of the SEZ. About 23,900 acres of potentially suitable habitat occurs within the SEZ region. |
| Pygmy rabbit | <i>Brachylagus idahoensis</i> | BLM-S; NV-P | Sagebrush-shrubland habitats throughout the SEZ region. Prefers loose soils to dig burrows. Nearest recorded occurrence is from BLM-administered lands approximately 20 mi northwest of the SEZ. About 1,325,950 acres of potentially suitable habitat occurs within the SEZ region. |

Dry Lake Valley North SEZ Data Needs

TABLE 1 (Cont.)

| Common Name | Scientific Name | Listing Status ^b | Habitat ^c |
|-----------------------------|----------------------------------|-----------------------------|---|
| Silver-haired bat | <i>Lasionycteris noctivagans</i> | BLM-S | Uncommon year-round resident in desert habitats of southern Nevada. Forages in coniferous forests, foothill woodlands, and montane riparian habitats. May also forage in desert shrublands. Primarily roosts in hollow trees. About 4,050,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Spotted bat | <i>Euderma maculatum</i> | BLM-S; NV-P | Year-round resident in forests and shrubland habitats. Uses caves and rock crevices for day roosting and winter hibernation. Nearest recorded occurrence is from the vicinity of Panaca, Nevada, approximately 13 mi east of the SEZ. About 3,952,400 acres of potentially suitable habitat occurs within the SEZ region. |
| Western pipistrelle | <i>Pipistrellus Hesperus</i> | BLM-S | A common year-round resident of deserts, grasslands, and woodlands in southern Nevada. Occurs in various habitats, including mountain foothill woodlands, desert shrublands, desert washes, and pinyon-juniper woodlands. Roosts primarily in rock crevices; occasionally in mines and caves. About 3,700,000 acres of potentially suitable habitat occurs within the SEZ region. |
| Western small-footed myotis | <i>Myotis ciliolabrum</i> | BLM-S | Year-round resident in a variety of woodlands and riparian habitats at elevations below 9,000 ft. Roosts in caves, buildings, mines, and crevices of cliff faces. Known to occur in Lincoln County, Nevada. About 5,016,400 acres of potentially suitable habitat occurs within the SEZ region. |

^a The listings for (1) federally listed, proposed for listing, or candidates for listing under the ESA, (2) species protected by the state of Nevada, and (3) Nevada BLM State Office sensitive species have been updated since the release of the Draft Solar PEIS.

^b BLM-S = listed as a sensitive species by the BLM; NV-P = protected in the state of Nevada under NRS 501.110 (animals) or NRS 527 (plants).

^c For plant and invertebrate species, potentially suitable habitat was determined by using California Regional Gap Analysis Project (CAREGAP) and Southwest Regional Gap Analysis Project (SWReGAP) land cover types (USGS 2005, 2010). For reptile, bird, and mammal species, potentially suitable habitat was determined using CAREGAP and SWReGAP habitat suitability models as well as CAREGAP and SWReGAP land cover models. Area of potentially suitable habitat for each species is presented for the SEZ region, defined as the area within 50 mi (80 km) of the SEZ center.

^d Species in bold text have been recorded or have designated critical habitat in the affected area.

^e To convert ft to m, multiply by 0.3048.

^f To convert acres to km², multiply by 0.004047.

^g To convert mi to km, multiply by 1.609.

Visual Resources

A summary of the Final Solar PEIS visual contrast analysis for the Dry Lake Valley North SEZ is provided in Table 2. This table includes only those sensitive visual resource areas (SVRAs) and sensitive viewing locations (SVLs) that would be subject to moderate or strong visual contrast from solar energy development in the Dry Lake Valley North SEZ, which are the following:

- Big Rocks Wilderness Area (WA)
- Weepah Springs WA
- Chief Mountain Special Recreation Management Area (SRMA)
- Silver State Trail Scenic Highway
- U.S. 93.

The following steps could be taken to better understand potential impacts on these areas from solar development in the Dry Lake Valley North SEZ:

- Identify key observation points (KOPs) within these areas through working with the management agency or other local stakeholders.
- Conduct viewshed analyses from the KOPs to determine how much of the SEZ would be in view from each KOP.
- As deemed necessary, based on viewshed analysis results, prepare wireframe Google Earth™ visualizations of hypothetical solar facilities in the SEZ depicting the 80% development scenario to better estimate potential impacts.

