BIOLOGICAL RESOURCES

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SUMMARY OF CONCLUSIONS

This section summarizes the Energy Commission staff's analysis and conclusions about the impacts of the ISEGS project, briefly describes appropriate mitigation for those impacts, and identifies issues that require resolution before finalizing the mitigation recommendations. It also summarizes the analysis by BLM staff regarding impacts and mitigation to biological resources. This section provides a summary of the analyses discussed in this document but does not make final decisions for either agency.

The Ivanpah Solar Electric Generating System (ISEGS) project would have major impacts to the biological resources of the Ivanpah Valley, substantially affecting many sensitive plant and wildlife species and eliminating a broad expanse of relatively undisturbed Mojave Desert habitat. Approximately 4,073 acres of occupied desert tortoise habitat would be permanently lost and a minimum of 25 desert tortoises would need to be translocated west of the ISEGS project site. These actions would require state and federal endangered species "take" authorization. In addition to direct loss of habitat, the project would fragment and degrade adjacent habitat, and could promote the spread of invasive non-native plants and desert tortoise predators such as ravens. These impacts would directly and adversely affect habitat for a threatened species (the desert tortoise), and would likely be highly controversial. Based on these factors, the proposed project would result in impacts that would be significant with respect to NEPA significance criteria in 40 CFR 1508.27.

Other special-status wildlife species potentially impacted by the project because of loss of breeding and/or foraging habitat include burrowing owl, loggerhead shrike, Crissal thrasher, golden eagle, and American badger. The project would also affect approximately 2,000 ephemeral drainage segments on the ISEGS site, potentially resulting in direct or indirect impacts to the wildlife functions and values provided by 198 acres of waters of the state.

The ISEGS project site supports a diverse flora including numerous special-status plant species. Eight special-status plant species, only one of which is considered sensitive by the Bureau of Land Management (BLM), would be directly impacted by construction of ISEGS. Energy Commission staff consider impacts to five of these (Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow) to be significant according to California Environmental Quality Act (CEQA) guidelines because the project would eliminate a substantial portion of their documented occurrences in the state. Depending on the degree of avoidance that the applicant can achieve, Energy Commission staff's proposed avoidance and minimization measures may reduce impacts to three of these species (desert pincushion, nine-awned pappus grass, and Parish's club-cholla) to less-than-significant levels. However, impacts to Mojave milkweed and Rusby's desert-mallow would remain significant in a CEQA context even after implementation of the special-status plant impact avoidance and minimization measures described in Energy Commission staff's proposed conditions of certification.

The BLM and Energy Commission staffs (hereafter jointly referred to as staff unless otherwise noted) have concluded that without mitigation the ISEGS project would be a substantial contributor to the cumulatively significant loss of Ivanpah Valley's biological resources, including the threatened desert tortoise and other special-status species. Impact avoidance and minimization measures described in staff's analysis and included in the conditions of certification would help reduce impacts to sensitive biological resources. However, compensatory measures are necessary to offset project-related losses, and to assure compliance with state and federal laws such as the federal and state endangered species acts and regulations protecting waters of the state. In the case of special-status plants, impacts would remain significant according to CEQA standards despite compensatory mitigation for other biological resources.

Compensatory mitigation for desert tortoise typically involves balancing the acreage of habitat loss with acquisition of lands that would be initially improved, protected and maintained to support healthy populations of desert tortoise. The compensation is achieved by improving the carrying capacity of the acquired acreage (for example, by habitat restoration, fencing, road closures) so that more desert tortoise will survive and reproduce on these lands, thus offsetting over time the decrease in numbers of tortoise resulting from the habitat loss.

To fully offset impacts, the California Endangered Species Act (CESA) requires a full mitigation finding, which usually contemplates a mitigation ratio greater than 1:1 for compensation lands (i.e., acquisition or preservation of one acre of compensation lands for every acre lost). On past energy projects considered by the Energy Commission, the California Department of Fish and Game (CDFG) has required a 3:1 ratio to meet the CESA full mitigation standard for good quality habitat such as that found at the ISEGS project site. The higher ratio reflects the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures. The BLM applies a 1:1 compensation ratio because they generally pursue desert tortoise recovery goals not through parcel by parcel acquisitions and management, but rather through implementation of region-wide management plans and land use planning as described in the Northern and Eastern Mojave (NEMO) Desert Management Plan (BLM 2002) and the Desert Tortoise Recovery Plan (USFWS 1994).

Energy Commission staff proposes compensation to achieve full mitigation at a 3:1 ratio for loss of desert tortoise habitat and for other CEQA significant impacts for the BrightSource ISEGS project. This compensation ratio is consistent with past Energy Commission projects and with Incidental Take Permits (ITPs) issued by CDFG in the region. The 3:1 ratio has also been proposed by the applicant (Ellison, Schneider & Harris LLP 2009). At least two thirds of the 3:1 mitigation could be achieved by acquisition of no less than 8,146 acres of land in the Mojave Desert providing adequate habitat and capable of increasing the carrying capacity for desert tortoise. The remaining third of the 3:1 compensatory mitigation would be developed in accordance with BLM's desert tortoise mitigation requirements as described in the NEMO. BLM's 1:1 mitigation plan has not yet been finalized, but is likely to include acquisition of private lands within the Desert Wildlife Management Area (DWMA) portion of the Eastern Mojave Recovery Unit and in the Mojave National Preserve, and with additional management and enhancement projects that would benefit the desert tortoise. The specifics of the desert tortoise acquisition and enhancement actions would be

developed by BLM in collaboration with Energy Commission staff, CDFG and the U.S. Fish and Wildlife Service (USFWS) in accordance with guidance from desert tortoise recovery plans (USFWS 2004, 2008a).

For the desert tortoise habitat compensation to be biologically effective, and thus mitigate CEQA impacts to desert tortoise to less-than-significant levels, and meet the full mitigation requirements of CESA, the acquired lands must (1) be protected in perpetuity, and (2) a funding mechanism must be established to undertake initial habitat improvements, and to sustain long-term management and habitat enhancement. Funding comes from an endowment provided by the applicant to create enough income to cover annual stewardship costs on the acquired lands, as well as a buffer to offset inflation. Funding for initial habitat improvements is also required for those actions needed immediately upon acquisition of the property to secure it and remove hazards. Energy Commission staff's proposed Condition of Certification **BIO-17** describes the funding security needed for land acquisition and long-term protection and management for the acquired mitigation lands.

Energy Commission staff developed the proposed Condition of Certification **BIO-17** based largely on CDFG recommendations from past Energy Commission projects, but CDFG has not yet provided formal guidance describing their requirements for satisfying CESA in writing other than to convey orally to staff that they would concur with a combined 3:1 mitigation package for desert tortoise for this project. Staff is not making any assumptions as to whether CDFG would agree with the Energy Commission staff's calculation of security costs (acquisition costs, initial habitat improvement, and long-term management endowment). However, based on the July 23, 2009 letter from the BLM to CDFG, staff believes CDFG would concur with including BLM's proposed mitigation approach as part of the complementary mitigation package to satisfy CESA's full mitigation standard if the provisions described by BLM in that letter were in place (BLM 2009e).

Energy Commission staff have concluded that the 2:1 compensatory mitigation, as described in staff's proposed Condition of Certification **BIO-17**, combined with the BLM 1:1 mitigation described conceptually above, would meet CESA's full mitigation standard pending resolution of the few issues described below. Staff considers the combination of these two mitigation approaches to be a complementary and complete mitigation package that would achieve full mitigation and would satisfy federal and state requirements for mitigating impacts to desert tortoise. However, a few issues need to be resolved before finalizing this complementary BLM-Energy Commission mitigation package:

- <u>In Perpetuity Protection</u>: Mitigation lands must be protected in perpetuity to satisfy Energy Commission and CDFG requirements. For BLM mitigation, acquisition of private lands within the DWMAs and the Mojave National Preserve would satisfy this requirement because the surrounding protective land uses would prevail. As described in the July 23, 2009 letter, BLM would provide some sort of assurances for long-term protection if these lands are to be counted as fulfilling part of CESA's full mitigation standard. To address this issue BLM has recently proposed development of deed restriction language and a Memorandum of Understanding between BLM and CDFG to offer protection to BLM-managed mitigation lands.

- Enhancement Actions: Staff has yet to develop a specific program of enhancement actions other than land acquisition that would fulfill BLM's 1:1 mitigation requirements and CESA's full mitigation standard. Proposed enhancement actions on BLM lands such as fencing and habitat restoration would need to be fully analyzed and disclosed to satisfy NEPA requirements. BLM will collaborate with Energy Commission staff, CDFG and USFWS in the development of the specific desert tortoise enhancement actions.
- Process for Mitigation Compliance: Staff needs to integrate CDFG and BLM mitigation processes and develop a mechanism that provides compliance monitoring of enhancement actions on BLM lands. For land acquisitions, BLM, CDFG and the Energy Commission have well developed and transparent procedures to track expenditures and acquisitions. A similar mechanism is needed to verify fulfillment of enhancement actions such as fencing or habitat restoration on BLM lands. BLM and Energy Commission staff will work together to develop a process that allows tracking and verification of enhancement actions for desert tortoise.

Energy Commission staff has determined that if these issues are resolved, the proposed land acquisitions and enhancement activities described above would satisfy requirements of the California Endangered Species Act. Except for the special-status plant impacts described earlier, this mitigation would also reduce CEQA impacts to less-than-significant levels. Staff anticipates resolution of these outstanding issues by working closely and cooperatively with USFWS, CDFG, and the applicant to finalize a mitigation and enhancement plan that would offset impacts to desert tortoises.

INTRODUCTION

This section of the Final Staff Assessment/Draft Environmental Impact Report (FSA/DEIS) provides staff's analysis of potential impacts to biological resources from the construction and operation of the Ivanpah Solar Electric Generating System (ISEGS) project. Information provided in this document addresses potential impacts to special-status species and areas of critical biological concern. This analysis also describes the biological resources at the project site and at the locations of ancillary facilities. This document explains the need for mitigation, evaluates the adequacy of mitigation proposed by the applicant, and specifies additional mitigation measures. It also describes compliance with applicable laws, ordinances, regulations, and standards (LORS), and recommends conditions of certification.

This analysis is based, in part, upon information provided in the Application for Certification (AFC) for ISEGS (BSE 2007a); responses to staff data requests; site visits or field work conducted on April 20, 2007, January 4, 2008, and May 23, 2008; data response staff workshops; and discussions with experts and various agency, non-profit organization, and applicant representatives.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant will need to abide by the laws, ordinances, regulations, and standards (LORS) during project construction and operation, as listed in **Biological Resources Table 1**.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Federal Endangered Species Act (Title 16, United States Code, section 1531 et seq., and Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat.
Migratory Bird Treaty (Title 16, United States Code, sections 703 through 711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Clean Water Act (Title 33, United States Code, sections 1251 through 1376, and Code of Federal Regulations, part 30, section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request state certification that the proposed activity will not violate state and federal water quality standards.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
California Desert Protection Act of 1994	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included substantial portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
California Desert Conservation Area Plan	The California Desert Conservation Area (CDCA) comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land and Policy Management Act (FLPMA). The FLPMA outlines how the BLM will manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.

Applicable Law	Description
Northern and Eastern Mojave (NEMO) Desert Management Plan	As an amendment to the CDCA Plan, the BLM produced the Northern and Eastern Mojave (NEMO) Desert Management Plan (BLM 2002). This document consists of proposed management actions and alternatives for public lands in the NEMO Planning Area. This area encompasses 3.3 million acres and is located in the Mojave Desert in southeastern California adjacent to Nevada. The area borders Nevada on the east, Fort Irwin and the West Mojave (WEMO) Planning Area on the west, and I-40 and the Northern and Eastern Colorado (NECO) Planning Area on the south. The ISEGS site is located in the southeastern portion of the NEMO Planning Area Boundary.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations Title 14, section 670.7).
Nest or Eggs (Fish and Game Code section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of Prey (Fish and Game Code section 3503.5	Unlawful to take, possess, or destroy any birds in the orders Falconiformes and Strigiformes or to take, possess, or destroy the nest or eggs of any such bird.
Migratory Birds (Fish and Game Code section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
California Environmental Quality Act (CEQA), CEQA Guidelines Section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under section 15830, species not protected through state or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.

Applicable Law	Description
Streambed Alteration Agreement (Fish and Game Code sections 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code section 1900 et seq.)	Designates state rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code section 80001 et seq. and California Fish and Game Code sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited. In the Ivanpah area, such plants include cacti, yuccas, and catclaw acacia (*Acacia greggii*).
Local	
San Bernardino County General Plan: Conservation/Open Space Element of the County General Plan (County of San Bernardino, 2007)	Includes objectives to preserve water quality and open space to benefit biological resources, and specific policies and goals for protecting areas of sensitive plant, soils and wildlife habitat and for assuring compatibility between natural areas and development. Although ISEGS is not located on lands under county jurisdiction, the general plan provides objectives which are consistent with some of the LORS listed above.

SETTING

REGIONAL SETTING

The proposed ISEGS would be located in Southern California's Mojave Desert, approximately 3 miles southwest of the Nevada border, to the west of Ivanpah Dry Lake. The project would be located in San Bernardino County, California, on federal (public) land managed by the BLM. The proposed project area is situated on a bajada (alluvial fan with many washes) that extends eastward from the surrounding Clark Mountains to Ivanpah Dry Lake. The Primm Valley Golf Club is immediately east of the proposed project area. Primm, Nevada is the nearest town, located just over the state line and approximately 4.5 miles east along Interstate 15 (I-15), which lies east of the proposed ISEGS (approximately 0.8 mile at its closest point). Immediately west and less than 3 miles south of the project are units of the Mojave National Preserve. Approximately 4.5 miles and 15 miles northeast along I-15 are a retail/casino center with residential facilities and the town of Jean, respectively. The outskirts of greater Las Vegas lie approximately 32 miles north-northeast of the proposed ISEGS.

Project Area and Description

The applicant has proposed to locate the ISEGS project in the Mojave Desert, near the Nevada border in San Bernardino County, California, on land administered by the

Bureau of Land Management (BLM). The proposed project site is located 4.5 miles southwest of Primm, Nevada, and 0.5 mile west of the Primm Valley Golf Club, which is located just west of the Ivanpah Dry Lake. Access to site is from the Yates Well Road Interchange on Interstate 15 (I-15) via Colosseum Road. See **Project Description Figure 1**.

The applicant for this project consists of Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC (applicant), which are subsidiaries of BrightSource Energy, Inc. On August 31, 2007, the applicant filed an Application for Certification (AFC) with the California Energy Commission (Energy Commission) seeking permission to develop the Ivanpah Solar Electric Generating System (ISEGS) project. The applicant filed four right-of-way (ROW) applications with the BLM for the ISEGS project on August 29, 2007. The four applications include an application for shared facilities including a substation, administration and maintenance buildings within a construction logistics area, and separate applications for the three power plants. On October 31, 2007, the Energy Commission accepted the AFC as data adequate. The applicant's development plans have been updated several times since filing its original AFC and ROW applications with the most substantial revisions summarized in the **Project Description** section of this document.

The proposed project would cause permanent disturbance of about 3,713 acres, temporary disturbance of 321 acres, and including the existing transmission line corridor of about 39 acres within the Construction Logistics area (CH2MHill 2009f), ISEGS would utilize about 4,073 acres (6.4 square miles) of federal land managed by BLM.

The ISEGS project area has increased by about 673 acres from 3,400 to 4,073 acres comparing the applicant's initial plans in the AFC to the current plan of development. The first incremental increase in project area of 300 acres, from 3,400 to 3,700 acres, is associated with the increase in spacing between heliostats as proposed in the Optimized Project Design and is necessary as a result of doubling the mirror area of each heliostat from about 7 to 14 square meters in order to avoid one heliostat shading another. The second incremental increase in project area of 365 acres, from 3,700 to 4,065 acres, is a result of the applicant proposing the addition of stormwater detention ponds. These have since been eliminated from the applicant's proposal without any adjustment downward in the project area.

The current project design also increases the heliostat surface area compared to the applicant's initial plans described in the AFC. The number of heliostats described under the Optimized Project Design (55,000 each for Ivanpah 1 and 2, and 104,000 for Ivanpah 3) represents the maximum number of heliostats that would be constructed; however, all of them may not be constructed. Although the number of heliostats within Ivanpah 1 and 2 have been reduced about 19.1%, the doubling of mirror area for each heliostat would result in the permitted surface area of the heliostats increasing about 61.8% from about 5,283,600 square feet (~490,960 square meters) to about 8,547,000 square feet (~794,200 square meters). In Ivanpah 3, with a 23.5% reduction in the number of heliostats, the doubling of mirror area for each heliostat would result in the permitted reflective surface area to increase about 52.9% from about 10,567,200 square feet (~981,920 square meters) to about 16,161,600 square feet (~1,501,760 square meters).

This added heliostat surface area increase would result in additional electricity production (MW-hours) on an annual basis with no change in installed capacity (MW) and with only a small amount of additional land. Under the Optimized Project Design, the applicant has not proposed any changes in the steam turbine-generators and interconnection capacity. For Ivanpah 1 and 2, the applicant's reduction in solar power towers from three to one each, the last rows are farther from the towers. Energy collection is less efficient the farther the mirrors are from the tower receivers, so additional heliostat surface area (approximately 5 to 10 percent) is needed to achieve the same annual energy output. Adding heliostat surface area results in increased heat to the solar power tower receivers and increased steam to the steam turbine during early morning and evening hours which otherwise would have resulted in lower production hours. During the peak hours of the day, these additional mirrors would be placed on standby since the steam turbine remains the same size and cannot accept additional steam.

This **Project Description** section provides an updated discussion of the ISEGS solar power plant equipment and facilities (heliostats, solar power towers, and power block, construction logistics area), the natural gas pipeline, water supply and discharge, access roads and maintenance paths, transmission system interconnections and telecommunications facilities. The **Project Description** also includes a detailed description of how project construction would be conducted for each of the three phases of the project, stormwater and waste management, and project decommissioning.

Vegetation and Wildlife

The ISEGS site is located on and surrounded by undisturbed, natural land, with the exception of the Primm Valley Golf Club and I-15 to the east and a transmission line and associated unpaved roads. Vegetation on the site and in the immediate project area consists of primarily Mojave creosote bush scrub, with Mojave yucca – Nevada ephedra scrub, and Mojave wash scrub also represented. Plant communities at the ISEGS site are characterized by an unusually high diversity and density of native succulents and relatively low levels of noxious weeds. Elevations in the project area range from approximately 3,150 to 2,850 feet above mean sea level (BSE 2007a). The Clark Mountain Range occurs to the north and west of the project area, and the topography slopes gradually down to the east and southeast toward Ivanpah Dry Lake on the alluvial fans and bajada on the Clark Mountains' east and south flanks. Approximately 2,000 ephemeral washes, which form part of the regional bajada, occur throughout the project area. The northernmost phase of the project site is immediately flanked by two hills: a limestone hill to the west and a metamorphic hill to the east.

The dominant plant community on the site, Mojave creosote bush scrub, is common in the Mojave Desert and is comprised of drought-adapted native shrubs. A census of all individuals of California barrel cactus (*Ferocactus cylindraceus* var. *lecontei*) and clustered barrel cactus (*Echinocactus polycephalus* var. *polycephalus*) recorded 2,869 individuals of California barrel cactus and 3,501 individuals of clustered barrel cactus within the project area. Densities were estimated at one to two mature barrel cacti per acre for the site overall (BSE 2007a, p. 5.2-105, CH2M Hill 2008c). The applicant

documented densities of 15 mature barrel cacti per acre in some localized areas. This density is unusual because it occurs on a bajada rather than on rocky slopes where high barrel cactus densities would be expected (BSE 2007a, p. 5.2-28).

