RECOMMENDED ADDITIONAL DATA COLLECTION IMPERIAL EAST 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 Imperial East 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 Imperial East SEZ has a total area of 5,717 acres (23.1 km^2). It is located in Imperial County in southeastern California, near the United States–Mexico border. The nearest town is the community of Holtville, located approximately 10 mi (16 km) northwest of the SEZ.

Recommended Additional Data Collection for the Imperial East SEZ

Military and Civilian Aviation

The BLM should continue to consult with the U.S. Department of Defense regarding potential issues with military training routes and special use air space. The potential impact of power towers in this SEZ, including the ability of power towers to comply with Federal Aviation Administration regulations pertaining to air navigation obstructions, should be further investigated.

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 California addresses the status of Minerals within the Imperial East SEZ (BLM 2012).

Water Resources

The Final Solar PEIS provided a planning-level water resources inventory of the Imperial 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 Imperial East SEZ. A more detailed discussion of each of these activities is included in the water resources action plan for the SEZs (Attachment A).

- Verify the mitigation wetland enhancement project for jurisdictional water determinations with the U.S. Army Corps of Engineers (USACE) (Los Angeles District) and the Imperial Irrigation District (IID). It is likely these were considered jurisdictional waters during the IID's restoration efforts. If no jurisdictional water determination has been made for the wetlands along the southern border of SEZ, then:
  - A field survey should be conducted, and
  - A jurisdictional water determination should be obtained from the USACE (Los Angeles District).

- 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.

- A three-dimensional numerical groundwater model for the Imperial Valley basin that is based on the Tompson et al. (2008) groundwater model for the Salton Sea region should be developed in order to evaluate the potential impacts of full build-out groundwater pumping scenarios (according to estimated, technology-specific water requirements) to include:
  - Assessing the potential for drawdown impacts on the restored, mitigation wetlands located along the All-American Canal, and
  - Coordination with the Imperial Irrigation District to identify any potential groundwater drawdown concerns regarding its operations (e.g., All-American Canal, East Highland Canal, other drainage ditches).

  (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 actions would help further characterize potential impacts on vegetation and plant communities for the Imperial East SEZ.

- Identify and map the location and areal extent of desert riparian, wash, and wetland habitats within the SEZ. Identify and map the location and areal extent of desert riparian, wash, and wetland habitats outside the SEZ that may

be affected by hydrologic changes, including groundwater elevations, and changes in water, sediment, and contaminant inputs associated with runoff. Such effort could determine the habitat characteristics (including water source, hydrologic regime, and dominant plant species) both within the wetland boundaries and in adjacent non-wetland habitats.

- Identify and map the location and areal extent of sand dunes and sand transport systems within the SEZ.

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 for desert bighorn sheep.

- Identify and map the location and areal extent of desert riparian wash, wetland, and sand dune and sand transport habitats within the SEZ. These areas are important habitat areas for many game and nongame species of wildlife.

Aquatic Biota. Wetlands are present, and, therefore, direct impacts on wetland communities are possible as a result of solar energy development within the SEZ. These areas could be surveyed for aquatic communities. Additionally, the man-made All-American Canal and East Highline Canal and associated palustrine wetlands within 5 mi (8 km) of the SEZ could be indirectly affected by development and operation of solar energy facilities. However, the All-American Canal and associated wetlands have primarily non-native fish, and no protected aquatic biota are known to be present. Thus, impacts on aquatic biota would likely be to invasive or common species. New surveys could be conducted to confirm this, but the primary value of these features is for nonaquatic animals that may consume aquatic biota within the SEZ. Therefore, no surveys are recommended.

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 (ESA); (2) listed by the State of California as endangered, threatened, or fully protected; or (3) designated as sensitive by the California 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 and CDFG.