This additional analysis may help judge potential visual contrast more accurately for most KOPs. For KOPs of particularly high sensitivity, a site visit with photography and superimposition of the wireframe models onto the photos might be required or desired.

TABLE 2 Selected Potentially Affected Sensitive Visual Resources within a 25-mi (40-km) Viewshed of the Dry Lake Valley North SEZ ^a

| Feature Type | Feature Name (Total Acreage) ^{b,c} | Feature Area or Linear Distance | | |
|-------------------|--|----------------------------------|--------------------|------------------|
| | | Visible within 5 mi ^d | Visible Between | |
| | | | 5 and 15 mi | 25 and 25 mi |
| WAs | Big Rocks (12,929 acres) | 0 acres (0%) | 1,450 acres (11%) | 0 acres (0%) |
| | Weepah Spring (51,309 acres) | 0 acres (0%) | 3,294 acres (6%) | 3,976 acres (8%) |
| Scenic Highway | U.S. 93 (149 mi) | 0 mi (0%) | 9 mi (6%) | 0 mi (0%) |
| | Silver State OHV Trail (240 mi) | 1.5 mi (0.6%) | 32.9 mi (14%) | 5.6 mi (2%) |
| SRMAs | Chief Mountain (111,151 acres) | 15,727 acres (14%) | 16,321 acres (15%) | 0 acres (0%) |

^a As revised for the Final Solar PEIS, assuming a target height of 650 ft (198.1 m).

^b The Far South Egans and Parsnip Peak WAs are not included in this table. These areas were in the viewshed of the original proposed SEZ and were included in the corresponding table in the Draft Solar PEIS; however, these areas are not within the viewshed of the SEZ as revised.

^c To convert acres to km², multiply by 0.004047. To convert mi to km, multiply by 1.609.

^d Percentage of total feature acreage or road length viewable.

Paleontological Resources

The BLM Regional Paleontologist may have additional information regarding Potential Fossil Yield Classification (PFYC) identifications in Nevada. A preliminary paleontological survey could be conducted to determine the PFYC of the SEZ, in order to update the temporary assignment of PFYC Class 3b used in the Draft Solar PEIS.

Cultural Resources and Native American Concerns

A Class II stratified random sample survey was conducted by SWCA Environmental Consultants (SWCA 2013) on 1,282 acres, or approximately 5% of the SEZ. A summary of the results of the survey are available on the Dry Lake Valley North SEZ page of the BLM Solar Energy Program Implementation Web site (<http://blmsolar.anl.gov/sez/nv/drylakevalleynorth/>).

Dry Lake Valley North SEZ Data Needs

A cultural sensitivity map was also prepared as part of the sample survey effort and is presented with the survey summary.

The following additional data collection efforts could reduce the uncertainty about potential impacts on cultural resources:

- Conduct Class I literature file search to better understand (1) the site distribution pattern in the vicinity of the SEZ, (2) potential trail networks through existing ethnographic reports, and (3) overall cultural sensitivity of the landscape.
- Continue government-to-government consultation, including follow-up to recent ethnographic studies with Tribes not included in the original studies to determine whether those Tribes have similar concerns. The Dry Lake Valley North SEZ falls in the traditional use area of primarily the Southern Paiute, but also the Western Shoshone. Potential topics presented in the Draft Solar PEIS to be discussed during consultation include Meadow Valley Wash and surrounding mountains, trail systems, mountain springs and other water sources, mineral resources, burial sites, ceremonial areas, rock art areas, and plant and animal resources.

References

BLM and DOE, 2011, *Supplement to the Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States*, DES 11-49, DOE/EIS-0403D-S, Oct.

BLM, 2012, *Assessment of the Mineral Potential of Public Lands Located within Proposed Solar Energy Zones in Nevada*, prepared by Argonne National Laboratory, Argonne, Ill., July. Available at <http://solareis.anl.gov/documents/index.cfm>.

SWCA Environmental Consultants, 2013, *Class II Cultural Resources Inventory of the Amargosa Valley, Dry Lake Valley North, Gold Point, and Millers Solar Energy Zones, Nye, Lincoln, and Esmeralda Counties, Nevada*, prepared for the Bureau of Land Management, January.

ATTACHMENT A: WATER RESOURCES ACTION PLAN

As part of the Solar Energy Program, the BLM committed to collecting additional SEZ-specific data and conducting additional analysis in order to more effectively facilitate future development in SEZs. In the Supplement to the Draft Solar PEIS (BLM and DOE 2011), the BLM presented a water resources action plan applicable for each SEZ; that action plan is presented below with appropriate updates. Additional data and analyses obtained on the basis of recommendations in this water resources action plan will be publicly released through the Solar Energy Program Implementation Web Site (<http://blmsolar.anl.gov>) as they become available.