Annual plants are also characteristic of Mojave creosote bush scrub but were notably absent during the applicant's initial field surveys in 2007 due to low rainfall (BSE 2007a, p. 5.2-18). Follow-up field surveys were conducted in 2008 to characterize annual plant cover. In the project area, creosote bush (*Larrea tridentata)* is dominant in Mojave creosote bush scrub, and the following are commonly associated perennial species: burrobush (*Ambrosia dumosa*), clustered barrel cactus, Nevada ephedra (*Ephedra nevadensis)*, California barrel cactus, cheesebush (*Hymenoclea salsola*), and Mojave yucca (*Yucca shidigera*) (BSE 2007a, p. 5.2-9). Additional plant communities and habitats within the project footprint include disturbed land associated with roads and transmission lines, Mojave wash scrub (contains acacia as described below), and numerous ephemeral washes also that occur on the site (BSE 2007a, pp. 5.2B-4 and 5.2-27). Additional vegetation types within a one-mile radius of the project footprint include Mojave yucca – Nevada ephedra scrub and limestone pavement plain (BSE 2007a, p. 5.2-79). Plant communities of each of the three sites are described below.

Ivanpah 1

Ivanpah 1, the southernmost site, consists almost entirely of the Larrea-Ambrosia subtype of creosote bush scrub and occurs mainly in a form characterized by a low density and diversity of shrubs and cacti and a very low density of Mojave yucca. Here, the dominant shrubs of the larrea-ambrosia subtype are mainly less than 3 feet in height, with many less than 1 foot in height, and relatively widely spaced. Creosote bush and burrobush are the most common shrubs, with cheesebush, pima ratany (*Krameria erecta*), Nevada ephedra, Mojave Desert California buckwheat (*Eriogonum fasciculatum* ssp. *polifolium*), silver cholla (*Opuntia echinocarpa*), buckhorn cholla (*Opuntia acanthocarpa* var. *coloradensis*), beavertail cactus (*Opuntia basilaris* var. *basilaris*), and pencil cholla (*Opuntia ramosissima*) all present in much lower abundance. Barrel cacti of both species (i.e., California barrel cactus and clustered barrel cactus) and Mojave yucca are present in low to very low numbers. The topography of the Ivanpah 1 site is relatively flat, although it is broken by a number of small to medium-sized ephemeral washes dominated by cheesebush.

Ivanpah 2

Vegetation of Ivanpah 2 consists predominantly of the larrea-ambrosia subtype of Mojave creosote bush scrub. This vegetation subtype varies in shrub and cactus density and species diversity from areas that are moderate in density and diversity at the upper elevation west end to areas that are low in density and diversity at the lower elevation east end. Creosote bush and burrobush are the dominant shrubs and are typically 1 to 4 feet in height. Associated species include: cheesebush, pima ratany, Nevada ephedra, Mojave Desert California buckwheat, silver cholla, buckhorn cholla, beavertail cactus, and pencil cactus. The density of barrel cacti, including California barrel cactus and clustered barrel cactus, and Mojave yucca, is highest in the northern third of the site, moderately high in the western half of the site, and lowest in the southern half, especially to the east.

The topography is relatively flat overall and dissected by many small to medium-sized ephemeral washes with active channels usually less than 5 feet wide that flow from west to east in the northern half of Ivanpah 2 and trend from southwest to northeast and east in the southern half of Ivanpah 2. The vegetation of most of these is composed mainly of shrub species typical of larrea-ambrosia scrub. Cheesebush washes are in higher densities than in adjacent areas. North of Colosseum Road, in the southern half of Ivanpah 2, is a large drainage complex up to 75 feet wide in some areas, although the active channels are much narrower. This large wash system supports Mojave wash scrub, although in a form distinguished mainly by the presence of catclaw acacia (*Acacia greggii*). This form has lower shrub species diversity than the Mojave wash scrub observed in Ivanpah 3.

Ivanpah 3

Ivanpah 3 is the northernmost and largest of the three proposed sites and supports more complex plant communities than Ivanpah I and 2. The larrea-ambrosia scrub subtype of Mojave creosote bush scrub is the most common vegetation type and occurs throughout Ivanpah 3, covering about 75 to 80 percent of the site. The larrea mixed scrub subtype of Mojave creosote bush scrub occurs north and south of the limestone hill, along the southwest margin, and also immediately adjacent to the northern boundary of Ivanpah 3. In the western and northern parts of Ivanpah 3, larrea mixed scrub patches alternate with patches of larrea-ambrosia scrub. Some of the larger drainage features, which are concentrated in the northern and western sections of Ivanpah 3, contain well-developed Mojave wash scrub. Within Ivanpah 3, the larrea-ambrosia scrub subtype varies from the low density-low diversity form to the high density-high diversity form. The patterns are complex but, in general, vegetation with lower densities and diversity of shrubs and cacti, and lower densities of Mojave yucca, is more widespread in the southeastern section of Ivanpah 3.

The elevation gradient within Ivanpah 3 trends very gradually downward from approximately 3,400 feet at the western margin to about 2,985 feet at the southeastern corner. The topography of Ivanpah 3 is more strongly undulating than that of Ivanpah 1 and 2 due to the presence of many small to large ephemeral wash drainage features that trend generally in a west-to-east direction. Mojave wash scrub is well-developed in some of the larger ephemeral wash drainage features in the northern and western sections of Ivanpah 3. These drainage features are typically 30 to 75 feet wide bank-to-bank, although the active channels occupy only a small portion of the entire feature.

Mojave wash scrub within Ivanpah 3 varies in density and diversity of shrubs. The dominant shrubs are drought-deciduous and are typically 3 to 10 feet in height. The best-developed stands include many large individuals of catclaw acacia, some scattered large desert-willow (*Chilopsis linearis*), and a variety of wash-associated smaller shrubs, including: cheesebush, desert almond (*Prunus fasciculata*), black-banded rabbitbrush (*Chrysothamnus paniculatus*), bladder sage (*Salazaria mexicana*), Cooper's boxthorn (*Lycium cooperi*), and Anderson's boxthorn (*Lycium andersonii*).

Noxious Weeds

Noxious weeds are species of non-native plants included on the weed lists of the California Department of Food and Agriculture (CDFA 2007), the California Invasive Plant Council, or those weeds of special concern identified by BLM. Noxious weeds were relatively low in abundance and diversity throughout the ISEGS project area. Eight species of invasive weeds were detected during the 2007/2008 floristic surveys (CH2M Hill 2008c), as described below.

- **Sahara mustard, or African mustard**, (*Brassica tournefortii*) was found at two locations, in Ivanpah 3 and in the utility corridor. This species is of high concern; Cal-IPC has declared this plant highly invasive (Cal-IPC 2006) and recommends that it should be eradicated whenever encountered.
- **Red brome** (*Bromus madritensis* ssp. *rubens*) is widespread in the project area, occurring at 961 widely scattered locations, mostly at disturbed sites. It is an introduced Eurasian grass adapted to microhabitats that can be frequently found at the base of desert shrubs. It can also form carpet cover in pockets of fine grained soils in rough terrain off the bajada. It is widespread and abundant in the Mojave Desert and has been found in the ISEGS site. Seeds from this species can disperse readily and across large distances. Cal-IPC has declared this plant highly invasive (Cal-IPC 2006). Because of its widespread distribution, red brome is not considered feasible for general control.
- **Cheat grass** (*Bromus tectorum*) was found at nine widely scattered locations in the ISEGS site. It is among the most widely distributed invasive plant species in the western U.S. Closely related to red brome, it is adapted to colder steppe and woodland habitats. Cal-IPC has declared this plant highly invasive (Cal-IPC 2006). Because of its widespread distribution, cheat grass is not considered feasible for general control.
- **Mediterranean grass** (*Schismus* spp.) was observed patchily distributed throughout the project site. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to control.
- **Russian thistle** (*Salsola* sp.) was recorded along the Colosseum Road access route. Although all invasive plants share the trait of being adapted to disturbed habitat, Russian thistle or tumbleweed (*Salsola tragus*) particularly tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed. This species was not observed at the project site, but is a common invader on disturbed sites. After summer rains in 2008, widespread areas on the northern margin of Ivanpah Playa were covered with a thick growth of tumbleweed. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006). There is a high potential that Russian thistle could become established in the construction area and this species should be eradicated if observed.

- **London rocket** (*Sisymbrium irio*) is widespread throughout the warm deserts of North America. It was identified near the project site along Colosseum Road in the southern half of Ivanpah 2. Cal-IPC has declared this plant moderately invasive (Cal-IPC 2006).
- **Mediterranean tamarisk or saltcedar** (*Tamarix ramosissima*) has been observed near the project site; however, it is a riparian plant and is therefore restricted to habitats where there is perennial saturation such as springs and seeps, or runoff from poorly maintained water pipelines or well pumps. Cal-IPC has declared this plant highly invasive (Cal-IPC 2006).
- **Filaree or storksbill** (*Erodium cicutarium*) is a widespread annual species common in disturbed habitats, and was detected at the ISEGS site. It can form dense, transient populations when conditions are suitable. It has a limited overall rating by Cal-IPC, generally because the ecological impacts of the species are minor. Because of its widespread distribution, eradication of filaree is not considered feasible.

Ephemeral Drainages and Waters of the State

Description of Project Area Drainages

The project area is located in the Ivanpah hydrologic unit of the South Lahontan Watershed, which includes approximately 278,486 acres in the Ivanpah and Pahrump Valleys of California and Nevada (BSE 2007a). All drainage from the surrounding mountains and alluvial fans collect in closed basins in the Ivanpah Valley. Streams, washes, and playas are dry most of the year, with surface water only present in response to storm events. Ivanpah Dry Lake is located approximately 2 miles east and down slope of the project area. The extensive dry lake bed covers approximately 35 square miles and is located in California adjacent to the California/Nevada border. Two mapped springs, Whisky Spring and Ivanpah Spring, are located approximately 1.6 miles west of the proposed project site in the foothills of the Clark Mountains.

The project area is located on a broad bajada that extends from the base of the Clark Mountains to the western shoreline of Ivanpah Lake, with numerous ephemeral washes occurring throughout the broad, coalescing, alluvial fans that convey storm water runoff from the mountains towards Ivanpah Dry Lake. These washes range in size from small (1 to 4 feet wide), weakly expressed erosional features to large, broad over 85 feet wide. A total of 1,973 segments of ephemeral washes were mapped in the project area (CH2M Hill 2008d). These washes encompass 198.72 acres, with a cumulative length of 291 miles of channels (CH2M Hill 2008d, Table 3.1-2, p 3-5). Approximately 1,400 of the ephemeral washes are small and are common and widespread throughout the entire project area. The larger washes are most abundant in the northern section of Ivanpah 3 as well as the east and west sides of Ivanpah 2. The larger washes tend to dissipate into smaller, more braided channels as they progress downslope. The majority of the drainages terminate prior to reaching Ivanpah Dry Lake with defined erosion features diminishing and becoming broad surface flow only. All of the ephemeral washes identified in the study area typically flow only in response to storm events. No wetlands or riparian habitat occurs within the ISEGS project area.

The active flow channels of the smaller washes are generally devoid of vegetation and typically have a sandy-gravel substrate, although some washes also contained cobble and scattered larger rocks. Most of the larger channels typically contained scattered vegetation including creosote bush and cheesebush especially in braided channels that contain slightly elevated areas intermixed with the active flow channels. Mojave wash scrub is limited to the larger washes (typically over 15 feet) with sandy gravel substrate and well-defined banks. Vegetation associated with these features includes catclaw, cheesebush, Mojave Desert California buckwheat, desert willow, black-banded rabbitbrush, bladder-sage, desert almond (*Prunus fasciculata*), Virgin River encelia (*Encelia virginensis*), Anderson's and Cooper's, sand-wash groundsel (*Senecio flaccidus* var. *monoensis*), wire lettuce (*Stephanomeria pauciflora*), and blue sage (*Salvia dorrii*).

Functions and Values of ISEGS Ephemeral Drainages

Ephemeral drainages on the project site are typical of the drainages that characterize most of the arid southwest in that they are ephemeral streams rather than perennial (an ephemeral stream is defined as one that flows briefly in direct response to precipitation). Dry desert washes support many of the same hydrological and ecological processes as perennial streams, and provide the following functions and values: landscape hydrologic connections; stream energy dissipation during high-water flows that reduces erosion and improves water quality; water supply and water-quality filtering; surface and subsurface water storage; groundwater recharge; sediment transport, storage, and deposition aiding in floodplain maintenance and development; nutrient cycling; wildlife habitat and movement/migration corridors; and support for vegetation communities that help stabilize stream banks and provide wildlife habitat (Levick et al. 2008).

Staff concludes that the ephemeral drainages at the ISEGS project site provide substantial hydrological and biological values and functions, including: hydrological connections with Ivanpah Dry Lake; stream energy dissipation during high-water flows that reduces erosion and improves water quality; surface and subsurface water storage; groundwater recharge; sediment transport, storage, and deposition aiding in floodplain maintenance and development; nutrient cycling; support for vegetation communities that help stabilize stream banks and provide wildlife habitat and a movement corridor.

Jurisditional Status

The applicant submitted a wetland delineation report to the United States Army Corps of Engineers (USACE) in February, 2008, which was subsequently revised and resubmitted in September 2008 (CH2M Hill 2008d). On May 28, 2009 the USACE made their jurisdictional determination and concluded that the ISEGS project would not discharge dredged or fill material into a water of the United States or an adjacent wetland, and therefore would not be subject to jurisdiction under Section 404 of the Clean Water Act (USACE 2009).

Under California State law, waters of the State refers to any surface water or groundwater within the boundaries of the state (California Water Code § 13050(e)). All the ephemeral drainages within the ISEGS project site are considered waters of the State (Stone 2009).

Wildlife

The diverse plant communities and landscape features in and around the ISEGS site support a correspondingly high diversity of wildlife. Reptiles detected during the 2007/2008 surveys include desert tortoise, side-blotched lizard (*Uta stansburiana*), desert iguana (*Dipsosaurus dorsalis*), long-nosed leopard lizard (Gambelia wislizenii), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), common collared lizard (*Crotaphytus collaris*), and sidewinder (*Crotalus cerastes*). The banded Gila monster (*Heloderma suspectum cinctum*) was not detected during the surveys, but this large, seldom-seen lizard may occur in the project vicinity.

The diverse landscape features, vegetation, forage, and prey availability at the ISEGS project area is likely to attract a variety of mammal species such as Audubon's cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), whitetail antelope squirrel (*Ammospermophilus leucurus*), desert kit fox (*Vulpes macrotis*), and coyote (*Canis latrans*). Given the proximity of the Clark Mountains, it is likely that mule deer (*Odocoileus hemionus hemionus*) and desert bighorn sheep (*Ovis canadensis nelsoni*) move down into the upper elevations of the valley, including the ISEGS project area, to forage (CH2M Hill 2008). It is also likely that portions of Ivanpah Valley provide movement corridors for mule deer and this bighorn sheep subspecies (CH2M Hill 2008).

The ISEGS project area provides forage, cover, roosting, and nesting habitat for a variety of bird species. Resident and migratory birds occur at the ISEGS site during the winter, migratory, and breeding seasons, including birds such as Say's phoebe (*Sayornis saya*), black-throated sparrow (*Amphispiza bilineata*), white-crowned sparrow (*Zonotrichia leucophrys*), sage sparrow (*Amphispiza belli*), blue-gray gnatcatcher (*Polioptila caerulea*), cactus wren (*Campylorhynchus brunneicapillus*), verdin (*Auriparus flaviceps*), western kingbird (*Tyrannus verticalis*), sage thrasher (*Oreoscoptes montanus*), house finch (*Carpodacus mexicanus*), lesser nighthawk (*Chordeiles acutipennis*), common ground-dove (Columbina passerina), mourning dove (*Zenaida macroura*), Gambel's quail (*Callipepla gambelii*), American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), and red-tailed hawk (*Buteo jamaicensis*).

Special-Status Species

Biological Resources Table 2 lists special-status species that are known to occur or could potentially occur in the project vicinity. Many of these special-status plants and animals are unlikely to occur at the ISEGS site due to lack of suitable habitat. However, quite a few were detected during the 2007/2008 surveys or otherwise known to occur at or near the site and those are indicated by **bold-face type**.

Biological Resources Table 2
Special-Status Species Known or Potentially Occurring in the ISEGS Project Area and Vicinity

PLANTS		
Common Name	***Scientific Name***	**Status State/Fed/CNPS/BLM**
Mormon needle grass	*Achnatherum aridum*	__/__/2.3
Clark Mountain agave*	***Agave utahensis* var. *nevadensis***	**__/__/4.2**
Desert ageratina	*Ageratina herbacea*	__/__/2.3
Coyote gilia	*Aliciella triodon*	__/__/2.2
Small-flowered androstephium	***Androstephium breviflorum***	**__/__/2.23**
White bear poppy	*Arctomecon merriamii*	__/__/2.2
Mojave milkweed	***Asclepias nyctaginifolia***	**__/__/2.1**
Cima milk-vetch	*Astragalus cimae* var. *cimae*	__/__/1B.2
Providence Mountain milk-vetch	*Astragalus nutans*	__/__/4.2
Scaly cloak fern	*Astrolepis cochisensis* ssp. *cochisensis*	__/__/2.3
Black grama	*Bouteloua eriopoda*	__/__/4.2
Red grama	*Bouteloua trifida*	__/__/2.3
Alkali mariposa lily	*Calochortus striatus*	__/__/1B.2
Purple bird's-beak	*Cordylanthus parviflorus*	__/__/2.3
Desert pincushion	***Coryphantha chlorantha***	**__/__/2.1**
Viviparous foxtail cactus*	***Coryphantha vivipara* var. *rosea***	**__/__/2.2**
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3
Gilman's cymopterus	*Cymopterus gilmanii*	__/__/2.3
Utah vine milkweed	***Cynanchum utahense***	**__/__/4.2**
Nine-awned pappus grass	***Enneapogon desvauxii***	**__/__/2.2**
Naked-stemmed daisy	*Enceliopsis nudicaulis* ssp. *nudicaulis*	__/__/4.3
Limestone daisy	*Erigeron uncialis* var. *uncialis*	__/__/1B.2
Forked buckwheat	*Eriogonum bifurcatum*	__/__/1B.2
Hairy erioneuron	*Erioneuron pilosum*	__/__/2.3
Clark Mountain spurge	*Euphorbia exstipulata* var. *exstipulata*	__/__/2.1
Wright's bedstraw	*Galium wrightii*	__/__/2.3
Pungent glossopetalon	*Glossopetalon pungens*	__/__/1B.2
Parish club-cholla	***Grusonia parishii***	**__/__/2.2**
Hairy-podded fine-leaf hymenopappus	*Hymenopappus filifolius* var. *eriopodus*	__/__/2.3
Jaeger's ivesia	*Ivesia jaegeri*	__/__/1B.3
Knotted rush	*Juncus nodosus*	__/__/2.3
Hillside wheat grass	*Leymus salinus* ssp. *mojavensis*	__/__/2.3
Plains flax	*Linum puberulum*	__/__/2.3
Spearleaf	*Matelea parvifolia*	__/__/2.3
Rough menodora	*Menodora scabra*	__/__/2.3
Polished blazing star	*Mentzelia polita*	__/__/1B.2
Utah mortonia*	***Mortonia utahensis***	**__/__/4.3**
Tough muhly	*Muhlenbergia arsenei*	__/__/2.3

PLANTS		
Common Name	***Scientific Name***	**Status State/Fed/CNPS/BLM**
Crowned muilla	*Muilla coronata*	__/__/4.2
False buffalo-grass	*Munroa squarrosa*	__/__/2.2
Cave evening-primrose*	***Oenothera cavernae***	**__/__/2.1**
Short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	__/__/1B.2
Curved-spine beavertail	*Opuntia curvospina*	__/__/2.2
Spiny cliff-brake	*Pellaea truncata*	__/__/2.3
White-margined beardtongue	*Penstemon albomarginatus*	__/__/1B.2
Rosy two-toned beardtongue	*Penstemon bicolor* ssp. *roseus*	__/__/2.3
Limestone beardtongue	*Penstemon calcareous*	__/__/1B.3
Death Valley beardtongue	*Penstemon fruticiformis* var. *amargosae*	__/__/1B.3
Stephen's beardtongue	*Penstemon stephensii*	__/__/1B.3
Thompson's beardtongue	*Penstemon thompsoniae*	__/__/2.3
Utah beardtongue	*Penstemon utahensis*	__/__/2.3
Aven Nelson's phacelia	*Phacelia anelsonii*	__/__/2.3
Barneby's phacelia	*Phacelia barnebyana*	__/__/2.3
Sky-blue phacelia	*Phacelia coerulea*	__/__/2.3
Parish's phacelia	*Phacelia parishii*	__/__/1B.1
Jaeger's phacelia	*Phacelia perityloides* var. *jaegeri*	__/__/1B.3
Chambers' physaria	*Physaria chambersii*	__/__/2.3
Small-flowered rice grass	*Piptatherum micranthum*	__/__/2.3
Desert portulaca	***Portulaca halimoides***	**__/__/4.3**
Abert's sanvitalia	*Sanvitalia abertii*	__/__/2.2
Many-flowered schkuhria	*Schkuhria multiflora* var. *multiflora*	__/__/2.3
Johnson's bee-hive cactus	*Sclerocactus johnsonii*	__/__/2.2
Mojave spike-moss	*Selaginella leucobryoides*	__/__/4.3
Rusby's desert-mallow	***Sphaeralcea rusbyi* var. *eremicola***	**__/__/1B.2/S**

WILDLIFE		
Common Name	***Scientific Name***	**Status State/Fed/BLM**
Reptiles		
Desert tortoise	***Gopherus agassizii***	**FT/ST/__**
Banded gila monster	*Heloderma suspectum cinctum*	__/SC/S
Birds		
Burrowing owl	***Athene cunicularia***	**CSC/FSC/__**
Golden eagle	***Aquila chrysaetos***	**CSC, FP/FSC/S**
Vaux's swift	***Chaetura vauxi***	**__/FSC/__**
Gray-headed junco	*Junco hyemalis caniceps*	WL/FSC/__
Loggerhead shrike	***Lanius ludovicianus***	**CSC/FSC/__**
Hepatic tanager	*Piranga flava*	WL/FSC/__
Summer tanager	*Piranga rubra*	CSC/__/__

WILDLIFE		
Common Name	***Scientific Name***	**Status State/Fed/BLM**
Brewer's sparrow	***Spizella breweri***	**__/BCC/__**
Bendire's thrasher	*Toxostoma bendirei*	CSC/BCC/S
Crissal thrasher	***Toxostoma crissale***	**CSC/BCC/__**
Le Conte's thrasher	***Toxostoma lecontei***	**WL/BSS/__**
Virginia's warbler	*Vermivora virginiae*	WL/BCC/__
Gray vireo	*Vireo vicinior*	CSC/BCC/S
Mammals		
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/__/S
Pallid bat	*Antrozous pallidus*	CSC/__/S
Long-legged myotis	*Myotis volans*	__/__/S
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	__/__/S
American badger	***Taxidea taxus***	**CSC/__**

Bold-face-type species names are those observed on or near the proposed project site or plants observed in the one-mile buffer by the applicant during the 2007/08 field surveys.