TABLE 1 Special Status Species That May Occur on the Imperial East SEZ[a]

Common Name	Scientific Name	Listing Status[b]	Habitat[c]
Plants			
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	BLM-S	Endemic to southern California. Chaparral desert sand dunes at elevations between 350 and 5,250 ft.[d] Historically occurred on and in the vicinity of the SEZ; the species has not been recorded in the project area since 1964. Most recent recorded occurrences are 15 mi[e] west of the SEZ. About 190,582 acres[f] of potentially suitable habitat occurs within the SEZ region.
Flat-seeded spurge	*Chamaesyce platysperma*	BLM-S	Sandy substrates of desert dunes within Sonoran desertscrub communities at elevations below 650 ft. Nearest recorded occurrences are 45 mi from the SEZ. About 1,249,216 acres of potentially suitable habitat occurs within the SEZ region.
Giant Spanish-needle[g]	***Palafoxia arida* var. *gigantea***	BLM-S	Desert sand dune habitats at elevations below 330 ft. Known to occur in the affected area within 5 mi east of the SEZ. About 190,187 acres of potentially suitable habitat occurs within the SEZ region.
Munz's cholla	*Opuntia munzii*	BLM-S	Gravelly or sandy to rocky soils, often on lower bajadas, washes, and flats. Also occurs in hills and canyon sides. Occurs in Sonoran Desert creosotebush shrub communities at elevations below 3,280 ft. Nearest recorded occurrences are 25 mi north (upgradient) of the SEZ. About 1,856,676 acres of potentially suitable habitat occurs within the SEZ region.
Sand food	***Pholisma sonorae***	BLM-S	Sonoran sand dune habitats at elevations below 650 ft. Known to occur in the affected area within 5 mi east of the SEZ. About 190,187 acres of potentially suitable habitat occurs within the SEZ region.
Reptiles			
Colorado Desert fringe-toed lizard	*Uma notata*	BLM-S	Sparsely vegetated arid areas with windblown sand, including dunes, flats, and washes at elevations below 1,600 ft. Nearest recorded occurrence is 6 mi northeast of the SEZ. About 658,770 acres of potentially suitable habitat occurs within the SEZ region.
Flat-tailed horned lizard	***Phrynosoma mcallii***	BLM-S	Sandy desert hardpan, gravel flats, and dunes with sparse vegetation of low species diversity at elevations below 850 ft. Known to occur in the affected area within 3 mi north of the SEZ. About 281,300 acres of potentially suitable habitat occurs within the SEZ region.

TABLE.1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]
Birds			
California black rail	***Laterallus jamaicensis coturniculus***	BLM-S; CA-FP; CA-T	Year-round resident in the Imperial Valley and lower Colorado River in Arizona and California. Locally common in marshes along the Colorado River or canal systems. Known to occur in the affected area from the All-American Canal. About 184,792 acres of potentially suitable habitat occurs within the SEZ region.
Ferruginous hawk	*Buteo regalis*	BLM-S	Winter resident and migrant at lower elevations and open grasslands, shrublands, and agricultural areas in southern California. Open grasslands, sagebrush flats, desertscrub, desert valleys, and fringes of pinyon-juniper habitats. This species is known to occur in Imperial County, California. About 1,252,826 acres of potentially suitable habitat occurs within the SEZ region.
Least bittern	*Ixobrychus exilis*	BLM-S	Year-round resident in the lower Colorado River Valley, including the Salton Sea and the Colorado River in California and Arizona. Emergent vegetation of larger bodies of water such as lakes, ponds, and rivers. Nests in dense cattail marshes and thickets of saltcedar. The species occurs near the Colorado River as near as 35 mi and 40 mi east and northwest of the SEZ, respectively. About 206,149 acres of potentially suitable habitat occurs within the SEZ region.
Western burrowing owl	*Athene cunicularia hypugaea*	BLM-S	Year-round resident within the SEZ region. Open areas with short sparse vegetation, including grasslands, agricultural fields, and disturbed areas. Nests in burrows created by mammals or tortoises. Feeds on insects and small mammals. Nearest recorded occurrence is 10 mi west of the SEZ. About 2,531,363 acres of potentially suitable habitat occurs within the SEZ region.
Yuma clapper rail	***Rallus longirostris yumanensis***	ESA-E; CA-FP; CA-T	Freshwater marshes containing dense stands of cattails. Nests on dry hummocks or in small shrubs among dense cattails or bulrushes along the edges of shallow ponds in freshwater marshes with stable water levels. Known to occur in the affected area along the All-American Canal within 0.5 mi south of the SEZ. About 185,175 acres of potentially suitable habitat occurs within the SEZ region.
Mammals			
California leaf-nosed bat	*Macrotus californicus*	BLM-S	Year-round resident in SEZ region. Desert riparian, desert wash, desertscrub, and palm oasis habitats at elevations below 2,000 ft. Roosts in mines, caves, and buildings. Nearest recorded occurrences are 20 mi east of the SEZ. About 1,539,377 acres of potentially suitable habitat occurs within the SEZ region.