The main action plan items relating to water resources applicable for all SEZs were discussed in the water resources action plan presented in the Supplement to the Draft Solar PEIS. The following sections explain each action plan item, identify items that were completed as part of the Final Solar PEIS, and provide some additional consideration for consultation with other federal, state, and local agencies and feasible timelines for the additional work.

1 Planning-Level Inventory of Water Resources

The Draft Solar PEIS summarized surface water and groundwater resources for individual SEZs at the programmatic level, but a more in depth or planning-level inventory was needed to provide a common resource for developers of individual SEZs. The following planning-level inventory data was provided in the Final Solar PEIS for all of the SEZs (sources in parentheses):

- Maps of basin valley and surrounding mountain ranges
 - All canals and perennial, intermittent, ephemeral streams (U.S. Geological Survey [USGS] National Hydrography Dataset [NHD])
 - HUC8 (8-digit, 4th-level hydrologic unit code) watersheds (USGS NHD)
 - Groundwater wells (USGS National Water Information System [NWIS] and Water Science Centers, National Resources Conservation Service [NRCS])
 - Springs (USGS NWIS)
 - Groundwater basin(s) (state water agency)
 - Wetlands (USFWS National Wetlands Inventory [NWI] or state agency)
 - Playas and dry lakes (USGS NHD or state agency)
 - Meteorological station locations (USGS NWIS, Western Regional Climate Center [WRCC], state agency climate stations, e.g., California Irrigation Management Information System [CIMIS] in California)
- Tabular information
 - Canals and perennial and intermittent streams (USGS NHD)
 - Total length of ephemeral stream channels (USGS NHD)
 - Total length of stream channels by stream order (USGS NHD)
 - Annual, seasonal, peak discharge values (USGS NWIS and Water Science Centers)
 - HUC8 watershed areas (USGS NHD)

- Groundwater basins—area, generic properties (state water agency, PEIS, USGS NWIS and Water Science Centers, NRCS)
- Wetlands—areas, types (USFWS NWI or state agency)
- Springs—names, elevations, flows (USGS NWIS or state agency)
- Climate—precipitation, snowfall, evapotranspiration (USGS NWIS, WRCC, state agencies)

The following planning-level inventory data were not provided in the Final Solar PEIS, but would be useful to assemble prior to solar development in any SEZ:

- Google Earth™/geographic information system (GIS) data files, providing links to datasets (USGS NWIS)
 - Stream gages—flows and water quality
 - Groundwater wells—depth to groundwater and water quality
 - Meteorological stations—temperatures, precipitation, snowfall, etc.

2 Floodplain Determinations

In May 27, 1977, the President signed Executive Order 11988 “Floodplain Management,” which states that federal agencies should avoid surface disturbance activities within identified 100-year floodplains (*Federal Register*, Volume 42, page 117, May 27, 1977). Only a few SEZs (Afton, Dry Lake, Imperial East, and Gillespie) have prior floodplain analyses available to map exclusion floodplain areas. Identifying 100-year floodplain areas must be performed in order to define non-development areas within SEZs. Given the episodic and sometimes catastrophic nature of rainfall-runoff events in the desert southwest, floodplain analyses could extend beyond the 100-year floodplain to regions susceptible to extreme flooding events (e.g. alluvial fans, high gradient areas).

Except for the SEZs listed above, floodplain determinations had not been completed at the time of publication of the Final Solar PEIS and are still needed. Floodplain determinations require field surveys, consultations with the Federal Emergency Management Agency (FEMA) and state/local flood control agencies, and hydrologic analyses. The primary steps to identifying floodplain areas include the following:

- Identifying of main surface drainage pathways within and adjacent to SEZs
- Consulting with FEMA and state/local flood control agencies regarding floodplain mapping protocols
- Conducting field surveys
 - Channel geometries
 - High-water-mark indicator maps
 - Ground-truthing NHD channel networks
- Performing hydrologic analyses
 - Analysis of flood frequency
 - Hydraulic modeling of runoff routing

- Determination of inundation areas
- Obtaining approvals (BLM-coordinated)
 - FEMA/agency for floodplains