* Found in buffer area surveys only. For all but Utah mortonia; no specific location information was included in the applicant's final botanical plant report (CH2M Hill 2008x).

Sources: CNDDB 2009 (Ivanpah Lake, State Line Pass, Mesquite Lake, Clark Mountain, Mescal Range, Mineral Hill, Nipton, and Desert USGS Quads); Plants: CNPS 2009, CDFG 2009; Animals: CDFG Special Animals List;

Status Codes:

Federal: FE - Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT - Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC: Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>

State CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
SE - State listed as endangered
ST = State listed as threatened
WL = State watch list

California Native Plant Society
List 1B - Rare, threatened, or endangered in California and elsewhere
List 2 - Rare, threatened, or endangered in California but more common elsewhere
List 3 - Plants which need more information
List 4 - Limited distribution – a watch list
0.1 - Seriously threatened in California (high degree/immediacy of threat)
0.2 - Fairly threatened in California (moderate degree/immediacy of threat)
0.3 - Not very threatened in California (low degree/immediacy of threats or no current threats known)

BLM: Sensitive: Bureau of Land Management
BLM Manual §6840 defines sensitive species as"…those species that are (1) under status review by the FWS/NMFS; or (2) whose numbers are declining so rapidly that Federal listing may become necessary, or (3) with typically small and widely dispersed populations; or (4) those inhabiting ecological refugia or other specialized or unique habitats." <www.blm.gov/ca/pdfs/pa_pdfs/biology_pdfs/SensitiveAnimals.pdf>

Special-Status Plant Species

Many special-status plant species were documented in the ISEGS project area, vicinity, and buffer areas during botanical surveys (CH2M Hill 2008x). No state or federally listed plant species occur within the ISEGS project area, but eight plant species listed by the

California Native Plant Society (CNPS) are known to occur on the site or in the immediate vicinity. This analysis discusses the following CNPS Lists, which are defined as follows:

List 1A: Plants Presumed Extinct in California

List 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere.

List 2: Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere

One of these, Rusby's desert-mallow, is also a BLM sensitive species. Information on the natural history, distribution, and status of these species on the project area is provided below. The status information is based on the results of the applicant's floristic surveys conducted in 2007/2008 (CH2M Hill 2008c). In addition to the floristic surveys, staff searched databases and files of the CDFG's California Natural Diversity Database (CNDDB), NatureServe (an international network of natural heritage programs), CNPS, and the Consortium of California Herbaria (2008) data, including information not yet entered into the CNDDB and CNPS databases. Four special-status plants (Clark Mountain agave, viviparous foxtail cactus, Utah mortonia, and cave evening-primrose) are not discussed in detail below because they were found outside the project footprint during buffer area surveys, would not be impacted by the project, and locations were not included for most of these plants in the applicant's final botanical report.

Small-Flowered Androstephium (Androstephium breviflorum)

Small-flowered androstephium is a bulbiferous herb found mainly in San Bernardino County, though it has been recorded in adjacent Riverside County and possibly Inyo County. This species also occurs in Arizona, Nevada, and Utah. It is found in dry, loose sandy to rocky soils and on sand dunes and alluvial fans. The CNDDB Element Occurrence records are all presumed extant. In addition, approximately 31 occurrences were documented in the AFC for the Stirling Energy Systems Solar One Project (SES 2008). This species was not detected in 2007, but in 2008 a total of 12 individuals were mapped in four locations on the ISEGS project site, within Ivanpah 1 and 2, in Mojave creosote bush scrub. Many new occurrences of this species have been found in recent years and the project area includes only a very small portion of its total distribution in California.

Mojave Milkweed (Asclepias nyctaginifolia)

The California distribution of Mojave milkweed is limited to a very small area in eastern San Bernardino County. Currently, it is known from less than 25 occurrences, 16 of which occur in Ivanpah Valley in the project area (CNDDB 2009) **(Biological Resources Figure 1).** Its distribution outside of Ivanpah Valley is limited to a few very old historic collections and only two other populations that have been confirmed extant (CNDDB 2009, Calflora 2009). This perennial plant also occurs in Arizona, New Mexico, and Nevada but it has a CNDDB state rank of S1 (critically imperiled and vulnerable to extirpation from the state due to extreme rarity).The habitat of Mojave milkweed in California includes washes and dry slopes from about 3,000 to 5,100 feet in Mojavean desert scrub and pinyon and juniper woodland (CNPS 2008). In 2008, 202 individuals of Mojave milkweed were mapped in 59 locations mainly in small washes in Ivanpah 1, 2

and 3. Within the project area Mojave milkweed typically grows in small- to medium-sized washes with sandy to gravelly substrates.

Desert Pincushion (Coryphantha chlorantha)

Desert pincushion is a stem succulent found in the Mojave Desert in San Bernardino and Inyo counties, and also occurs in Arizona, Nevada, and Utah. CNDDB currently lists fewer than 25 documented occurrences in California, approximately one-third of which occur in the project area (CNDDB 2009). It has a CNDDB global rank of G2 (imperiled and at high risk of extinction due to a very restricted global range) and a CNDDB state rank of S1 (critically imperiled). In California its habitat is gravelly or rocky carbonate substrates. In California, desert pincushion is known from the Mojave Desert, in San Bernardino and Inyo counties (CNDDB 2009); it also occurs in Nevada, Arizona and Utah. Desert pincushion's distribution in California is apparently restricted to a few mountain ranges in the eastern Mojave Desert, in eastern San Bernardino County and southeastern Inyo County. Desert pincushion is widely scattered throughout the project area. In 2008, 477 individuals of this species were mapped in 177 locations during protocol-level surveys, within Ivanpah 1, 2 and 3, the construction logistics area, and the utility corridor. In 2007, an additional 122 individuals were found in 114 locations. The combined total for 2007 and 2008 is 599 individuals in 291 locations. Most individuals were found in Mojave creosote bush scrub.

Utah Vine Milkweed (Cynanchum utahense)

Utah vine milkweed is a perennial herb found in the Mojave Desert in San Bernardino County and in the Colorado Desert in Riverside, Imperial, and San Diego Counties. This species also occurs in Arizona, Nevada, and Utah (CNDDB 2009). In California its habitat is sandy and gravelly soils, often in washes climbing up through shrubs. The CNDDB electronic files do not track CNPS List 4 species, but staff found two Element Occurrences in the CNDDB paper files. Herbarium records noted approximately 42 additional occurrences. In 2008, 991 individuals were found in 146 locations, mainly in Ivanpah 1 and 2. In 2007, three individuals were mapped in three locations, all within Ivanpah 1. Most individuals were found in small washes in Mojave creosote bush scrub. The total for 2007 and 2008 on the Ivanpah Project site is 994 individuals in 149 locations. In addition, one occurrence was documented in the AFC for the Stirling Energy Systems Solar One Project (SES 2008).

Nine-Awned Pappus Grass (Enneapogon desvauxii)

Nine-awned pappus grass is a widespread species of the southwestern U.S., Mexico and South America, but the California range of this species is restricted to a small portion of eastern Mojave Desert, in San Bernardino County (CNDDB 2009). It has a CNDDB state rank of S2 (imperiled). It is currently known from fewer than 25 documented occurrences. Habitat of nine-awned pappus grass in California consists of rocky slopes, crevices, calcareous soils, in desert woodland. In the Ivanpah Valley, this species occurs on the often north-facing sides of medium-sized to large washes, and on cobble mounds within and outside of washes that include some calcareous rocks, from 2,900 to 3,400 feet, in Mojave creosote bush scrub. In 2007, no individuals of this species were detected within the ISEGS project area, but in the 2008 surveys 8,145 plants were documented, suggesting that the population varies widely in response to seasonal variation in precipitation and other climate variables..`

Parish's Club-Cholla (Grusonia parishii)

The California range of Parish's club-cholla has a CNDDB state rank of S2 (imperiled). Currently, it is known from fewer than 20 occurrences but it has a wider range in California that extends south into Riverside County. Nearly 30 percent of the documented occurrences to date occur within the project area (CNDDB 2009). This stem succulent also occurs in Nevada, Arizona, and possibly Texas. The habitat of Parish's club-cholla within the project area consists of sandy to somewhat gravelly uplands in the larrea-ambrosia sub-type of Mojave creosote bush scrub. Parish's club-cholla is abundant within the ISEGS project area, where it is discontinuously distributed, with most locations found in Ivanpah 1 and 3, and the construction logistics area. This species grows in clones consisting of spreading mats that may form separate patches over time. One 'mat' (dense, clonal clumps) was defined as one individual during the 2007-2008 surveys. In 2008, 196 clumps or mats of Parish's club-cholla were mapped at 47 locations within Ivanpah 1, the construction logistics area, and the utility corridor. In 2007, 143 were mapped within 96 locations in Ivanpah 1 and 3, and the construction logistics area. For 2008 and 2007 combined, 339 individuals were mapped in 143 locations.

Desert portulaca (Portulaca halimoides)

Desert portulaca is a late summer/early fall blooming annual found in Riverside and San Bernardino Counties, and possibly San Diego County. This species also occurs in Nevada, Arizona, Utah, Colorado, New Mexico, Oklahoma, Texas, and Baja California. Habitat of desert portulaca consists of sandy washes and flats, from about 3,000 to 3,600 feet in elevation. Herbarium records noted 16 different occurrences, not including the one collected from the project site. Desert portulaca is a CNPS List 4 species that has a plant of limited distribution but is not considered rare from a statewide perspective so its distribution is not tracked by CNDDB.

At the ISEGS project area, no individuals of desert portulaca were detected during field surveys conducted in April, May, and June 2007, or in April 2008. However, desert portulaca was observed within the ISEGS project area in October 2007, following rains in August 2007. Quantitative data on the distribution and abundance of desert portulaca within the ISEGS project area are not available, but one individual was detected at the site. The plant's location in the project area was not mapped in the applicant's final botanical report (CH2M Hill 2008x).

Rusby's Desert-Mallow (Sphaeralcea rusbyi var. eremicola)

Rusby's desert-mallow is a California endemic perennial herb; it is documented globally from less than 30 occurrences in Inyo and San Bernardino Counties in the Death Valley Region and Eastern Mojave Desert in the Clark Mountain Range. It has a CNDDB state rank of S2 (imperiled). It occurs in the Clark Mountain Range at Ivanpah Springs, on desert slopes and gravelly sandy washes and often in carbonate and limestone substrate, extending into the project area. This plant is the only BLM-sensitive plant species detected on site. This species was not detected during the 2007 surveys, but in 2008 15 individuals were mapped in 12 locations in Mojave creosote bush scrub within Ivanpah 1, 2, and 3, the construction logistics area, and the utility corridor.

Special-Status Wildlife Species - Birds

Western Burrowing Owl (Athene cunicularia hypugaea)

Western burrowing owls inhabit arid lands throughout much of the western United States and southern interior of western Canada (Haug et al. 1993). In the Mojave Desert region, and in many other areas, this species has declined because of habitat modification, poisoning of its prey, and introduced nest predators. The burrowing owl is diurnal and usually non-migratory in this portion of its range.

Burrowing owls are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by California ground squirrels, San Joaquin kit fox, desert tortoise, and other wildlife. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats. They often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al. 2008). The southern California breeding season (defined as from pair bonding to fledging) generally occurs from February to August with peak breeding activity from April through July (Haug et al. 1993).

In the Mojave Desert, burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant (Gervais et al. 2008). Burrowing Owls tend to be opportunistic feeders. Large arthropods, mainly beetles and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice and voles (*Microtus*, *Peromyscus*, and *Mus* spp.), are also important food items. Other prey animals include reptiles and amphibians, young cottontail rabbits, bats, and birds, such as sparrows and horned larks. Consumption of insects increases during the breeding season (Haug et al. 1993).

This species was detected on the ISEGS site during the 2008 surveys but not in 2007. Suitable habitat was identified. No owls, feathers, active burrows, pellets or whitewash were observed. The size and status of burrowing owl population at the project site is not known. The ISEGS site provides suitable foraging and breeding habitat for this species.

Golden Eagle (Aquila chrysaetos)

Throughout most of the western United States golden eagles are mostly year-round residents, breeding from late January through August with peak activity in March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover. Golden eagles were detected on the ISEGS project site, but are unlikely to

nest there because of the absence of suitable nesting habitat. However, the Clark Mountains, just north of the project area, provide suitable nesting habitat for this species, and the ISEGS site provides foraging habitat.

Loggerhead Shrike (Lanius ludovicianus)

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast (Humple 2008). In the Mojave Desert this species appears to be most numerous in flat or gently sloping deserts and desert/scrub edges, especially along the eastern slopes of mountainous areas (Humpel 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996).

This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996). Loggerhead shrikes were detected on the ISEGS site and are year-round residents, using the site for nesting, foraging, and cover.

Le Conte's Thrasher (Toxostoma lecontei)

This species inhabits some of the hottest and driest habitats in the arid southwest, including the Mojave Desert where they occur year-round. Preferred habitats include sparse desert scrub, alkali desert scrub, and desert succulent scrub habitats with open desert washes. They seek gentle to rolling slopes bisected by dry desert washes, conditions found on alluvial fans that are found in the project area. The Le Conte's thrasher population densities are among the lowest of passerine (perching) birds, estimated at less than five birds per square kilometer in optimal habitats (Fitton 2008). This low population density decreases the probability of their detection during field surveys. This species requires areas with an accumulated leaf litter under most plants as cover for its preferred arthropod prey; they also feed on seeds, insects, small lizards, and other small vertebrates. LeConte's thrashers were detected during the surveys. They are year-round residents at the ISEGS site and use the site for nesting, foraging, and cover.

Crissal Thrasher (Toxostoma crissale)

Crissal thrashers are non-migratory residents ranging from southern Nevada and southeastern California to western Texas and central Mexico, and they are known to occur in the Mojave Desert in the vicinity of the Clark Mountains (Fitton 2008). This species prefers habitats characterized by dense, low scrubby vegetation, such as desert and foothill scrub and riparian brush including higher elevation arroyos of the Mojave Desert, normally near the upper limit of desert scrub vegetation as it transitions into pinyon-juniper woodland. The nest of this species typically consists of an open cup of twigs, lined with finer vegetation, and placed in the middle of a dense shrub. Loss of

habitat to clearing for agriculture or urban and suburban development threatens some populations. Crissal thrashers were detected during the surveys and are likely to be year-round residents at the ISEGS site, using the site for nesting, foraging, and cover.

Vaux's Swift (Chaetura vauxi)

Most Vaux's swifts observed in the Mojave Desert are passing through, and this species is not known to breed in San Bernardino County or elsewhere in the Mojave Desert (Hunter 2008). Very few nests have been found so their breeding range has been inferred from sightings of birds flying over potential nesting areas during their nesting season, in June and July. Vaux's swifts prefer to nest in the hollows formed naturally inside of large old conifer trees, especially snags, which are entirely lacking from the project area. This species was detected in the project area, but was likely a migrant rather than a resident. The ISEGS project area does not provide nesting habitat for Vaux's swift.

Brewer's Sparrow (Spizella breweri)

This species is a fairly common summer resident and breeder east of the Cascade-Sierra Nevada crest in mountains and higher valleys of the Mojave Desert. In summer, Brewer's sparrow often finds cover in sagebrush in extensive stands with moderate canopy unbroken by trees, while similar shrub habitats, such as bitterbrush, are used to a lesser extent. This species breeds in treeless shrub habitats with moderate canopy, especially in sagebrush. In winter, this species is common in open desert scrub and cropland habitats of the southern Mojave and Colorado deserts, usually in areas with some herbaceous understory. Brewer's sparrows were detected during the surveys and are likely to be year-round residents at the ISEGS site, using the site for nesting, foraging, and cover.

Special-Status Wildlife Species - Mammals

American Badger (Taxidea taxus)

American badgers were once fairly widespread throughout open grassland habitats of California. They are now uncommon, permanent residents throughout most of the state, with the exception of the northern North Coast area. Known to occur in the Mojave Desert, they are most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and cold desert areas. Cultivated lands have been reported to provide little usable habitat for this species. They feed mainly on small mammals, especially ground squirrels, pocket gophers, rats, mice, and chipmunks. This species captures some of its prey above ground foraging on birds, eggs, reptiles, invertebrates, and carrion. Its diet will shift seasonally and yearly depending upon prey availability. This species is somewhat tolerant of human activities. The ISEGS project site provides suitable foraging habitat and denning sites for American badger, and it was detected during the 2007 surveys.

Nelson's Bighorn Sheep (Ovis canadensis nelsoni)

The Nelson's bighorn sheep includes bighorns from the Transverse Ranges through most of the desert mountain ranges of California and adjacent Nevada and northern Arizona to Utah. This species is widely distributed from the White Mountains in Mono County south to the Chocolate Mountains in Imperial County, and is known to occur in the Clark Mountains (CH2M Hill 2008). Essential habitat for bighorn sheep includes steep, rocky slopes of desert mountains, termed "escape terrain". Their agility on steep rocky terrain is an adaptation used to escape predators such as coyotes, eagles, and cougars (Wehausen 1992).

Bighorn sheep graze on grasses and browse shrubs, particularly in fall and winter, and seek minerals at natural salt licks. In the spring, when annual plants are available, bighorn tend to disperse downhill to bajadas and alluvial fans to forage. Bighorn sheep have a large rumen, relative to body size, which allows digestion of grasses, even in a dry state (Hanly 1982). This gives them flexibility to select diets that optimize nutrient content from available forage. Consequently, bighorn sheep feed on a large variety of plant species and diet composition varies seasonally and among locations. While diet quality in the Mojave Desert varies greatly among years, it is most predictably high in late winter and spring (Wehausen 1992), and this period coincides with the peak of lambing. Desert bighorn have a long lambing season that can begin in December and end in June in the Mojave Desert, and a small percentage of births commonly occur in summer as well (Wehausen 1992).