TABLE.1 (Cont.)

Common Name	Scientific Name	Listing Status[b]	Habitat[c]
Mammals (Cont.)			
Pallid bat	*Antrozous pallidus*	BLM-S	Year-round resident throughout the California solar region. Inhabits low-elevation desert communities, including grasslands, shrublands, and woodlands. Day roosts in caves, crevices, and mines. Nearest recorded occurrence is from the North Algodones Dunes Wilderness, approximately 18 mi north of the SEZ. About 1,403,590 acres of potentially suitable habitat occurs within the SEZ region.
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM-S	Found throughout California, in all but subalpine and alpine habitats, and may be found at any season throughout its range. Roosts in caves, mines, tunnels, buildings, or other man-made structures. Nearest recorded occurrence is approximately 35 mi from the SEZ. About 2,919,158 acres of potentially suitable habitat occurs within the SEZ region.
Western mastiff bat	*Eumops perotis californicus*	BLM-S	Year-round resident in southern California and southwestern Arizona in many open semiarid habitats, including conifer and deciduous woodlands, shrublands, grasslands, chaparral, and urban areas. Day roosts in crevices in cliff faces, buildings, and tall trees. Nearest recorded occurrence is 16 mi west of the SEZ. About 2,435,906 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, and (2) California 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; CA-FP = listed as fully protected by the State of California; CA-T = listed as threatened by the State of California; ESA-E = listed as endangered under the ESA

[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 by 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, which is defined as the area within 50 mi (80 km) of the SEZ center.

[d] To convert ft to m, multiply by 0.3048.

[e] To convert mi to km, multiply by 1.609.

[f] To convert acres to km^2, multiply by 0.004047.

[g] Species in bold text have been recorded or have designated critical habitat in the affected area.

The Draft Solar PEIS presents a table of special status species for which potential impacts need to be evaluated prior to development in the Imperial East SEZ. The list of species presented in Table 9.1.12.1-1 of the Draft Solar PEIS also includes species listed by the State of California and species ranked by the State of California as S1 or S2. No additional special status species were identified as potentially present in the SEZ in the Final Solar PEIS. On the basis of the 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 riparian, wash, and wetland habitats within the SEZ, including habitat characteristics (such as water source, hydrologic regime, and dominant plant species) both within the wetland boundaries and in adjacent non-wetland habitats. Species potentially associated with these habitats include Munz's cholla, Colorado Desert fringe-toed lizard, California black rail, ferruginous, least bittern, Yuma clapper rail, California leaf-nosed bat, pallid bat, Townsend's big-eared bat, and western mastiff bat.

- Identify and map the location and areal extent of sand dunes and sand transport systems on the SEZ. Species potentially associated with these habitats include chaparral sand-verbena, flat-seeded spurge, giant Spanish-needle, sand food, Colorado Desert fringe-toed lizard, and flat-tailed horned lizard.