3 Jurisdictional Waters Determinations

Section 404 of the Clean Water Act (CWA) requires a permitting process for dredging and filling activities affecting “jurisdictional waters” of the United States. The U.S. Army Corps of Engineers (USACE) and EPA oversee the permitting process and make determinations on what constitutes jurisdictional water on a case-by-case basis. Jurisdictional water determinations can be made by using a variety of techniques, including topographic maps and aerial photographs, field surveys, and hydrologic analyses. The appropriate method for jurisdictional water determinations must be coordinated with the appropriate offices of the USACE and EPA. If field surveys are required, coordination with field surveys for floodplain determinations should be made. Jurisdictional water determinations for the SEZs had not been completed at the time of publication of the Final Solar PEIS and are still needed. Jurisdictional water determinations will not define non-development areas within SEZs but will determine where CWA Section 404 permitting will be required.

4 Significant Ephemeral Waters Determinations

In addition to floodplains and jurisdictional waters, several commenters and cooperators on the Draft Solar PEIS had concerns regarding the loss of ephemeral stream networks because of their importance to hydrology, geomorphology, and habitat. The Draft Solar PEIS identified significant washes to be excluded from development that showed physical evidence of conveying substantial flood flows (these areas will likely overlap with 100-year floodplain mapping). The Final Solar PEIS identified sensitive stream reaches for each SEZ on the basis of available geospatial datasets and professional judgment. Further analyses should be performed to identify dense ephemeral stream networks that overlap with critical habitat, provide significant groundwater connectivity, or constitute critical geomorphic features necessary for maintaining connected features (e.g., dunes, eolian transport corridors, and active alluvial fans). These additional analyses should use high-resolution imagery to identify stream reaches not accounted for in FPEIS analysis, as well as include consultation with local BLM offices, cooperating federal agencies, and state agencies regarding critical ephemeral stream networks for habitat, hydrologic, and geomorphic value.

5 Monitoring and Adaptive Management Programs

Careful siting and planning of solar facilities can reduce adverse impacts on surface water and groundwater resources, but there are many unknowns regarding both surface water and groundwater processes. Establishing a robust monitoring program and analysis tools for SEZs would gain important information on whether surface water or groundwater resources are being affected by solar facilities. Monitoring programs would need to incorporate stakeholder involvement including appropriate federal/state/local agencies (e.g., local BLM offices, USGS Water Science Centers, USFWS, National Park Service [NPS], state water resources agencies)

that conduct water resources monitoring. The Final Solar PEIS recommended a process and methods and tools for developing SEZ monitoring programs for water resources. The process should include identifying a stakeholder monitoring committee including agencies involved with water rights and resources. The committee should oversee the development and implementation of a monitoring program. The basic components of surface water and groundwater monitoring programs should include recommended monitoring parameters, measuring frequency, a plan for stakeholder involvement. The monitoring program could also include new or modified design features for the SEZ, such as a requirement to have water flow meters on groundwater pumps to accurately measure extractions (to be used in groundwater models and analyses to support long, term monitoring programs).

6 Groundwater Analyses

Utility-scale solar energy facilities have the potential to affect groundwater. For the Final Solar PEIS, an analysis of potential groundwater impacts for each SEZ was done quantitatively using a simple one-dimensional groundwater modeling approach (BLM and DOE 2012, Appendix O) and qualitatively by summarizing available information relative to groundwater processes and comparing that information to estimates of potential groundwater extractions for the four main solar energy technologies evaluated. The level of groundwater analysis needed for each SEZ will vary depending on the proposed level of water use (e.g., less detailed analyses may be needed for photovoltaic [PV] facilities than for higher water use facilities such as parabolic trough).

Seven SEZs were identified in the Final PEIS that would benefit from a more quantitative analysis: Afton, Amargosa Valley, Brenda, Dry Lake, Dry Lake Valley North, Imperial East, and Riverside East. At these seven SEZs, numerical groundwater models are being used to better address two major concerns: potential drawdown impacts on surface water features (e.g., loss of springs, change in river discharge) and drawdown impacts on other groundwater users and groundwater processes. Where there are existing groundwater models, the following will be added:

- Groundwater model refinements for SEZ analysis, and
- Analyses of full build-out pumping scenarios.

Where there are not existing groundwater models, the following will be provided:

- Simplified, superposition-based, groundwater modeling; and
- Analyses of full build-out pumping scenarios.

The groundwater models and reports for these SEZ will be released through the SEZ pages of the Solar Energy Program Implementation Web Site (<http://blmsolar.anl.gov/sez>) as they become available.