Radio telemetry studies of bighorn sheep in various southwestern deserts, including the Mojave Desert of California, have found considerable movement of these sheep between mountain ranges (Bleich et al. 1990). Consequently, intermountain areas of the desert floor that bighorn traverse between mountain ranges can be as important to the long-term viability of populations as are the mountain ranges themselves (Schwartz et al. 1986, Bleich et al. 1990).

Surface water is another element of desert bighorn habitat considered essential to population health. Male and female bighorn sheep inhabiting desert ecosystems can survive without consuming surface water (Krausman et al. 1985), and males appear to drink infrequently in many situations; however, there are no known large populations of bighorn sheep in the desert region that lack access to surface water. It is common for males and females to segregate and occupy different habitats outside the breeding season (Bleich et al. 1997). Females tend to choose particularly steep, safe areas for bearing and initial rearing of lambs. Areas of steep limestone are commonly preferred lambing areas if available. Males frequently occupy much less precipitous habitat during the lamb-rearing season (Bleich et al. 1997).

The CNDDB records indicate that this species was documented in the vicinity of the ISEGS project in 1986, when approximately 150 sheep were recorded approximately 2.9 miles west and northwest of the project area in the Clark Mountains (BSE 2007a). Jaeger's (1994) studies of bighorn sheep in the Kingston and Clark Mountain ranges provide some more recent information on the demography, habitat use, behavior and movement patterns of the Clark Mountain population of Nelson's bighorn sheep. Jaeger (1994) estimated 58 ewes in the Clark Mountain population in 1991 and 1992, and

calculated the ewe to ram ratio to be approximately 96:100 (Jaeger 1994). Jaeger (1994) found that from 1991 through 1993 the ewe population in the Clark Mountain Range declined due to poor recruitment of lambs combined with mountain lion predation on adults. Jaeger (1994) also studied seasonal movements of big horn sheep, and determined that radio-collared ewes in the Clark Mountain Range moved seasonally between Clark Mountain and the State Line Hills, a part of the Spring Range in Nevada, to the northeast (Jaeger 1994). Bighorn also utilized the Mesquite Range, which lies to the northwest of the Clark Mountains.

No studies are available that would confirm the presence of Nelson's bighorn sheep in the project area. Given the proximity of the Clark Mountains, it is likely that bighorn sheep move down into the upper elevations of the Ivanpah Valley, including the ISEGS project area, to forage (CH2M Hill 2008 p. 3-7). Alluvial fans near steep rocky terrain can provide crucial foraging habitat for big horn sheep (Wehausen 2009). For example, ewes at the end of gestation that need nutrients may come down from steep, rocky terrain looking for higher quality forage. They might use areas like the project site for only three weeks, but those three weeks are critical (Wehausen 2009). The Ivanpah Valley might also provide important movement corridors for deer and bighorn sheep (CH2M Hill 2008 p. 3-7). CDFG has noted that wildlife corridors are present through and adjacent to the ISEGS site, and have expressed concern that the project could adversely affect bighorn sheep (CDFG 2008). However, no studies are available documenting bighorn use of the Ivanpah Valley as a migratory area.

Special-Status Bat Species

Pallid bat (*Antrozous pallidus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) are special-status bat species that have been reported in the project vicinity (Brown 2008, CNDDB 2008). The pallid bat is a locally common species of low elevations in California, occurring throughout the state from Shasta to Kern counties except in the high Sierra. It occupies a wide variety of habitats is occupied, including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. The species is most common in open, dry habitats with rocky areas for roosting and is a yearlong resident in most of the range. Pallid bats use caves, crevices, and mines for day roosts.

Townsend's big-eared bat is found throughout California in all but subalpine and alpine habitats, and may be found at any season throughout its range. Once considered common, Townsend's big-eared bat now is considered uncommon in California. It is most abundant in mesic habitats, and uses caves, mines, tunnels, buildings, or other human made structures for roosting. The Townsend's big-eared bat captures their prey in flight using echolocation, or by gleaning from foliage, with small moths being the principal food of this species. Extremely sensitive to disturbance of roosting sites, a single visit may result in the abandonment of a maternity roost.

Pallid and Townsend's big-eared bats could use the project area for foraging and might use nearby mine shafts for roosting. The AFC (BSE 2007a) correctly states that no mines exist on site, but staff observed a mine shaft in the limestone hill immediately west of Ivanpah 3. While no direct impacts to the mine would occur from the project, BLM staff assessed the level of bat activity at the mine shaft by conducting a visual

night survey on June 23, 2008. At least five bats were observed from the limestone hill, and one individual flew into and out of the mine shaft (Grant 2008). Species identification was not possible with this type of survey. Although standard acoustic surveys would be able to distinguish most species, they would not be successful in detecting Townsend's big-eared bat (Brown 2008).

Special-Status Wildlife Species - Reptiles

Banded Gila Monster *(Heloderma suspectum cinctum)*

The banded Gila monster is considered rare in California (Lovich and Beaman 2007) with only 26 credible records of the species documented in California within the past 153 years. This large and distinct looking lizard is difficult to observe even in areas where they have been recently recorded. As a result, little is known about this species' distribution, population status, and life history in California.

Most of the historical observations in California occurred in mountainous areas of moderate elevations with rocky, incised topography, in large and relatively high ranges as well as riparian areas (Lovich and Beaman 2007). Despite the widespread localities of potential habitat throughout the California desert, the few documented observations suggest the California populations appear to be confined to the eastern portion of the California desert (Lovich and Beaman 2007), and the current distribution is apparently a function of summer rainfall. As reported by Lovich and Beaman (2007), all California Gila monster observations occurred east of the 116° longitude in areas that received at least 25 percent of their annual precipitation during the summer months. Throughout their range, Gila monsters appear to be most active during or following summer rain events. Gila monsters have been recorded in the adjacent Mojave National Preserve and the Clark Mountains (Lovich and Beaman 2007). The closest confirmed observation of a Gila monster to the project area is likely an animal collected within the Mojave National Preserve in 1962 on the eastern slope of the Clark Mountains near Ivanpah Springs (Persons and Nowak 2007). Another incidental observation from the area includes finding Gila monster remains beneath a red-tail hawk nest near Primm, Nevada (CH2M Hill 2008g).

Like most areas of the desert, rain fall within the Ivanpah Valley is variable but mean annual precipitation is approximately 4 to 7 inches. The distribution of rainfall is also bi-modal with winter peak precipitation typically in February and summer peak rain falls in August. Runoff from the steep surrounding mountains is rapid and flash floods are common events as most of the storm water in the Ivanpah Valley drains across the alluvial fan to Ivanpah and Roach Dry Lakes. Although the Mojave is the driest of the North American deserts, the east Mojave does receive a large percentage of its annual precipitation from summer "monsoon" rains. As reported in Hereford et al. (2001) the relative abundance of cacti, many yuccas, agaves, and agave-like plants tend to be greater where warm-season rainfall is abundant. This is true of the ISEGS project area where cacti are extremely abundant. Although the project area does not receive near the amount of the rainfall as the Sonoran Desert where Gila monsters are more prevalent, the Ivanpah Valley does mimic the climatic conditions that appear to be favorable to Gila monster presence (CH2M Hill 2008g).

Gila monsters have the potential to occur in the ISEGS project area, particularly near the metamorphic hill, immediately adjacent to the southeastern boundary of Ivanpah 3 (CH2M Hill 2008g). They could also occur at the northeastern corner of Ivanpah 2 as well as the utility interconnections south of the base of the Clark Mountains (CH2M Hill 2008g). Gila monsters may venture from those rockier areas adjacent to the project area where they would likely take refuge in small crevices and caves to forage within the spreading arroyo on which the proposed project is located (CH2M Hill 2008g).

Desert Tortoise

The desert tortoise's range includes the Mojave Desert region of Nevada, southern California, and the southwest corner of Utah and the Sonoran Desert region of Arizona and northern Mexico. The desert tortoise range is divided into Mojave and Sonoran populations. The Ivanpah Valley supports the Mojave population, which is primarily found in creosote bush-dominated valleys with adequate annual forbs for forage.

Desert tortoises have been known to live up to 70 years or more but the typical adult likely lives 25 to 35 years (in USFWS 1994). Like many long-lived species, the tortoise has a relatively slow rate of reproduction, and achieves breeding status at 15 to 20 years of age. Egg-laying occurs primarily from April to July (Rostral et al. 1994; USFWS 1994); the female typically lays 2-14 eggs (average 5-6) eggs in an earthen chamber excavated near the mouth of a burrow or under a bush (Woodbury and Hardy 1948; USFWS 1994). The eggs typically hatch 90 to 120 days later, between August and October.

Desert tortoise activity is seasonally variable, and in California peak adult and juvenile activity typically coincides with the greatest annual forage availability during the early spring and summer. However, tortoises will emerge from their burrows at any time of year when the weather is suitable. Hatchling desert tortoises typically become active earlier than adults do and their greatest activity period can be expected between late winter and spring. During active periods, tortoises feed on a wide variety of herbaceous plants, including cactus, grasses, and annual flowers (USFWS 1994).

Annual home ranges have been estimated between 10 and 450 acres and are age, sex, seasonal, and resource density dependent (USFWS 1994). Although adult males can be aggressive toward each other during the breeding season, there can be a great deal of overlap in individual home ranges (USFWS 1994). More than 1.5 square miles of habitat may be required to meet the life history needs of a tortoise and individuals have been known to travel as much or more than 7 miles at a time (BLM 2001). In drought years, tortoises can be expected to wander farther in search of forage. During their active period, desert tortoises retreat to shallow burrows and aboveground shade to escape the heat of the day, and will also retire to burrows at nighttime. Desert tortoises are primarily dormant in winter in underground burrows and sometimes congregate in communal dens.

Desert tortoise populations have declined throughout their range because of loss and degradation of habitat caused by urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or

consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to declines.

The proposed ISEGS project would be constructed within the Northeastern Mojave Recovery Unit, one of six designated evolutionarily significant units within the range of the desert tortoise (USFWS 1994). When the 1994 recovery plan was issued, some of the highest known tortoise densities were in southern Ivanpah Valley, with 200 to 250 adults per square mile (USFWS 1994). These 1990s densities were less than estimates for the southern Ivanpah Valley in the 1970s; a decline has been attributed to raven predation (USFWS 1994). Densities for the northern Ivanpah Valley in the 1990s were typically less than 50 adults per square mile (USFWS 1994). According to the 1994 recovery plan, tortoise densities in the Ivanpah Valley Desert Wildlife Management Areas were estimated between 5 and 250 adult tortoises per square mile and the area was given a threat level of 3 out of 5 (5 = extremely high) (USFWS 1994). The Desert Tortoise Recovery Planning Assessment Committee (DTRPAC) recommended revising the threat level for the Ivanpah Valley Desert Wildlife Management Areas to a 4 to reflect 2003 conditions (DTRPAC 2004). Desert tortoises are distributed throughout Ivanpah Valley with the exception of the dry lakes and developed areas. According to the Northern and Eastern Mojave Planning Area EIS (BLM 2002), the non-lakebed portion of Ivanpah Valley area is considered excellent quality tortoise habitat with some of the highest population densities in the East Mojave.

The ISEGS project area provides high quality habitat for this species, with low levels of disturbance and high plant species diversity (CDFG 2008a). The desert tortoise population in this part of the Ivanpah Valley is also unique because it is the highest elevation at which this species is known to reside in the state (CDFG 2008a). The 2007/2008 protocol desert tortoise surveys found 25 live desert tortoises, 97 desert tortoise carcasses, 214 burrows, and 50 other tortoise sign (BSE 2007a). Tortoise sign and density was greatest in Ivanpah 1 at the southern boundary of the project site and was less dense as the survey moved towards the Clark Mountains and Ivanpah 3.

Desert tortoises also occur along the ISEGS linear facilities (BSE 2007a). Surveys of the fiber optic route by EPG, Inc. (2008) (cited in BSE 2007a) confirmed that the entire route is within desert tortoise habitat. Protocol level surveys were not conducted. However, in surveying the fiber optic route EPG found three tortoise burrows and a tortoise shell.

Sensitive Habitats

Critical Habitat Designation and Desert Tortoise Recovery Plan

The USFWS desert tortoise recovery plan is the key strategy for recovery and delisting of this species (USFWS 1994). As part of the recovery strategy, the USFWS designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah (USFWS 1994). Critical habitat is a term defined by the federal Endangered Species Act that refers to areas designated by the USFWS that are essential for the conservation of threatened or endangered species and may require special management and protection

(USFWS 2005). The proposed project is not within designated critical habitat for any species, but is located approximately five miles north of the Ivanpah Critical Habitat Unit for desert tortoise, just north of the I-15 and Route 164 (Nipton Road) interchange.

The recovery plan (USFWS 1994) recommends implementation of reserve level protection of desert tortoise populations and habitat within Desert Wildlife Management Areas (DWMAs), while maintaining and protecting other sensitive species and ecosystem functions. DWMAs were developed to provide “reserve level” protection for the tortoise (USFWS 1994). Critical habitat was designated to identify areas containing key biological and physical attributes that are essential to the desert tortoise’s survival and conservation, such as space, food, water, nutrition, cover, shelter, and reproductive sites. As part of the actions needed to accomplish the recovery of this species, land management goals within all DWMAs include restriction of human activities that adversely affect desert tortoises (USFWS 1994).

The 1994 and draft 2008 Desert Tortoise Recovery Plans (USFWS 1994, 2008) emphasize aggressive management within “tortoise conservation areas” a term that encompasses critical habitat Desert Wildlife Management Areas, Areas of Critical Environmental Concern, and other conservation areas or easements managed for desert tortoises. While the recovery plans suggest that land managers focus the most aggressive recovery efforts toward tortoise conservation areas, they also emphasize that land managers should strive to limit the loss of desert tortoise habitat outside conservation areas as much as possible (USFWS 2008). The recovery plans recognize that activities occurring on lands beyond the boundaries of existing tortoise conservation areas can affect tortoise populations and the effectiveness of conservation actions occurring within the conservation area boundaries. While recovery efforts may be prioritized within existing desert tortoise conservation areas, populations, habitats, and actions outside of these areas may also contribute to, or hamper, recovery of the species.

CDFG Sensitive Natural Communities

In addition to special-status species, a search of CDFG’s California Natural Diversity Database (CNDDB) revealed the presence of a sensitive natural plant community in the project vicinity: mesquite bosque, a type of desert riparian forest dominated by mesquite (*Prosopis pubescens*). While there are several ephemeral washes of considerable size on the site, their associated vegetation is Mojave wash scrub, a common vegetation type. The nearest occurrence of mesquite bosque was recorded encircling Mesquite Lake, which is approximately five and a half miles north of the northern end of the project site (CNDDB 2009).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Methods and Threshold for Determining Significance

The determination of whether a project has a significant effect on biological resources is based on the best scientific and factual data that staff could review for the project. The significance of the activity is in large part dependent on the setting and the existing laws, ordinances, regulations, and standards (LORS) for the particular site. For example, disturbance during construction on a “brownfield” (i.e., developed) site may

not be significant, but this same activity on a “greenfield” (i.e., undeveloped) site may be significant because of the greater likelihood of sensitive biological resources in the area. Significance of impacts is generally determined by compliance with applicable LORS; however, because of the diversity of biological resource impacts, guidelines adopted by resource agencies may also be used.

According to CEQA guidelines, significant impacts to biological resources would occur if special-status species, such as state- or federal-listed species, state fully protected species, candidates for state or federal listing and/or Species of Special Concern, are likely to be impacted from the construction and/or operation of the proposed project. Interruption of species migration; reduction of native fish, wildlife and plant habitat; causing a fish or wildlife population to drop below self-sustaining levels; and disturbance of wetlands, marshes, riparian areas or other wildlife habitat would also be considered significant impacts. Harassment of a protected species, even if it does not result in the loss of habitat or reduction in population numbers, would still be considered a significant impact. Substantial degradation of the quality of the environment or environmental effects that are individually limited, but cumulatively considerable, would also be considered significant.

Direct and Indirect Impacts and Mitigation

The California Environmental Quality Act (CEQA) Guidelines define direct impacts as those impacts that result from the project and occur at the same time and place. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the ISEGS project.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the Mojave Desert ecosystem the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). In this analysis, an impact is considered temporary only if there is evidence to indicate that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years. Unless otherwise indicated, the acreages provided below for impacts are considered permanent.

Construction Impacts and Mitigation

Biological Resources Table 3 summarizes the acreage of permanent and temporary impacts as a result of the construction of ISEGS project features.

Biological Resources Table 3
Permanent and Temporary Disturbance of BLM Land

Facility	Acres
Permanent Disturbance	
Ivanpah 1	913.5
Ivanpah 2	920.7
Ivanpah 3	1,836.3
Substation	16.1
Administration/warehouse & parking	8.9
Kern River Gas Line Tap Station (100’ X 150’)	0.3
Southwest Gas Metering Set for Ivanpah 1 & 2 (20’ X 40’)	0.02
Groundwater Wells [10’ x 10’ area for 2 supply wells & 1 monitoring well]	0.01
Transmission Towers (8’ x 8’ area every 750 feet)	0.01
Linear Facilities (Colosseum Road, Gas, Water & Transmission Lines)	16.9
Subtotal – Permanent Disturbance	**3,712.7**
Temporary Disturbance	
Main Construction Laydown Area	260.0
Equipment Laydown and Wash Area	21.5
Contractor Trailers	20.1
Colosseum Road Improvement (100-ft wide construction corridor from Golf Club to Ivanpah 2, less asphalt road)	12.4
Southwest Gas construction laydown	5.0
Gas line (75' wide construction disturbance from tap to Ivanpah 3 for 2,011 feet)	2.9
Kern River Gas Line tap construction area (200’ x 200’)	0.9
Adjustment for Roads	(1.8)
Subtotal – Temporary Disturbance	**321.0**
Existing Transmission Line Corridor (within Construction Logistics Area)	38.9
Total ISEGS Project Land Use	**4,073**

Source: CH2M Hill 2009f

Additional land disturbance beyond the project site boundaries would be associated with the gas line tap station and its construction (1.26 acres), the gas line and its construction from the tap station to the edge of Ivanpah 3 (2.30 acres), the new dirt road to the mining claim (0.41 acres), and construction and paving of a portion of Colosseum Road from the Primm Valley Golf Club to the project (9.69 acres) (CH2M Hill 2009q).

Impacts to Plant Communities

The revised ISEGS project reflects a Low Impact Development (LID) approach and the applicant has expressed their intent to minimize disturbance of vegetation during construction and operations (CH2M Hill 2009f). However, the applicant has provided only a conceptual scenario of how vegetation would be treated during construction and operation. Clearing and grubbing, where shrubs and roots are removed, would be

performed for permanent access roads in each of the three ISEGS units, in the power blocks, and in common areas where the existing topography requires modification to provide access for installation equipment and materials during construction (CH2M Hill 2009f).

Outside of access roads and maintenance tracks, vegetation would be cut to 12-18 inches to provide clearance for heliostat function, but would leave the root structures intact (CH2M Hill 2009q). The vegetation would be cut with a flail type mower mounted on a low-ground pressure tractor. Vegetation would be maintained at 12-18 inches in the vicinity of heliostats for the duration of the project. The applicant has not provided acreage estimates of what areas would be subject to this vegetation clearing during project construction and operation, but estimated that 412,600 cubic yards of vegetation would be cut and mulched (BSE 2007a, CH2M Hill 2009f).

In an attempt to assess the impacts of mowing the applicant conducted some preliminary studies at the project site (CH2M Hill 2009g). The researchers clipped seven species (burrobush, creosote bush, cheese bush, pencil cactus, silver cholla, Nevada Mormon tea, and Mojave yucca) at the project site in March 2009 and evaluated them for regrowth and vigor in April 2009. The 35 clipped plants showed vigorous resprouting following mowing (CH2M Hill 2009g). The results of this study indicated that mowed plants will initially respond by re-sprouting from the base, but staff does not believe that this preliminary research provides useful information about the long-term effects of mowing on the project area's plant communities. Little research has been done on the effects of mowing on native desert plant species, but extensive studies have been conducted on general plant responses to short- and long-term mowing in weed research. Mowing suppresses vegetation through carbohydrate starvation, reduces its water use (which is likely to give a competitive edge to annual grasses between shrubs) and discourages reproduction by seed. Frequent mowing can stimulate branch development in some species, and eventually depletes the plants' carbohydrate reserve if done often enough (Radosevich et al. 1997). Sprouting is a common morphological response and, when repeated, results in a prostrate, turf-like structure in adapted species. Mowing every few weeks for at least one or two seasons may be all that is required to suppress perennial vegetation (Radosevich et al. 1997).