Visual Resources

A summary of the Final Solar PEIS visual contrast analysis for the Imperial East 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 Imperial East SEZ, which are the following:

- Juan Batista de Anza National Historic Trail

In addition, the following other lands and resource areas would be subject to moderate or strong visual contrasts from solar development:

- Interstate 8 (I-8)

- State Route 98.

TABLE 2 Summary of Potential Visual Impacts on SVRAs and SVLs within the 25-mi (40 km) Viewshed of the Imperial East SEZ[a]

		Feature Area or Linear Distance[b]		
			Visible between	
Feature Type	Feature Name (Total Acreage/Linear Distance)	Visible within 5 mi	5 and 15 mi	15 and 25 mi
National Historic Trail	Juan Batista de Anza	0 mi	0 mi	4 mi

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

[b] To convert acres to km^2, multiply by 0.004047; to convert mi to km, multiply by 1.609.

The following steps could be taken to better understand potential impacts on these areas from solar development in the Imperial East 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 (e.g., the historic trail), a site visit with photography and superimposition of the wireframe models onto the photos might be required or desired.

Paleontological Resources

The BLM Regional Paleontologist may have additional information regarding the paleontological potential of the SEZ. A preliminary paleontological survey could be conducted to update the temporary assignment of PFYC Class 3b used in the Draft Solar PEIS. In addition, the San Bernardino County Museum paleontologist may have additional information regarding the potential of paleontological resources in the vicinity of the SEZ.A more detailed look at the geological deposits of the SEZ is needed to determine whether a paleontological survey is warranted

Cultural Resources and Native American Concerns

A Class I literature review was completed by SWCA Environmental Consultants (SWCA and University of Arizona 2011). The results of that search are summarized in the Final Solar PEIS.

A Class II stratified random sample survey was conducted by SWCA Environmental Consultants (SWCA 2013) on 288 acres, or approximately 5% of the SEZ. A summary of the results of the survey are available on the Imperial East SEZ page of the BLM Solar Energy Program Implementation Web site (http://blmsolar.anl.gov/sez/ca/imperial-east/). 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:

- The four previously recorded resources found within and adjacent to the SEZ should be located and the records describing them updated. A National Register of Historic Places (NRHP) evaluation should be completed for these resources and any newly discovered sites as well.

- Continue with government-to-government consultation, including follow-up to recent ethnographic studies with Tribes not included in the original studies in Utah and Nevada to determine whether those Tribes have similar concerns. The Imperial East SEZ falls in the traditional use area of primarily the Quechan, Cocopah, and Cahuilla. Potential topics to be discussed during consultation include two known burials identified in the NAHC database, Indian Pass, Xam Kwatcan Trail, Pilot Knob, Picacho Peak, Yuha Basin, Yuma-San Diego Trail, Lake Cahuilla ACEC Areas C and D, 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 California*, prepared by Argonne National Laboratory, Argonne, Ill., July. Available at http://solareis.anl.gov/documents/index.cfm.

SWCA and University of Arizona (SWCA Environmental Consultants and Bureau of Applied Research in Anthropology), 2011, Ethnographic and Class I Records Searches for Proposed Solar Energy Zones in California, Nevada, and Utah for the Bureau of Land Management's Solar Programmatic Environmental Impact Statement, prepared by SWCA Environmental Consultants, Albuquerque, N.M., and Bureau of Applied Research in Anthropology, University of Arizona, Tucson, Ariz., Dec.

SWCA Environmental Consultants, 2013, *California Solar Energy Zones (SEZs): Class II Cultural Resources Inventory of the Imperial East and Riverside East SEZs, Riverside and Imperial Counties, California*, prepared for the Bureau of Land Management, January.

Thompson, A., et al., 2008, Groundwater Availability within the Salton Sea Basin, LLNL-TR-400426, Lawrence Livermore National Laboratory.

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.