Mowing is likely to promote the proliferation of non-native invasive weeds, in particular cheat grass and red brome, two species of particular concern at the project site. These plants are of low-stature and suppressing the surrounding taller native vegetation would give these lower-growing weeds a competitive edge. The native perennial shrubs would be weakened and diminished in size, utilizing less moisture and nutrients, and increasing sunlight available to the weeds between shrubs.

In addition to the effects of mowing, mulching of mowed vegetation could change the characteristics of the soils and the plant communities in the vicinity of heliostats. Over time the addition of organic matter such as mulch in the vicinity of the heliostats would likely bring about changes to the composition of the soil (soil texture and chemistry), resulting in a decrease in native species adapted to sandy soils and favoring non-native species better suited to loamy soils.

Cheat grass, red brome, and Mediterranean grass are already present in the project area and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of non-native annual grasses such as these have dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not an important part of the Mojave Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either. The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire, and the effects to these poor-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Burned creosote and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986).

Vegetation that is not directly impacted by clearing or pruning would be indirectly impacted by shading. Shading from heliostats would reduce the amount of sunlight available for photosynthesis, eliminating longer wavelengths of the visible light spectrum. This would likely have the most dramatic affect on crassulacean acid metabolism (CAM) plants, desert-adapted plants like Mohave yucca, barrel cactus, and cholla. Pollinators that have a mutualistic relationship with CAM plants, like yucca and yucca moths, would also be affected. Habitat fragmentation would also adversely affect pollinator activity and therefore potentially affect gene flow among the plants that remain. Shading would reduce transpiration due to reduced in photosynthetic rates, increasing soil moisture, and resulting in changes to soil nutrient availability and microbial communities.

Other indirect effects on plant communities during operation include soil compaction, changes to the soil structure by use of dust suppressants, and changes in the distribution of precipitation falling on the solar fields. During precipitation events heliostats would be placed in the flat horizontal position. Precipitation runoff would concentrate along the dripline below the heliostats rather than being uniformly distributed, changing the soil water content. Mirror wash water would similarly concentrate along the drip line below the heliostats, causing minor erosion of the soil at the drip line and promoting growth of weeds.

Construction and operation of the ISEGS project would substantially change the structure and species composition of the plant communities over the project lifetime. Conditions at the site would favor more disturbance-tolerant and shade tolerant species, and the site would be vulnerable to invasion by non-native plants such as cheat grass and red brome. Shrubs and cacti that are frequently mowed, shaded, or subject to increased levels of water would eventually die and be replaced by short-lived species like cheesebush and rabbitbrush and invasive weeds.

Energy Commission staff considers the direct and indirect impacts to native plant communities from construction and operation of the ISEGS project to be significant. Staff's proposed Condition of Certification **BIO-13**, the Weed Management Plan, would help prevent the spread of non-native and invasive plant species on the ISEGS site.

Condition of Certification **BIO-14**, the Closure, Revegetation and Rehabilitation Plan, provides guidelines for minimizing impacts to project area plant communities, and for revegetating project area plant communities affected by construction.

Revegetation/Reclamation Plan

The applicant submitted their first draft of a Closure, Revegetation, and Rehabilitation Plan (Plan) in August 2008 (CH2M Hill 2008b). The Plan described procedures and practices for salvage and storage of succulents (cacti and yuccas) and revegetation of sites temporarily affected during construction. The Plan also included conceptual guidance for revegetation and rehabilitation efforts after closure and decommissioning at the end of the 50-year life of the project, or earlier in the event of an unplanned closure.

Staff provided comments and requests for major revisions to that plan (BLM 2009b), and the applicant provided a revised plan on June 30, 2009 (CH2M Hill 2009q). Staff reviewed the revised Plan and concluded that it still does not provide adequate information to successfully guide the salvage, revegetation, and rehabilitation efforts required to satisfy BLM's requirements. **Biological Resources Appendix A** details the issues that need to be addressed, as described in staff's proposed Condition of Certification **BIO-14**.

Impacts to Special-Status Plants

The following impact assessment and recommended conditions of certification represent Energy Commission staff's analysis and conclusions, not those of BLM staff. Energy Commission staff have concluded that construction of the ISEGS project would directly impact eight special-status plant species, and that impacts to five of these — Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow — would be considered significant under CEQA guidelines. Energy Commission staff considers project impacts to three of the eight special-status —small-flowered androstephium, Utah vine milkweed, and desert portulaca—to be less than significant. In the case of small-flowered androstephium, many new occurrences[1] of this species have been found recently, and it has a larger total number of documented occurrences. Utah vine milkweed, Utah mortonia, and desert portulaca are ranked as "watch list" by CNPS and CDFG's CNDDB and as such generally considered more regionally common than plants on higher priority lists.

[1] An occurrence is defined by CDFG's CNDDB as individuals of a particular species occurring within one-quarter mile of each other. Staff discusses the status of the special-status plants found within the project footprint in terms of occurrences rather than numbers of individual plants. Due to incomplete data, contributors to the CNDDB sometimes do not note the number of individuals when reporting CNDDB occurrences and herbaria records, and the occurrence size in terms of individual plants cannot be ascertained.

Energy Commission staff's conclusion of CEQA significance was based on an analysis of impacts to Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow in light of the following variables:

- Proportion of occurrences that may be lost and indirectly affected by the project relative to the documented occurrences and distribution of these species in California;
- Occurrence size;
- Habitat quality;
- Cumulative effects and indirect threats to remaining occurrences; and
- Peripheral population status.

Proportion of Occurrences Affected and Occurrence Size:

A substantial portion of the Ivanpah Valley documented occurrences of Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow would be directly, indirectly, and cumulatively impacted by the project. Plants and other sessile organisms are particularly vulnerable to the effects of habitat fragmentation; small fragments of habitat can only support small populations and are more vulnerable to extinction. Even minor fluctuations in climate can be catastrophic in a small fragmented population. For Mojave milkweed, desert pincushion, nine-awned pappus grass, and Parish's club-cholla, the California populations are already geographically marginal relative to their core populations outside the state. For most of these species, these Ivanpah Valley populations represent a substantial portion of their total documented range regionally and within California. Loss of a substantial portion of these populations makes them more vulnerable to extirpation within the state, especially for Mojave milkweed; its California distribution outside of the Ivanpah Valley is restricted to only two other observations and a handful of historic herbarium collections. **Biological Resources Figure 1** illustrates the restricted range of these species. **Biological Resources Appendix A** summarizes the percentage of statewide documented occurrences for special-status plant species in the ISEGS project area for which impacts are considered significant by Energy Commission staff under CEQA guidelines.

Rusby's desert-mallow is a highly restricted endemic, found only in California, with a range sufficiently small and represented by so few occurrences that the ISEGS impact in the Ivanpah Valley is significant as that term is defined by CEQA. Its total documented global distribution is currently limited to fewer than 30 small occurrences in the Panamint, Clark, and Kingston ranges, including those in the project area (CNDDB 2009). Within its range, Rusby's desert-mallow is restricted to gravelly slopes and sandy washes, typically on carbonate and limestone substrates. **Biological Resources Figure 1** illustrates the restricted range of these species, and their relatively few populations, making them especially vulnerable to extirpation from the state.

A substantial portion of the documented occurrences for the five species of concern (Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow) is attributed to the project area. Of the remaining documented occurrences, many are threatened by livestock grazing, transmission line

and access road maintenance, and non-native plants (CNDDB 2009). All of these species have a highly restricted range in California, and all are known from fewer than 30 documented occurrences (including those found in the project area). Numerous new occurrences of small-flowered androstephium (also a CNPS List 2 species) have been found in recent years during surveys conducted for other recent development projects. For this reason (combined with a larger total number of documented occurrences), the project effects to this species were not considered significant in a CEQA context.

Energy Commission staff has concluded that adequate information on spring-blooming special-status plants is available to assess the proportion of special-status plant occurrences lost and indirectly affected by the project relative to the total number of documented occurrences in California. However, some summer blooming special-status plants may have been missed by the applicant's surveys (CNPS 2009b, Andre 2009, Sanders 2009) and this concern has been addressed in Energy Commission staff's Condition of Certification **BIO-18**.

Habitat Quality

Staff notes that the habitat in the project area that supports the special-status species is of particularly high quality in terms of species richness and diversity, including rich cactus and succulent diversity, creosote rings, micro-topographic diversity (upon which several of the special-status species depend), and currently contains relatively few non-native plants. Additionally, the project occurrences for some of the affected species (such as the nine-awned pappus grass) are robust in number, relative to the smaller (and potentially less viable or defensible) populations outside of the project area.

Threats

Threats to remaining CNDDB occurrences outside the project area include grazing, transmission projects, ORV use, and non-native plants (CNDDB 2009). Some species have occurrences in the Mojave National Preserve that are not subject to these threats. While the project area contains several power lines and access roads, there appears to have been no vegetation maintenance, very little cross-country ORV damage, and what little grazing has occurred has apparently not noticeably degraded special-status plant habitat quality.

Compounding the overall threats to remaining populations are the cumulative effects of present and reasonably anticipated future energy projects and infrastructure development. In addition to the direct reduction and fragmentation of the Ivanpah Valley populations of these species described above, the project contributes to the cumulative, interactive, and synergistic impacts of multiple indirect threats, including the potential spread of non-native plants and an increased risk of fire. The recent push for renewable energy development on private and public lands in the Mojave Desert region has put many of its special-status plants under far more immediate threat of local extinctions. Accordingly, significant impacts to special-status plant species, particularly Mojave milkweed, could contribute to an increased need for state listing if not adequately mitigated. **Biological Resources Tables 6** and **7** provide a list of projects considered in the cumulative impacts analysis. Given the project's location on a large portion of the Ivanpah Valley, and in particular, the bajada and alluvial fans that support the special-status plants, it is reasonable to conclude that a substantial portion of the suitable

habitat for these plants would be affected, and there is an increased threat of local extinction for the Ivanpah Valley proportion of these species' ranges.

Status as Peripheral Populations

California occupies an important biogeographic location and zone of ecological transition on the Pacific coast of North America, and so its floristic diversity includes many widespread taxa on the edge of their range. This includes all of the CNPS List 2 plants occurring in the project area which represent the western limit of those species' ranges—geographically marginal, peripheral populations on the frontiers of their ranges. Peripheral populations can be completely isolated from their core populations, or they can occur in closer proximity to other marginal populations.

Peripheral plant populations are at greater risk of extirpation because they occur on the edge of a species' range. Relative to core populations, peripheral populations tend to be smaller, more isolated, and more genetically and ecologically divergent than central populations have more variable densities, and are ecologically distinctive and/or occur in marginal habitats (Leppig & White 2006). The biological and intrinsic values of these peripheral populations are well documented; maintenance of genetic variation contributes to long-term species survival and preservation of local genetic diversity (Channel and Lomolino 2000).

CEQA Significance and CNPS Status

Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow are not listed under the California Endangered Species Act, but that does not diminish the significance of their loss. Plants on the CNPS List 1A, 1B and 2 meet the definitions of Sections 2062 and 2067 (CESA) of the California Fish and Game Code, and are eligible for state listing (CNPS 2001a). Furthermore, even if a species is not a California or federally listed species it still may be considered endangered, rare or threatened, if the species can be shown to meet the criteria in Section 15380 of the CEQA Guidelines. "CEQA Section 15380 provides that a plant or animal species may be treated as 'rare or endangered' even if not on one of the official lists if, for example, it is likely to become endangered in the foreseeable future." Plants appearing on CNPS List 1B or 2 are considered to meet CEQA's Section 15380 criteria, and effects to these species are generally considered "significant." The applicant has acknowledged and cited this same CEQA section in their Application for Certification (BSE 2007a page 5.2-41). This is particularly true for the S1-ranked Mojave milkweed.

CNPS List 4 species are plants of limited distribution or infrequent throughout a broader area of California, and their vulnerability or susceptibility to threat appears low at this time. In the project area, CNPS List 4 plants found on the project site include desert portulaca, Utah vine milkweed, and Utah mortonia. Very few CNPS List 4 plants meet the definition for state listing (CNPS 2001a). Nevertheless, many are significant locally if, for example, they occur at the periphery of a species' range, exhibit unusual morphology, or occur in atypical habitats, and should be evaluated in a CEQA analysis.

The applicant concludes in the AFC (BSE 2007a page 5.2-45) that CNPS List 2 plants found onsite "…meet the definition of a rare plant pursuant to CEQA. Impacts to these special-status plants are significant and mitigation is required." but more recently the

applicant has suggested that impacts to CNPS List 2 plants are not significant because the plants range into Nevada (CH2M Hill 2009a). However, the range of these List 2 taxa extend into California to such a sufficiently small degree that they are considered rare here. CNPS List 2 plants are indeed considered rare, threatened, or endangered in California but more common outside of California (CNPS 2001a).

CEQA Guidelines section 15065 lists certain conditions which are considered to be mandatory findings of significance. One such condition is if the project has the potential to substantially degrade the quality of the environment, and substantially reduce the number or restrict the range of an endangered, rare, or threatened species. Section 15380 of the CEQA Guidelines defines the terms "species," "endangered," "threatened" and "rare". In general, plants appearing on CNPS List 1A, 1B, or 2 are considered to meet CEQA's Section 15380 criteria, and effects to these species are considered "significant." As such, the Energy Commission and other state agencies such as CDFG and the California Department of Water Resources, have a history of requiring mitigation for impacts to these special-status plants.

Article 9 of CEQA (Section 15125 [c]) states: "Knowledge of the regional setting is critical to the assessment of environmental impacts. Special emphasis should be placed on environmental resources that are rare or unique to that region and would be affected by the project."

The joint CNPS Rare Plant Program and CDFG's CNDDB Plant Status Review Process for CNPS List and CDFG Special Plants List status is a rigorous review process that evaluates existing literature, reviews herbarium collections, and communicates with experts before making a recommendation for listing. A summary of information on the candidate is reviewed by a network of over 500 California botanists, representing state and federal agencies, environmental consulting firms, academic institutions, CNPS and other conservation organizations. All of the CNPS List 1B and 2 plants in the project area are also included in the CDFG Special Plants List (CDFG 2009) and are tracked by the CDFG's CNDDB. The *CNPS Inventory* has been a broadly recognized and accepted source of science-based information on the rarity, endangerment, and distribution of California special-status plants since its first edition in 1974. The Energy Commission's regulations reference CNPS Lists in the definition of "species of special concern" (California Code of Regulations, Title 20, section 1702 (q) and (v)), and the BLM has a policy of designating all CNPS List 1B plants, unless specifically excluded by the BLM State Director, as BLM Sensitive (BLM 2009).

Avoidance and Minimization Measures

Energy Commission staff evaluated the potential for minimizing impacts to special-status plant species with by avoiding the highest densities of special-status plant concentrations. The applicant's Low Impact Development (LID) approach has substantially reduced the effects of the solar fields on soil and water resources. However, Energy Commission staff does not consider preservation of special-status plants by maintaining vegetation between the heliostats as a feasible avoidance measure. The following mitigation options were considered but ultimately determined by Energy Commission staff to be infeasible for the reasons described below.

Mitigation Measures Considered but Rejected

Acquisition and Protection of Populations on Private Lands. Energy Commission staff's analysis of mitigation of special-status plant species mitigation through acquisition of private lands indicated few opportunities for acquisition of existing occurrences. Energy Commission staff examined the mapped CNDDB distribution of the special-status plant species and added land ownership and conservation lands map overlays available in CDFG's Biogeographic Information Observation System (BIOS, www.bios.cdfg.ca.gov). Available ownership data in CNDDB text records was also examined. The vast majority of documented occurrences are located on BLM or National Park Service (NPS) land. A few are owned by the State Lands Commission, and several were owned by a combination of these agencies. In addition, several parcels were listed as unknown ownership, and for those, Energy Commission staff contacted the San Bernardino County Assessor's Office to inquire whether they are privately owned, but was unsuccessful in obtaining additional ownership information. Only two occurrences (ranked poor quality) of one species, Rusby's desert-mallow, were listed as partial private ownership; however, it is unlikely that this land would be suitable for acquisition as mitigation because it appears to be a transmission line right-of-way owned by Southern California Edison. Essentially all occupied habitat (i.e., habitat containing special-status plants) occurs on federal land, primarily BLM and NPS land, and no suitable private parcels were found that could be placed under a conservation easement or other deed restrictions to prevent future development.

Protection and Enhancement of Populations on Public Lands. Special-status plant occurrences on NPS lands are considered to be adequately protected and thus offer no potential for offsetting project losses. In recognition that some of the occurrences on BLM land are subject to the effects of grazing, ORV, transmission projects, mining (CNDDB 2009), and more currently, by potential future energy projects, Energy Commission staff investigated the possibility of off-setting project losses by placing land use restrictions on or enhancing BLM lands which contained one or more of these special-status plants and which were not currently protected as part of the Mojave Preserve or within a Desert Wildlife Management Area (DWMA). However, such a proposed action (land use changes potentially affecting other uses of the land) would trigger a requirement for a separate NEPA analysis. Consequently, this mitigation option would not be timely for this project as it would take considerable time and effort before it was even determined whether such an option was feasible. As summarized in the discussion of enhancements for desert tortoise mitigation: BLM cannot make pre-decisional firm commitments to implement specific actions such as fencing, altering grazing allotments, burro removal, or habitat restoration without conducting a NEPA analysis and providing full public disclosure on the effects of those actions. However, Energy Commission staff and CDFG cannot defer mitigation requirements for compliance with the California Endangered Species Act to a "yet to be completed" NEPA document. A CEQA review might also be needed for some of these enhancement measures.

Transplantation. The general consensus in the scientific community is that transplantation is not a viable strategy for special-status plant mitigation (Howald 1996). A study by CDFG (Fiedler 1991) found that, even under optimum conditions, transplantation was not effective in 85 percent of cases studied. CNPS has an official

policy opposing transplantation (CNPS 1998) as well as one on the appropriate use of ex-situ conservation techniques (CNPS 1992), which summarize numerous reasons why these techniques fail as a mitigation method. Successful transplantation requires information about micro-habitat requirements, reproductive biology, essential pollinators, soil conditions and soil organisms, community relationships, and other critical biological characteristics. This information is typically lacking for most species, and is not available for the special-status plant species impacted by the project. Re-establishment attempts are therefore generally considered experimental in nature rather than an acceptable mitigation practice based on scientific principles and tested methods. Sometimes efforts show early promise but lose viability or decline after the first few years due to one or more of the many factors listed above. For example, although reseeding of Rusby's desert-mallow has been conducted as part of past mitigation efforts and succeed in the short-term, long-term viability of re-established occurrences has yet to be demonstrated (Hiatt et al. 1995, Smith, 2008). Additionally, establishment in the wild of plant material stored ex-situ could result in genetic contamination of existing wild populations of the same or related taxa.

Energy Commission Staff's Recommended Conceptual Avoidance Approach

Energy Commission staff has concluded that reconfiguration of the project footprint within areas that support the highest density and diversity of special-status plants could substantially reduce impacts to special-status plant species. Energy Commission staff has made no recommendations as to the specific reconfiguration that might occur within these areas, but has assumed that some flexibility is available in the alignment of the gas pipeline and in the location of project features such as staging areas within the Construction Logistics Area. Energy Commission staff has also assumed that approximately 365 acres within the 4073-acre footprint is potentially available to establish special-status plant protection areas. As discussed earlier in the Project Description subsection, the project footprint has expanded twice since the ISEGS project application was submitted. The most recent expansion was 365 acres, from 3,700 to 4,065 acres, a result of the applicant proposing the addition of stormwater detention ponds. These ponds have since been eliminated from the applicant's proposal without any adjustment downward in the project area. Energy Commission staff has therefore assumed that the 365 acres gained when the ponds were eliminated could be applied to protecting special-status plants rather than expanding the number of heliostats in the northernmost portion of ISEGS 3 and ISEGS 1, areas that support many special-status plants.

Biological Resources Figure 2 highlights the areas where a diversity of special-status plants occur at particularly high densities, and where avoidance would achieve the greatest possible benefit while minimizing the area of impacts to project operations. In delineating these high density special-status plant areas particular attention was given to protecting Rusby's desert-mallow, desert pincushion, and Mojave milkweed because these species are the rarest and most restricted in their occurrence. These occurrences are shown in **Biological Resources Figure 2**

Biological Resources Figure 2 is color-coded by species, and the point size reflects the size of the locality in terms of the numbers of individual plants. Areas A, B, and C on this figure include:

- Area A: Northernmost Portion of ISEGS 3 and ISEGS 1:
- Area B: Construction Logistics Area
- Area C: Gas Pipeline

Staff's recommended mitigation approach is to protect at least 75% of the individuals of each of the five special-status plant species within the project area (as mapped in Figure 5-3 of the applicant's final botanical survey report [CH2M Hill 2008x]). Staff has concluded that this goal is feasible for desert pincushion, nine-awned pappus grass, and Parish's club cholla by maximizing impact avoidance within the areas of high plant density and diversity as shown in **Biological Resources Figure 2**. This level of protection may not be possible for Rusby's desert-mallow and Mojave milkweed because of the scattered distribution of these species in the project area.

Energy Commission staff's proposed Condition of Certification **BIO-18** (Special-Status Plant Impact Avoidance and Minimization) requires the applicant to minimize disturbance to the extent feasible as described above. This condition also requires development of a special-status plant protection and monitoring plan to be implemented for the life of the project and other measures to minimize impacts to protected special-status plant populations.

Requiring special protection and management of special-status plant occurrences on BLM lands is not a feasible mitigation measure for the ISEGS project, as discussed above. However, Energy Commission staff considers survey efforts and mapping of special-status plant occurrences on acquisition lands to have some value for conservation planning and management purposes. Most of the 3.3 million acres within the NEMO boundaries have not been surveyed for special-status plant species, including those on other public lands. Having information about the location and numbers of special-status plant species would provide useful data for planning actions on all BLM lands within the NEMO, and could also inform management actions for special-status plants occurring within the Mojave National Preserve, DWMAs, or other public lands. Energy Commission staff's proposed Condition of Certification **BIO-18** requires surveys for Rusby's desert-mallow and Mojave milkweed on all lands that will be acquired as part of the desert tortoise compensatory mitigation requirements (Condition of Certification **BIO-17**). Similar surveys would be required desert pincushion, nine-awned pappus grass, and Parish's club-cholla for each of those species that did not meet the 75 percent on-site avoidance goal. The goal of the surveys would be to identify at least the number of occurrences on off-site lands as were impacted by the ISEGS project. If this goal is not met by surveys on proposed acquisition lands, Condition of Certification **BIO-18** requires additional surveys on suitable habitat on BLM lands within the Mojave National Preserve and DWMAs or other public lands until the same number of occurrences of each species that were impacted are identified. This requirement does not serve to reduce the impacts of the ISEGS project to less-than-significant levels, but provides information that might help inform

future siting to avoid additional impacts from other development, and could thus help offset the cumulative impacts of the ISEGS project.

Indirect Effects

Staff has only limited information to assess indirect impacts to special-status plants adjacent to the project boundary because there are no survey data available for this area. Floristic surveys were originally conducted in 2007 to cover the 250-foot buffer zone outside the project footprint, but in 2008 the applicant proposed substantial changes to the ISEGS project and expanded the project into this 250-foot buffer zone. Given the distribution of special-status plants within the project footprint and adjacent habitat characteristics staff is assuming that these same species are likely to occur within the buffer zone, although the specific location and number of these plants is unknown. The discussion below is therefore a conceptual overview of potential indirect impacts to special-status plants.

Indirect effects to special-status plants outside the project boundary include erosion/sedimentation of plants or their seed bank (particularly downslope any disturbed soils); the spread of noxious weeds from the solar fields into the surrounding habitat; changes in the hydrology from alterations in the drainage patterns of the site (several special-status plant species are associated with desert washes); greater than normal dust levels, the effects of herbicide drift on special-status plants and their pollinators; and an increased risk of fire. Even activities as seemingly harmless as dumping or spreading clippings from mowing areas infested by weeds is likely to result in the inadvertent introduction and spread of invasive plants into rare plant populations.

These indirect impacts could extend beyond the immediate vicinity of the project area. Disturbance of the soil's surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian (wind-borne) transport of dust and sand can result in the degradation of soil and vegetation over a wide area (Okin et al. 2001). Aeolian transport and dust, sand, and litter are the primary mechanisms of degradation, killing plants by burial and abrasion, interrupting natural processes of nutrient accumulation, and allowing the loss of soil resources.

Non-native forms may be introduced or existing weeds spread due to construction and operation of ISEGS. Many invasive non-native species are adapted to and promoted by soil disturbance, and seeds are commonly transported on vehicles and by wind and water. Exotics can out-compete native species because of minimal water requirements, high germination potential and high seed production (Beatley 1966) and can become locally dominant, representing a serious threat to native desert ecosystems (Abella et al. 2008). The ISEGS project could adversely affect special-status plant occurrences near the project area by the increase and spread of non-native plant species. Soil disturbance from construction activity often renders habitat vulnerable to invasion by non-native species (Lathrop & Archibald 1980). Construction activities have the potential to indirectly affect botanical resources through the spread of weeds already present in the construction footprint to currently uninfested areas, and by the accidental introduction of new weed species from contaminated equipment and straw (used for erosion control). The spread of invasive plants is a major threat to biological resources

in the Mojave Desert because non-native plants can displace native plants (and the wildlife that depend on them), increase the threat of wildfire (particularly cheat grass), alter the habitat structure and ecological function of wetland, riparian, and desert wash communities, and invade threaten special-status plant occurrences and habitat (Zouhar et al 2008; Lovich 1998; Lovich et al 1997, Lovich et al 1996).

Implementation of Energy Commission staff's proposed Conditions of Certification **BIO-11** (Impact Avoidance and Best Management Practices) and BIO-13 (Weed Management Plan) could potentially avoid, minimize and compensate for these indirect impacts to special-status plant species on/near the ISEGS site. Energy Commission staff's proposed Condition of Certification **BIO-18** requires pre-construction surveys within the 250-foot buffer beyond the project fenceline, and requires monitoring and protection measures for protected special-status plant populations to minimize indirect impacts.

Conclusion

Uncertainty remains as to what level of avoidance could be achieved to protect special-status plants. The applicant stated at the July 31, 2009 staff workshop that they cannot yet commit to specific avoidance areas because site-specific heliostat layouts have not yet been developed. During that workshop the applicant also indicated a willingness to work with staff to discuss specific avoidance areas and reduce impacts to the extent feasible.

Given the uncertainties as to extent of special-status plant protection that might be feasible, Energy Commission staff has concluded that implementation of proposed Condition of Certification **BIO-18** would reduce impacts to desert pincushion, nine-awned pappus grass, and Parish's club-cholla to less-than-significant levels if the protection goals described above were achieved. The impacts to Mojave milkweed cannot be sufficiently reduced by avoidance in the three areas described above because it is so widely distributed throughout the site. The impacts to Rusby's desert-mallow would also remain significant in a CEQA context because construction would still eliminate a substantial portion of its global population even if the majority of individuals are protected on site.

Staff has also anticipated that the use of polymer-based chemicals for fugitive dust control will require product selection and application methods that will not adversely impact these sensitive plant species within the avoidance areas or impact site vegetation overall. Staff believes it is impractical to use water for dust control after site grading is completed over such a broad area, considering the rapid evaporation rate in the desert environment and limitations in water supply. Therefore, Air Quality Conditions of Certification **AQ-SC3 and AQ-SC-7** and **Soil and Water-1** would require selection and application of chemical dust suppressants that would not adversely affect vegetation.

Impacts/Mitigation to Wildlife - Overview

Vegetation clearing and grading associated with ISEGS construction would directly affect wildlife by removal and crushing of shrubs and herbaceous vegetation, resulting in loss and fragmentation of cover, breeding and foraging habitat. Construction and

operation of ISEGS could also result in wildlife being crushed, entombed in dens or burrows, and colliding with vehicles and power line conductors or towers. In addition, wildlife could experience increased predation levels from ravens and other predators attracted to the project site and could be disturbed by increased levels of noise and activity. These impacts can be reduced with avoidance and minimization measures described in staff's proposed Conditions of Certification **BIO-1** through **BIO-7** and in other conditions of certification. Impacts and mitigation measures for special-status wildlife species are discussed below.

Migratory/Special-Status Bird Species

Mojave creosote bush scrub at the power plant site provides foraging, cover, and/or breeding habitat for migratory birds, including a number of special-status bird species confirmed to be present at the site (golden eagle, burrowing owl, loggerhead shrike, Crissal thrasher and Brewer's sparrow). Power plant construction would eliminate nesting habitat and result in direct and cumulative impacts to these species due to habitat loss or injury/fatality of individuals. Potential cumulative impacts to these species are discussed in more detail later in this section.

The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503. The applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds that have been incorporated into staff's Conditions of Certification **BIO-11** (Impact Avoidance and Best Management Practices), **BIO-15** (Pre-construction Nest Surveys) and **BIO-16** (Burrowing Owl Avoidance and Impact Minimization Measures). Implementation of staff's recommended conditions of certification would avoid direct impacts to nests, eggs, or young of migratory birds, and would minimize the impacts of construction disturbance to nesting birds to less-than-significant levels.

Loss of nesting and foraging habitat for these special-status bird species would adversely affect populations of these species within the Ivanpah Valley. As discussed in the cumulative impact subsection, staff considers the ISEGS project to be a substantial contributor to the cumulative loss of Ivanpah Valley's biological resources, including these special-status bird species. Staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan, could offset the loss of habitat for these species and reduce the impact to less-than-significant.

Impacts to Special-Status Mammals

American Badger (Taxidea taxus)

American badgers were detected on the ISEGS site, and the site includes suitable foraging and denning habitat for this species. The American badger is protected under Title 14, California Code of Regulations (sections 670.2 and 670.5), and potential impacts to individuals of this species must be mitigated to less-than-significant levels. Construction of the ISEGS project could kill or injure American badgers by crushing with heavy equipment, or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. Condition of Certification **BIO-11** requires that concurrent with the desert tortoise clearance survey, a qualified biologist would perform a preconstruction survey for badger dens in the project area, including

areas within 250 feet of all project facilities, utility corridors, and access roads. If badgers are detected within the fenced ISEGS project site during desert tortoise clearance surveys, the applicant shall develop and implement trapping and relocation plan in consultation with staff and CDFG.

The ISEGS project would permanently remove approximately 4,073 acres of foraging and denning habitat for American badgers and would fragment and reduce the value of foraging and denning habitat adjacent to the project site. This habitat loss and degradation could adversely affect American badger populations within the Ivanpah Valley. As discussed in the cumulative impact subsection, staff considers the ISEGS project to be a substantial contributor to the cumulative loss of Ivanpah Valley's biological resources, including American badgers. Staff's proposed Condition of Certification **BIO-17**, the compensatory mitigation plan, could offset the loss of habitat for this species and reduce the impact to less-than-significant.

Nelson's Bighorn Sheep (Ovis canadensis nelsoni)

Nelson's bighorn sheep are known to occur in the nearby Clark Mountains, and could use the ISEGS project site as foraging habitat and possibly as a migratory corridor (CDFG 2008). The project could reduce the availability of seasonal forage for Nelson's bighorn sheep. The proposed ISEGS project boundaries and security fencing were shifted approximately 130 to 340 feet away from adjacent hills to provide a wildlife corridor (BSE 2007a p. 5.2-54). The applicant acknowledges that Nelson's bighorn sheep could occur in the project area (CH2M Hill 2008a). However, the AFC (BSE 2007a) does not provide sufficient project-specific information on use of the site by Nelson's bighorn sheep to identify specific areas that might provide foraging habitat or movement corridors, nor are studies available detailing use of the Ivanpah Valley by bighorn sheep.

Based on consultation with experts and review of the literature (Wehausen 2009, Jaeger 2009, Jaeger 1994) staff has concluded that construction and operation of the ISEGS project could reduce foraging opportunities for bighorn on the bajada. The project could also narrow the width of movement corridors between Clark Mountain and the Stateline Hills for this species. These direct and indirect impacts would contribute to the cumulative impacts to bighorn sheep in the eastern Mojave Desert. Throughout their range bighorn sheep have suffered considerable population declines in the past 140 years, and metapopulations have been fragmented by roads and other barriers, with a resulting decline in genetic diversity (Bleich et al. 1996, Epps et al. 2005). Disease, sometimes brought about by contacts with domestic sheep, drought and predation interacting with other anthropogenic factors may also have contributed to declines in bighorn sheep populations (Wehausen 2005). Loss of surface water sources may also diminish the viability of existing populations (Wehausen 2005).

Implementation of staff's proposed Condition of Certification **BIO-19** would compensate for the project's contributions to cumulative impacts to bighorn sheep by creation of a new water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated wilderness. This artificial water source would attract bighorn sheep and expand foraging opportunities in the lower elevations of the mountains to replace areas of the bajada lost to ISEGS facilities and the zone of disturbance on the

north. This water source would also serve to attract the bighorn during seasonal movements and keep them in the mountainous portion of the wildlife corridor.

The CDFG (CDFG 2008) and others (SCBHS 2009, DOW 2008, 2009a) expressed concerns regarding potential impacts of the ISEGS wells and groundwater pumping on springs used by bighorn sheep. The proposed project includes the installation of two groundwater wells east of Ivanpah 2. Water consumption for all three phases of all three projects is estimated at less than 100 acre-feet/year for the 50-year life of the project (BSE 2007a p. 5.5-17). This level of pumping, combined with all other projects, is not expected to substantially affect overall groundwater recharge in the Ivanpah Valley (BSE 2007a p. 5.15-20). The **Soil & Water** section provides an analysis of this issue, and concludes that the seeps and springs located in the Clark Mountain are ephemeral and located upgradient and over three miles away from the project's proposed pumping wells. The seeps and springs derive their water from precipitation further upgradient in the Clark Mountains and beyond the potential reach of any cone of depression that would result from the project's proposed groundwater pumping. Staff has therefore concluded that the project is unlikely to affect springs and big horn sheep that use these water sources.

Impacts to Special-Status Reptiles

Banded Gila Monster (Heloderma suspectum cinctum)

Gila monsters were not detected during the 2007/2008 surveys, but this species is difficult to detect and cannot be assumed to be absent based on the absence of observations. If Gila monsters are present in the ISEGS project area they may be harmed during clearing, grading and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Condition of Certification **BIO-11** requires that concurrent with the desert tortoise clearance survey, a biologist perform a preconstruction survey for Gila monsters in the project area, and implement appropriate impact avoidance and minimization measures if detected.

Construction of the ISEGS project would eliminate 4,073 acres that might provide cover, foraging, and breeding habitat for Gila monsters. Condition of Certification **BIO-17**, the compensatory mitigation plan, could offset the loss of habitat for this species and reduce the impact to less-than-significant.

Desert Tortoise (Gopherus agassizii)

Direct Impacts

During construction of the ISEGS project desert tortoises may be harmed during clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, and

injury or mortality from encounters with workers' or visitors' pets. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may take shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved.

The applicant has recommended impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoise out of construction areas, relocating/ translocating the resident desert tortoise from the ISEGS site, reducing construction traffic and speed limits to reduce the incidence of road kills and worker training programs.

Staff has incorporated these recommendations into conditions of certification. These include Conditions of Certification **BIO-1** through **BIO-6**, which apply to protection of desert tortoise and other biological resources in and near the ISEGS project area, and Conditions of Certification **BIO-8** through **11**, which are specific to desert tortoise.

Staff's proposed Condition of Certification **BIO-8** would involve installation of security and desert tortoise exclusionary fencing around the entire project site and along access roads, and **BIO-9** recommends the development and implementation of a desert tortoise translocation plan to move the tortoises currently living in the ISEGS project area to the identified translocation sites (CH2M Hill 2009d). Staff's proposed **BIO-10** requires verification that all desert tortoise impact avoidance, minimization, and compensation measures have been implemented. Staff's proposed **BIO-11** recommends a variety of additional impact avoidance and minimization measures to reduce the risk of injury and death to desert tortoise as well as other sensitive species.

Implementation of staff's proposed Conditions of Certification **BIO-8** and **BIO-9** have inherent risks and could themselves result in direct effects such as mortality, injury, or harassment of desert tortoises due to equipment operation, fence installation activities, removal of tortoise burrows, and tortoise translocation. Installation of exclusionary fencing at the perimeter of the project area would also fragment habitat for desert tortoise and home ranges of individual tortoises.

Translocation/Relocation

Capturing, handling, and relocating desert tortoises from the proposed site after the installation of exclusion fencing could result in harassment and possibly death or injury. Tortoises may die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures, pathogens may be spread among the tortoises, both resident and translocated animals. For those tortoise near but not within the ISEGS site, removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result

in loss of health, exposure, increased risk of predation, increased intraspecific competition, and death. Tortoises moved outside their home ranges would likely attempt to return to the area from which they were moved, therefore making it difficult to isolate them from the potential adverse effects associated with project construction. Mortality for translocated desert tortoise has been estimated at approximately 15 percent (Sullivan 2008).

The risks and uncertainties of translocation to desert tortoise are well recognized in the desert tortoise scientific community. The Desert Tortoise Recovery Office (DTRO) Science Advisory Committee (SAC) has made the following observation regarding desert tortoise translocations (DTRO 2009, p. 2):

> "As such, consensus (if not unanimity) exists among the SAC and other meeting participants that translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted populations in areas containing "good" habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of "depleted" (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition."

Given the dangers to desert tortoises associated with their translocation, the CDFG, USFWS and other parties (CBD 2009a, DOW 2009b, SC 2009b) have expressed their concerns about the outcome of proposed desert tortoise translocations for the ISEGS project, and have requested that those concerns be addressed in any relocation/ translocation plans approved for the ISEGS project.

To provide guidance for the applicant in addressing these concerns and developing an adequate relocation/translocation plan, on December 12, 2008 the USFWS prepared specific guidelines for clearance and translocation of desert tortoises from the ISEGS project site (USFWS 2008b). The applicant submitted their first Draft Desert Tortoise Relocation/Translocation Plan on March 19, 2009, identifying an area west of the ISEGS project site as a relocation area and lands southwest of the project site, adjacent to I-15, as a translocation area[2]. Staff and USFWS and CDFG provided comments on that submittal (CEC 2009b), requesting considerably more detail on the habitat quality and suitability of the proposed relocation and translocation sites, as well as specific details on the how the translocation would be conducted. The applicant submitted a revised Draft Desert Tortoise Relocation/Translocation Plan on May 27, 2009 in their

[2] *Translocation is required when a desert tortoise must be moved more than 1000 meters to clear it from a project site, while relocation requires a movement of less than 1000 meters (USFWS 20008b).*

Supplemental Data Response Set 2D, Attachment BR5-1B, as part of their Incidental Take Permit application (CH2M Hill 2009i). In this second submittal the applicant identified the area west of the ISEGS site as both potential translocation and relocation areas.

On July 14, 2009 staff, USFWS and CDFG commented on that second relocation/ translocation plan and once again requested additional information on the habitat quality and suitability of the proposed relocation/translocation sites (CEC 2009d). In response to those comments, in July 2009 the applicant conducted surveys for desert tortoise in four potential translocation areas to the west of the Ivanpah SEGS project site (CH2M Hill 2009d). They also undertook field surveys to make a vegetation assessment of areas to the west of the Ivanpah SEGS project and to the southwest of the project, near I-15 (CH2M Hill 2009v). Because the vegetation data were collected during summer and well after the flowering period of most winter and spring annuals the focus of the study was on perennial shrubs and succulents alone.

Four live tortoises and numerous tortoise burrows and carcasses were observed during surveys at four proposed relocation/translocation areas (CH2M Hill 2009d). The applicant's consultants concluded that the density of desert tortoises in the proposed translocation area was low and translocation of animals from the ISEGS site to this area would not overburden the resident population (CH2M Hill 2009d). Based on their vegetation assessment (CH2M Hill 2009v) the applicant also asserted that the relocation areas to the west of the project area had higher shrub and succulent diversity and richness than the ISEGS site itself. Based on the desert tortoise survey result, the applicant concluded that the relocation/translocation sites west of the project site would provide suitable habitat for desert tortoises removed from the ISEGS project area.

Staff and the USFWS have reviewed the applicant's desert tortoise and vegetation survey results for the proposed relocation/translocation sites. The CDFG has not yet provided their assessment of the applicant's recent submittals on desert tortoise survey results and vegetation studies. Staff has determined that the survey and vegetation results are satisfactory, and fulfill expectations regarding assessment of habitat quality at the relocation/translocation site west of the project area (BLM 2009). However, due to the season of these vegetation studies, there was no measure of annuals, the main diet of tortoises, or evaluation of the soils (BLM 2009). BLM staff requested that the applicant provide a habitat assessment based on the USGS desert tortoise habitat model (Nussear et al. 2009). That assessment showed that three of the four proposed translocations sites, as well as all three of the ISEGS units, have excellent desert tortoise habitat potential, ranking as 0.9 on a scale of 1.0 (CH2M Hill 2009u). This ranking is based on the USGS model of desert tortoise habitat potential which incorporates variables encompassing: soil (soil depth, rockiness, bulk density); landscape (surface roughness, slope, aspect, elevation); climate (winter and summer precipitation, variance of precipitation); and biotic (annual plant potential and perennial plant cover) (Nussear et al. 2009).

Staff at the Ventura USFWS office also reviewed the applicant's submittals and considered the desert tortoise surveys and vegetation data adequate to evaluate the effects of the relocation of desert tortoises to the applicant's proposed

translocation/relocation sites (USFWS 2009). The USFWS also expressed the opinion that highway fencing along I-15 was needed prior to translocation because of the potential for long-distance movements by tortoise following release (USFWS 2009).

Staff's proposed Condition of Certification **BIO-9** requires development of a final Desert Tortoise Translocation Plan in consultation with staff, CDFG and USFWS to address outstanding concerns that these agencies have regarding the specifics of the plan. Now that a satisfactory translocation site has been identified, staff concludes that implementation of this condition would minimize harm to desert tortoise during relocation and translocation activities associated with construction of the ISEGS project.

Habitat Loss and Compensatory Mitigation

One of the most substantial direct effects of the ISEGS project on desert tortoise is loss of approximately 4,073 acres of occupied habitat and fragmentation and disturbance to adjacent habitat. Compensatory mitigation is required to offset this significant impact and to fully mitigate for desert tortoise. Compensatory mitigation for desert tortoise typically involves balancing the acreage of habitat loss with acquisition of lands that would be permanently protected and enhanced to support healthy populations of desert tortoise. The compensation comes about by improving the carrying capacity of the acquired property so that more desert tortoise will survive and reproduce on these lands, thus offsetting over time the decrease in numbers of tortoise resulting from the habitat loss.

For the acquisition of mitigation lands to truly compensate for the habitat loss and to make up for the numbers of desert tortoise that would otherwise have been supported by that habitat, the acquisition must be accompanied by: (1) permanent protection and management of the lands for desert tortoise, and (2) enhancement actions. The permanent protection is essential because that allows the lands to be managed in a way that excludes multiple threats and incompatible uses (grazing, off-highway vehicle use, roads and trails, utility corridors, military operations, construction, mining, grazing by livestock and burros, invasive species, fire, and environmental contaminants). Without this protection and management the desert tortoise populations on the acquired lands would be subject to the same threats that led to its population declines and threatened status. An equally important component is the implementation of enhancement actions to improve desert tortoise survival and reproduction. These actions might include habitat restoration, weed control, road closures or road fencing, reducing livestock and burro grazing, and controlling ravens and other predators. Without permanent protection and enhancement actions on lands acquired for mitigation, the result would be a net loss for desert tortoise populations.

To adequately offset habitat loss CDFG usually requires a mitigation ratio greater than 1:1 for compensation lands (i.e., acquisition of one acre of compensation lands for every acre lost), and typically uses a 3:1 ratio for good quality habitat such as that found at the ISEGS project site. The higher ratio reflects the limits to increases in carrying capacity that can be achieved on the acquired lands, even with implementation of all possible protection and enhancement measures. Depending on the quality of the habitat that is lost and the habitat conditions of the land that is acquired, it is difficult to sufficiently increase the carrying capacity of the acquisition lands to completely offset habitat loss without relying on additional acreage to boost the numbers of desert tortoise that can be

supported on the mitigation lands. The BLM applies a 1:1 compensation ratio because they pursue desert tortoise recovery goals not through parcel by parcel acquisitions and management, but rather through implementation of region-wide management plans and land use planning as described in the NEMO, the California Desert Conservation Act plan, and the Desert Tortoise Recovery Plan (USFWS 1994).

Energy Commission staff proposes habitat compensation at a 3:1 ratio for loss of desert tortoise habitat through land acquisitions or an assessed financial contribution based on the final construction footprint. This mitigation ratio is consistent with past Energy Commission mitigation requirements for projects with impacts to desert tortoise (for example, High Desert Power Plant Project and the Victorville 2 Hybrid Power Project), staff's recommended mitigation as stated in the Final Staff Assessment for the Beacon Solar Energy Project, and with Incidental Take Permits issued by CDFG for other non-Energy Commission jurisdiction projects in the region. The 3:1 ratio has also been proposed by the applicant (Ellison, Schneider & Harris LLP 2009).

State Desert Tortoise Mitigation Requirements

To satisfy CDFG's full mitigation standard and to comply with requirements of a state Incidental Take Permit for desert tortoise, the proposed mitigation must meet certain criteria described in Title 14 CCR, Sections 783.4(a) and (b). These criteria include requirements that the proposed mitigation would be capable of successful implementation and that adequate funding is provided to implement the required mitigation measures and to monitor compliance effectiveness of the measures. In meeting these requirements the CDFG typically requires and the Energy Commission would require that lands acquired for mitigation purposes for a listed species be managed and protected in perpetuity for the benefit of that species. The CDFG has not yet provided their recommendation on appropriate compensatory mitigation for desert tortoise habitat loss, therefore staff is relying on CDFG guidance from past Energy Commission projects to develop a compensatory mitigation approach that fulfills the state's full mitigation standard while integrating the applicant's proposed mitigation contributions.

BLM Desert Tortoise Mitigation Requirements

This desert tortoise mitigation approach for the ISEGS project must satisfy BLM's policies for lands within the Northern and Eastern Mojave Planning Area (BLM 2002). No law, regulation, policy or plan would permit BLM to require assessing more than a 1:1 compensation ratio for habitat that lies outside of Desert Wildlife Management Areas (DWMA) such as the ISEGS site. BLM's mitigation requirements for desert tortoise are described in *Appendix A: Desert Tortoise Conservation Strategy: Section A.7. Management Actions in Desert Tortoise Habitat Outside ACECS* (BLM 2001, p. A-16), which specify:

> "Compensation shall be required by BLM for disturbances of desert tortoise habitat at the rate of 1 acre for each acre disturbed; this is the same as the current requirement in BLM's Desert Tortoise Statewide Management Policy. Funds collected from project proponents shall be directed to habitat enhancement, rehabilitation or acquisition in the Eastern Mojave Recovery Unit. Proponents may also implement enhancement or rehabilitation projects or donate lands directly, at BLM discretion."

Integrating State and BLM Desert Tortoise Mitigation

The ISEGS project is the first to be processed under a joint, coordinated review by the Energy Commission and BLM; integrating desert tortoise mitigation requirements that would satisfy policies and requirements of both agencies is a complex undertaking that is not yet complete. The CDFG and BLM have made substantial progress toward developing a mitigation framework that would work for both state and federal agencies, as described in a July 23, 2009 letter from BLM California Acting State Director James Abbot to CDFG Deputy Director Kevin Hunting (BLM 2009). This letter indicates that the BLM mitigation ratio of 1:1 would be applied within the mitigation ratio required by CDFG. The following issues must be addressed in developing the final desert tortoise compensatory mitigation package that jointly satisfies both the state and BLM policies and requirements:

1. Security and Per Acre Mitigation Fee

Energy Commission staff's proposed Condition of Certification **BIO-17** specifies compensatory mitigation for desert tortoise habitat loss at a 3:1 ratio, and BLM has proposed nesting their 1:1 mitigation requirement within this framework. The Energy Commission staff's condition of certification requires a security for funding two-thirds of their mitigation requirement. BLM would likely require the project owner to provide a deposit to be held in a BLM-managed contributed funds account based on the area of ground disturbance as determined by the final project footprint.

To satisfy section 2081 of the California Endangered Species Act the applicant must provide financial assurances to guarantee that an adequate level of funding is available to implement all impact avoidance, minimization, and compensation measures described in the desert tortoise conditions of certification. These financial assurances are generally provided in the form of an irrevocable letter of credit, a pledged savings account or another form of security prior to initiating ground-disturbing project activities. For the BLM, a cash payment (proffer) is made prior to initiating ground-disturbing activities. The Energy Commission staff's conditions of certification typically specify the dollar amount of the security. This security amount is calculated by multiplying the acreage of the impact area by the total per acre costs, a figure which represents the sum of the costs required for: (1) land acquisition, (2) initial habitat improvements, and (3) an endowment to support long-term management of the acquired lands.

The latter cost for the long-term management endowment is typically the largest component of the mitigation fee. Interest from the endowment creates a funding source that provides enough income to cover annual stewardship costs on the acquired lands and includes a buffer to offset inflation. The amount for the endowment is established by a Property Analysis Record (PAR), a computerized database methodology developed by the Center for Natural Lands Management (<www.cnlm.org/cms>) which calculates the costs of land management activities for a particular parcel. These activities include development of a desert tortoise management plan tailored for each parcel of mitigation land to assess habitat status, identify desired conditions, and develop plans to achieve conditions that would best support desert tortoise. Once the management plan is developed and approved by the appropriate resource agencies, implementation of enhancement actions such as fencing, road closure, weed control, habitat restoration as

well as monitoring can begin. The goal of these activities is to increase the carrying capacity of the acquired lands for desert tortoise and increase their population numbers by enhancing survivorship and reproduction.

Funding for the initial habitat improvements supports those actions needed immediately upon acquisition of the property to secure it and remove hazards. These activities might include fencing or debris clean-up, or other urgent remedial action identified prior to when the parcels were acquired. When the management plan is completed for the acquired parcel activities like these are thereafter funded from the interest produced by the long-term management endowment described above.

In contrast to CDFG's mitigation approach, BLM does not require an endowment fee or creation of a management plan to undertake habitat improvements on the acquired mitigation lands. However, guidelines for BLM stewardship and enhancement actions to protect and enhance habitat for desert tortoise are provided by the NEMO and the CDCA Plan. The BLM also undertakes all feasible management actions recommended by the Desert Tortoise Recovery Plan (USFWS 1994) on their lands. Similarly, the National Park Service utilizes its General Management Plan for the Mojave National Preserve (2001) to guide management of acquired lands.

Energy Commission staff's proposed Condition of Certification **BIO-17** specifies acquisition of 8,146 acres and provides an estimate of associated costs. These costs include acquisition fees of $910 per acre, a figure that reflects land sale costs over the past three years for parcels in unincorporated San Bernardino County (CDFG 2009a). In addition, based on guidance from CDFG on past power plant siting projects, initial habitat improvement costs (for example, fencing, debris removal) are estimated at $250/acre. The long-term management endowment is estimated at $1,350/acre based on a Property Analysis Records from past Energy Commission projects. The estimated composite mitigation cost to meet Energy Commission staff's recommendation for establishing the security would be $2,510/acre. Energy Commission staff has recommended in proposed Condition of Certification **BIO-17** that the applicant's financial responsibility for the actual cost of mitigation shall not increase by more than 25 percent of the Security Amount.

BLM proposes compensatory mitigation at a 1:1 ratio, consistent with their guidance from NEMO. BLM has indicated that the current per acre mitigation fee established by the BLM California State Director should be updated to reflect current land value and recent purchase prices (BLM 2009). BLM will work with CDFG and the applicant to establish an updated value (BLM 2009). Until a land value is re-evaluated, BLM would likely continue to use $500/acre for acquisition of lands in the Eastern Mojave Recovery Unit, and this per acre fee is consistent with prices for land sales in the Eastern Mojave (CDFG 2009a). Other per acre costs would include an additional 15 percent acquisition cost, a 17.1 percent indirect cost rate (2009 rate), as well as funding for appraisals, environmental site assessments, property cleanup, and an inflation contingency. The BLM's first priority for land acquisition would be private lands outside of the Mojave Preserve that are within the Desert Wildlife Management Area (DWMA) portion of the Eastern Mojave Recovery Unit. Remaining funds would be spent acquiring private lands within the Mojave National Preserve and on additional management and enhancement projects that would benefit the desert tortoise. BLM staff will develop the specifics of

desert tortoise acquisition and enhancement actions in collaboration with Energy Commission staff, CDFG and USFWS in accordance with guidance in the Desert Tortoise Recovery Plans (USFWS 1994, 2008a).

Energy Commission staff have concluded that the combination of the 2:1 compensatory mitigation, as described in staff's proposed Condition of Certification **BIO-17**, and the BLM 1:1 mitigation described conceptually above, would meet CESA's full mitigation standard and would mitigate CEQA impacts to desert tortoise to less-than-significant levels. Staff considers the combination of these two mitigation approaches to be a complementary and complete mitigation package that would achieve 3:1 mitigation and would satisfy state and federal requirements for mitigating impacts to desert tortoise.

CDFG has not yet provided formal guidance describing their requirements for satisfying CESA other than to convey verbally to staff that they would concur with a combined 3:1 mitigation package for desert tortoise. Staff is not making any assumptions as to whether CDFG would concur with the Energy Commission staff's calculation of security costs (acquisition costs, initial habitat improvement, and long-term management endowment), or whether CDFG would concur with including BLM's proposed mitigation approach as part of the complementary mitigation package to satisfy CESA's full mitigation standard. However, the calculations for security are consistent with past CDFG guidance on Energy Commission projects that included an Incidental Take Permit, and staff believes that CDFG would find this approach acceptable.

2. "In Perpetuity" Protection for Acquired Mitigation Lands

Historically, the Energy Commission staff and CDFG typically do not accept land acquisition as adequate mitigation for impacts to endangered species unless the lands can be maintained and protected in perpetuity for the benefit of those species. For most BLM lands their multiple use mandate restricts their ability to designate land solely for conservation purposes and to exclude potentially incompatible development and activities. That in-perpetuity protection requirement for BLM mitigation lands is likely to be satisfied by buying private in-holdings within BLM's Desert Wildlife Management Areas (DWMAs) or Mojave National Preserve, so that the surrounding protective land management would prevail. For the Energy Commission mitigation lands, CDFG or an appropriate conservation organization would own, protect and manage the lands to ensure permanent protection.

If other lands were acquired that were not within such protected areas, BLM would need to provide some sort of assurances as to the long-term protection of those lands for desert tortoise if these lands are to be counted as fulfilling part of CESA's full mitigation standard. To address this issue BLM has recently indicated that deed restriction language approved by the Department of Justice could possibly be included in the deeds for lands acquired for project mitigation and donated to BLM for long-term management to meet BLM mitigation requirements (BLM 2009). BLM has also indicated that for any land enhancement actions or recovery actions implemented on existing BLM-owned lands as part of mitigation for ISEGS, BLM would develop a Memorandum of Understanding (MOU) with CDFG containing provisions for notification of any proposed projects affecting those lands (BLM 2009). The BLM agreed that future projects authorized on these mitigation lands that might degrade or diminish the desert tortoise recovery value of this mitigation would be compensated at a higher rate (BLM

2009). More specific information would be needed on how this deed restriction for acquired lands and MOU for existing public lands might work before Energy Commission staff could conclude that such restrictions would provide sufficient assurances for long-term protection of mitigation lands.

3. Location of Acquired Mitigation Lands

CDFG and BLM differ in the regional scope of areas that they could consider for potential acquisition lands. While both agencies agree that the mitigation lands should be as close to the ISEGS site as possible, ideally in the Ivanpah, Shadow, and/or Piute Valley areas, CDFG is willing to consider acquisition of mitigation lands that occur in the West Mojave Desert area. BLM can only acquire lands within the Eastern Mojave Recovery Unit as described in BLM's Northern and Eastern Mojave Desert Management Plan (BLM 2001). BLM has expressed concern that limited private in-holdings are available in this area and that they would be unable to secure 4,073 acres to meet their requirement. BLM could not consider acreage acquired outside of the Eastern Mojave Recovery Unit as contributing to fulfillment of their mitigation requirement.

BLM will target acquisition of private inholdings within the DWMA portions of the Eastern Mojave Recovery Unit and the Mojave National Preserve. The balance of the mitigation funds remaining after land acquisition would primarily fund implementation of recovery actions jointly recommended by BLM, CDFG and the USFWS (BLM 2009), as described below.

4. Enhancement Actions Other Than Land Acquisition

The USFWS recovery plans for desert tortoise (USFWS 1994, USFWS 2008a) describe actions in addition to land acquisition that could reduce threats to desert tortoise populations. Some of these actions include habitat restoration and weed control, eliminating livestock and burro grazing, fencing to exclude livestock and vehicles or reduce the incidence of roadkill, controlling tortoise predators such as ravens, feral dogs and coyotes, as well as increased law enforcement, signage and education. Staff agrees that fencing, retirement of grazing allotments, removal of burros, and habitat restoration show considerable promise as actions that could increase desert tortoise survivorship and reproduction on the remaining habitat in the Ivanpah Valley. The control of ravens shown to be predators on juvenile desert tortoises is also a particularly effective recovery action.

Despite concurrence among staff as to the benefits of these recovery actions, there are formidable challenges to requiring enhancement actions like these in staff's conditions of certification. BLM cannot make pre-decisional firm commitments to implement specific actions such as fencing, altering grazing allotments, burro removal, or habitat restoration without conducting a NEPA analysis and providing full public disclosure on the effects of those actions. BLM can contribute funds to the Fish and Wildlife Service program of raven control without additional review. However, Energy Commission staff and CDFG cannot defer mitigation requirements for compliance with the California Endangered Species Act to a "yet to be completed" NEPA document.

The specifics of the enhancement actions would be consistent with direction from the NEMO, CDCA plan, and the Desert Tortoise Recovery Plans (USFWS 1994, 2008a). BLM and USFWS will collaborate with Energy Commission staff and CDFG in the development of desert tortoise enhancement actions.

5. Mitigation Compliance Monitoring

Mitigation measures in staff's recommended conditions of certification must be specific and enforceable with a process in place to monitor mitigation compliance and take action to remedy non-compliance. For land acquisitions, BLM, CDFG and the Energy Commission have well developed and transparent procedures to track expenditures and acquisitions. However, a mechanism is needed to verify fulfillment of enhancement actions such as fencing or habitat restoration on BLM lands, and provide a process for compliance monitoring to determine if the actions are being implemented as required by the conditions of certification. For mitigation other than land acquisition, BLM and Energy Commission staff will work together to develop a process that allows tracking and verification of enhancement actions for desert tortoise.

Staff anticipates resolution of all of these issues in the near future, and will work closely and cooperatively with USFWS, CDFG, and the applicant to finalize a mitigation and enhancement plan that would offset the significant habitat loss and indirect impacts to desert tortoises associated with construction and operation of the ISEGS project.

Indirect Effects

The indirect effects of the ISEGS project include loss of forage, nesting sites, and cover sites, the potential replacement of native with non-native plant species, loss of dispersal areas and connectivity to other areas, contracted home ranges, and increased risk of predation by predators attracted to the area by increased human activity. Each of these impacts is discussed in more detail below.

Ravens, Coyotes, and Other Predators

Human activities in the ISEGS project area potentially provide food or other attractants in the form of trash, litter, or water, which draw unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990, USFWS 2008a).

In addition to ravens, feral dogs have emerged as major predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994; Evans 2001). Dogs brought to the project site with visitors may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely in occupied desert tortoise habitat. The worker environmental awareness training (**BIO-6**) and restrictions on pets being brought to the site required of all personnel (**BIO-11**) would reduce or eliminate the potential for these impacts.

Construction and operation of the ISEGS project would increase raven and coyote presence in the project area. Ravens depend on human encroachment to expand into areas where they were previously absent or in low abundance. Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources that are introduced or augmented by human encroachment. The Ivanpah Valley currently includes several unauthorized public and open community dumps (BLM 2001), and the casinos at Primm (4.5 miles from ISEGS) and the Primm Valley Golf Club (0.5 miles from ISEGS) provide food, water features, and roosting/nesting substrates (buildings, signs, lamps, and utility poles) that otherwise would be unavailable. This development adjacent to the proposed ISEGS provides year-round water and trash subsidies for the raven as well as nesting opportunities.

Small mammal, fox, coyote, rabbit, lizard, snake, and tortoise road kill along I-15, Nipton Road, Yates Well Road, Colosseum Road, and other local roads provides an additional attractant and subsidy for opportunistic predators/scavengers such as ravens. Road kills would mount with increased ISEGS construction and operations traffic, further exacerbating the raven/predator attractions and increasing desert tortoise predation levels.

The ISEGS area is already subject to elevated raven predation pressure and any cumulative loss of juvenile tortoise due to the further addition of raven subsidies could have a long-term effect on the Ivanpah tortoise population by reducing the recruitment of juvenile tortoises into the adult life stages (Boarman 2003). The effects of this shortage may not be apparent for years because tortoises do not typically reach sexual maturity until approximately 15 to 20 years of age.

To reduce the impacts of increased raven presence at the ISEGS project site, the applicant has prepared a draft Raven Management Plan (CH2M Hill 2008f) and has recommended additional avoidance and minimization measures. Staff has incorporated these recommendations with proposed Conditions of Certification **BIO-11** and **BIO-12,** which would minimize the effects of increased predation on the Ivanpah Valley population of desert tortoise. The USFWS is currently developing a raven management plan that would address some of these potential impacts on a regional basis (Croft 2008) and which would implement recommendations in the USFWS *Environmental Assessment to Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise* (USFWS 2008). This USFWS regional raven management plan will be integrated with staff's conditions of certification if that plan is completed in time.

Increased Risk from Roads/Traffic

Vehicle traffic would increase as a result of construction and improvement of access roads, increasing the risk of injuring or killing desert tortoise. During the month-long time period in which the ISEGS workforce is at its largest, an estimate of the average daily traffic would include 39 transport buses and 192 personal vehicles (BSE 2007a). Likewise during this time period, the average total of construction truck traffic would be approximately 145 vehicles per day. For all other periods during construction (and to a much greater extent during operations and maintenance activities) daily average vehicle activity would be far less.

The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest though tortoises on dirt roads may also be affected depending on vehicle frequency and speed. Census data indicate that desert tortoise numbers decline as vehicle use increases (Bury et al. 1977) and that tortoise sign increases with increased distance from roads (Nicholson 1978). Additional unauthorized impacts that may occur from casual use of the access roads in the project area include unauthorized trail creation.

To minimize the risks of increased traffic fatality and other hazards associated with roads at the ISEGS project site, the applicant has proposed a variety of minimization measures which staff has incorporated into Condition of Certification **BIO-11**. These measures include confining vehicular traffic to and from the project site to existing routes of travel, prohibiting cross country vehicle and equipment use outside designated work areas, and imposing a speed limit of 20 miles per hour on Colosseum Road and other dirt access routes within desert tortoise habitat.

Dust

Disturbance of the soil's surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erodibility of the soil and accelerates the loss of nutrients (Okin et al. 2001). Soil erosion from construction activities and vehicle activity, which affects vegetation and soil properties, could have an adverse effect on both tortoise foraging and burrowing potential to lands outside of the ISEGS boundaries. The impacts of increased dust and other construction impacts can be minimized with implementation of Condition of Certification **BIO-11**, and with Air Quality Conditions of Certification **AQ-SC3 and AQ-SC-7** and **Soil and Water-1** that would require selection and application of chemical dust suppressants that would not adversely affect vegetation.

Impacts to Waters of the State/United States

The many ephemeral drainages in the project area provide beneficial functions and values such as groundwater recharge, flood peak attenuation and floodwater storage, and wildlife habitat. As discussed in the **Soil & Water** section most of these functions would remain relatively unimpaired by construction and operation of the ISEGS project because of the Low Impact Development approach (CH2M Hill 2009l). Solar field development would maintain sheet flow where possible with water exiting the site in existing natural contours and flows. The majority of the project site would maintain the original grades and natural drainage features (CH2M Hill 2009l). Existing small to moderate ephemeral washes would remain intact at locations capable of being traversed by installation equipment. Large ephemeral washes would be graded at road crossings to the extent necessary to provide equipment access (CH2M Hill 2009l). In areas such as the power blocks and substation, administrative areas a storm drainage system would be designed using diversions channels, by-pass channels, or swales to direct run-on flow from up-slope areas, and run-off flow through and around each facility (CH2M Hill 2009l).

Stormwater would be allowed to sheet flow across roads. An “Irish Bridge” or low-water crossing would be constructed where permanent asphalt paved access roads cross major ephemeral washes on the site (CH2M Hill 2009l). These bridges would be constructed of reinforced concrete or gabion baskets, would generally conform to the cross-sectional dimensions of the channel, and are being designed to prevent the scour and washout of major asphalt access roads during storm events (CH2M Hill 2009l). When necessary, offsite stormwater drainage would be collected using a system of swales, berms, and existing ephemeral washes to control and direct stormwater through and around the ISEGS site (CH2M Hill 2009l).

The applicant estimated the extent of temporary and permanent impacts to project area ephemeral drainages by multiplying the average width of the five size categories of ephemeral drainages by the length of the estimated impact for all project features (CH2M Hill 2009l). The permanent impacts to the drainage crossings were assumed to be the width of the road or path that crosses it. To estimate temporary impacts of roads the applicant assumed a total of 20 feet of upstream and 20 feet of downstream impact for a maximum temporary construction area of 40 feet. Areas that could not be revegetated within one year, such as those in the Construction Logistics Area, were considered permanent impacts (CH2M Hill 2009l).

Heliostats would be installed throughout the ISEGS solar fields, including in ephemeral drainages. Staff requested estimates of the extent of impacts to ephemeral drainages for heliostats placed within desert washes; the applicant noted that the project was still in the preliminary design phase and plans for heliostat installation were still conceptual, but that they assumed that the pile driver and cranes used to install the mirrors would use the same 10-foot-wide maintenance path as the mirror washing machines (CH2M Hill 2009l).

Based on the assumptions described above, staff has summarized the extent of direct impacts to ephemeral drainages in **Biological Resources Table 4**

Biological Resources Table 4
Impacts to Ephemeral Drainages from Project Features

Project Feature	Amount	Linear Impacts[4] (feet):	Impact Area (acres)
30-foot-wide asphalt roads (including 3-foot shoulder)	**Amount**	**11,639**	**---**
	Temporary[1]		**0.995**
	Long-term[2]		**0.5**
	Permanent[3]		**1.346**
24-foot-wide asphalt roads	**Amount**	**4,433**	**---**
	Temporary		**0.13**
	Long-term		**0.31**
	Permanent		**0.059**
15-foot-wide dirt roads	**Amount**	**2,022**	**---**
	Temporary		**0**
	Long-term		**0.192**
	Permanent		**0**
12-foot-wide dirt roads	**Amount**	**16,171**	**---**
	Temporary		**0.154**
	Long-term		**2.19**
	Permanent		**0.113**
12-foot-wide rerouted trails	**Amount**	**1,194**	**---**
	Temporary		**0**
	Long-term		**0.061**
	Permanent		**0.188**
12-foot-wide gravel road	**Amount**	**487**	**---**
	Temporary		**0**
	Long-term		**0**
	Permanent		**0.028**
10-foot-wide heliostat maintenance paths	**Amount**	**154,800**	**---**
	Temporary		**0**
	Long-term		**21.57**
	Permanent		**0**
10-foot-wide heliostat arrays	**Amount**	**158,285**	**---**
	Temporary		**21.8**
	Long-term		**0.031**
	Permanent		**0**
Natural gas line corridor	**Amount**	**7,380**	**---**
	Temporary		**0.939**
	Long-term		**0**
	Permanent		**0**
Gas and water utility lines	**Amount**	**1,126**	**---**

Project Feature	Amount	Linear Impacts[4] (feet):	Impact Area (acres)
	Temporary		**0.215**
	Long-term		**0.19**
	Permanent		**0**
Metering sets	**Amount**	**80**	**---**
	Temporary		**0**
	Long-term		**0.005**
	Permanent		**0**
Power blocks, diversion channels and berms	**Amount**	**17,177**	**---**
	Temporary		**0**
	Long-term		**1.284**
	Permanent		**0.15**
Gen-tie lines and towers	**Amount**	**0**	**---**
	Temporary		**0**
	Long-term		**0**
	Permanent		**0**
Administration/Maintenance Building	**Amount**	**3,618**	**---**
	Temporary		**0**
	Long-term		**0.444**
	Permanent		**0**
Substation	**Amount**	**4,670**	**---**
	Temporary		**0**
	Long-term		**0**
	Permanent		**0.572**
Construction laydown, staging and stockpiling	**Amount**		**---**
	Temporary		**2.674**
	Long-term		**0**
	Permanent		**0**
Perimeter fence installation	**Amount**	**0**	**---**
	Temporary		**76**
	Long-term		**0**
	Permanent		**0**
TOTAL DREDGE AND FILL IMPACTS	Amount	383,082	
	Temporary		26.91
	Long-term		26.78
	Permanent		2.46

Source: CH2M Hill 2009w, Table 5

NOTES:

[1] Temporary impacts are associated with construction activities, and these areas will be restored upon completion of construction.

[2] Long-term impacts continue for the duration of Project operations, which is estimated at approximately 50 years. At Project decommissioning, these areas will be rehabilitated and revegetated.

[3] Permanent impacts are associated with roads and structures that will remain following Project closure.

[4] Note that linear distances are likely overestimated since there is redundancy among values for temporary, long-term, and permanent impacts.

The applicant estimates that 37.66 acres would be the total extent of impacts to the project site's ephemeral drainages. Staff considers this to be a substantial underestimate of the impacts that are likely to occur to drainages during construction and operation. Staff believes it is unlikely that disturbance associated with heliostat installation could be feasibly limited to the footprint of a 10-foot wide maintenance path. In addition, mowing of vegetation to a 12 – 18 inch height beneath the heliostats within drainages during construction and operations would add considerably to the extent of impacts. Staff further considers any drainage that is accessible to construction vehicles to be potentially vulnerable to disturbance, unless the applicant is able to establish fencing at all the proposed road crossings on all the ephemeral drainages and ensure that construction traffic is limited to those crossings. After major storm events many of the road crossings would be likely to require reconstruction, particularly on the stream banks where soil has been disturbed as a result of grading to make ingress and egress more level. As maintenance paths and roads develop washouts, and maintenance workers are likely to seek wider routes to avoid rough spots, enlarging the original footprint of the roads. Considering the vast network of paths and roads proposed in the solar fields even small incremental widenings would amount to an ongoing degradation of ephemeral streams.

Staff concludes that all 198 acres of the ephemeral drainages on the ISEGS project area are potentially vulnerable to soil and vegetation disturbance as a result of road building, installation of heliostats, construction of power blocks and other project features, prolonged use of the construction logistics area, construction of linear facilities, as well as ongoing vegetation maintenance, weed control, and other maintenance activities associated with project operation. These drainages currently support undisturbed native plant communities that help stabilize stream banks and provide valuable wildlife habitat and wildlife movement corridors. Energy Commission staff considers impacts to the project area drainages to be significant because the ISEGS project would fragment and degrade the beneficial functions and values that these state waters provide to wildlife.

Staff's proposed Condition of Certification **BIO-20** specifies that, in addition to minimizing impacts to drainages where feasible, the applicant acquire and enhance property that includes 198 acres of ephemeral drainages similar to those on the ISEGS site. This mitigation could be integrated with the desert tortoise mitigation requirement for acquisition and enhancement of suitable desert tortoise habitat. With implementation of this proposed condition of certification impacts to the project area's ephemeral drainages would be reduced to less-than-significant levels.

Spread of Noxious Weeds

Construction activities and soil disturbance could introduce new noxious weeds to the ISEGS site and linear facilities, and could further spread weeds already present in the project vicinity. The spread of invasive plants is a major threat to biological resources in the Mojave Desert because non-native plants can displace native plants, increase the thread of wildfire, and supplant wildlife foods that are important to desert tortoise and other herbivorous species. The weeds of highest concern in the general area include

Sahara mustard and salt cedar (CH2M Hill 2008). Red brome and other ubiquitous weeds are also present; however, because of the widespread nature of these weeds, control is considered impracticable.

To avoid and minimize the spread of existing weeds and the introduction of new ones, an active weed management strategy and control methods must be implemented. The applicant has provided a detailed Weed Management Plan (CH2M Hill 2008e) to avoid and minimize the adverse effects of noxious weeds. Staff concurs with the recommendations in the applicant's weed management plan, and has incorporated it into staff's proposed Condition of Certification **BIO-13**. The Weed Management Plan includes a discussion of weed eradication and control methods, preventative measures to be implemented during construction (for example, limiting the size of disturbance, establishing wash stations for construction vehicles, using only weed-free products for erosion control) and long-term reporting requirements.

Noise

Noise from construction activities could temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. Many bird species rely on vocalization during the breeding season to attract a mate within their territory. Noise levels from certain construction, operations, and demolition activities could reduce the reproductive success of nesting birds. The expected loudest composite noise levels are approximately 89 dBA at 50 feet from the activity, which results in noise levels of approximately 77 and 61 dBA at distances of 200 and 400 feet from the activity, respectively (BSE 2007a). The construction period is relatively short, about 20 months per phase, and wildlife usually becomes habituated to ongoing general construction noise. Weisenberger et al. (1996) found that bighorn sheep responded to aircraft over-flights with increased heart rates and altered behavior; however, animal response decreased with increased exposure. In general, nearly all equipment would be specified to have near-field maximum noise levels that do not exceed 90 dBA at 3 feet from the activity (or 85 dBA at 3 feet where available as a vendor standard) to limit the noise exposure of plant personnel to acceptable levels. As a result of these design features, the temporary nature of these activities, and the adherence to noise reducing mitigation measures, the noise levels at the project fence line are not expected to have any substantial impact on nearby wildlife resources.

Operation Impacts and Mitigation

Potential operation impacts include impacts to birds due to collision with structures, risk of burns to birds that fly into the reflected sunlight between the heliostats and the power towers, and effects of disturbance and lighting. Operational impacts to desert tortoise impacts and other special-status wildlife species from increased road traffic, noise, and disturbance, and impacts to vegetation including special-status plants from dust and spread of noxious weeds, was addressed above in the subsection on special-status species.

Lighting, Collisions and Electrocution

Birds are known to collide with communications towers, transmission lines and other elevated structures. The ISEGS project design would result in the construction of 7 power towers 312 feet in height, 5 power towers 459 feet in height, and 3 boiler stacks

131 feet in height. Numerous other project-related structures lower in height would also be constructed. The heliostat array at Ivanpah 1 and 2 would be arranged around a single centralized solar power tower, and for Ivanpah 3 arranged around five power towers, each 459 feet high. These towers would include FAA required lighting and a lightening pole that would extend above the top of the towers approximately 5 to 10 feet. Lighting plays a substantial role in collision risk because lights can attract nocturnal migrant songbirds, and major bird kill events have been reported at lighted communications towers (Manville 2001) with most kills from towers higher than 300 to 500 feet (Kerlinger 2004). Many of the avian fatalities at communications towers and other tall structures have been associated with steady-burning, red incandescent L-810 lights used at communications towers seem to attract birds (Gehring et al. 2006). Longcore et al. (2008) concluded that use of strobe or flashing lights on towers resulted in less bird aggregation, and, by extension, lower bird mortality, than use of steady-burning lights. Bright night lighting close to the ground at the ISEGS project site could also attract bats and disturb wildlife that occurs adjacent to the project site (e.g., nesting birds, foraging mammals, and flying insects).

To minimize this risk of collision and disturbance to wildlife from lights, staff recommends implementation of staff's proposed Condition of Certification **BIO-11**, which includes specifications that the lighting atop the towers use flashing strobe lights rather than steady burning, and recommendations for lighting to be shielded downward and turned off when not needed.

Diurnal birds could also collide with tall structures, and could also be at risk of injury and fatality from burns if they flew into the reflected sunlight between the heliostats and the power towers. Staff has concluded that the risk of such impacts is low. Bird fatality studies at the Solar One facility near Daggett, San Bernardino County found that bird mortality observed on the site was associated with the large evaporation ponds at this solar plant rather than collisions or burns (McCrary 1986). Furthermore, most diurnal bird collisions with tall structures are associated with guyed towers in poor visibility conditions such as fog or inclement weather (Manville 2001). The ISEGS project does not include evaporation ponds or guyed structures, and rarely is subject to weather that reduces visibility.

Large raptors like golden eagles can be electrocuted by transmission lines when a bird's wings simultaneously contact two conductors of different phases, or a conductor and a ground. This happens most frequently when a bird attempts to perch on a structure with insufficient clearance between these elements. The presence of distribution lines 69 kV or less represents more of a danger to raptors than transmission lines greater than 69 kV, because the spacing between elements in distribution lines is much less than that of transmission lines (APLIC, 1996). The proposed transmission lines would be 115 kV. To minimize risk of electrocution, the applicant has proposed a "raptor-friendly" construction design for the transmission line with conductor wire spacing greater than the wingspans of large birds to help prevent electrocution as described in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006). BLM will not approve a transmission line that is not raptor safe. With the proposed mitigation addressed in Condition of Certification **BIO-11**, staff concludes that the proposed transmission lines would not pose a substantial threat to birds.

Noise

Operational noise, anticipated to be less than 30 dBA, would be more consistent and at a much lower level than during construction. The power plant would operate an average of about 10 hours a day, 7 days a week throughout the year, with the exception of a scheduled shutdown in late December for maintenance (BSE 2007a). The solar field and power generation equipment would be started up each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required for generating power. In addition, the solar nature of the facility limits its primary operations and noise generating activities to the daylight hours when ambient levels (such as from I-15, which is located 0.8 mile southeast of proposed Ivanpah 1) are typically highest. Therefore, with the implementation of noise-reducing measures described in the AFC (BSE 2007a), the impact on operational noise on surrounding wildlife is expected to be less-than significant. These measures include requiring construction equipment to maintain maximum noise levels at 90 dBA or less three feet from the construction activity.

NO PROJECT / NO ACTION ALTERNATIVE

The No Project / No Action Alternative is a proposed action that would not be undertaken. Under this alternative, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality in conformance with applicable statutes, regulations, policy and land use plan.

The results of the No Project / No Action Alternative would be the following:

The impacts of the proposed project to biological resources, including desert tortoise and special status plant and wildlife species, and ephemeral drainages would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project.

The benefits of the proposed project in reducing greenhouse gas emissions from gas-fired generation would not occur. Both State and Federal law support the increased use of renewable power generation.

If this project is not approved, renewable projects would likely be developed on this and other sites in the Mojave Desert, or in adjacent states, as developers strive to provide renewable power that complies with utility requirements and state/federal mandates. For example, there are three large solar projects proposed on BLM land in Nevada within a few miles of the proposed ISEGS site. In addition, as of August 2009 there were 66 applications for solar projects covering 611,692 acres pending with BLM in the California Desert District. The No Project/No Action Alternative would not cause any significant impacts to biological resources.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects

of past projects, the effects of other current projects, and the effects of probable future projects (Cal. Code Regs, tit. 14, § 15130). Cumulative impacts must be addressed if the incremental effect of a project, combined with the effects of other projects is "cumulatively considerable" (14 Cal Code Regs §15130(a)). Such incremental effects are to be "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (14 Cal Code Regs §15164(b)(1)).

This cumulative impact analysis makes a broad, regional evaluation of the impacts of past projects that threaten plant and animal communities within California's southern deserts, and also discusses in a general fashion future foreseeable threats. This overview of regional impacts is followed by a more detailed discussion of the effects of past, present, and future projects to biological resources of the Ivanpah Valley, in particular to its desert tortoise population.

Regional Overview

Over the past two hundred years California southern deserts have been subject to major human-induced changes that have threatened native plant and animal communities by habitat loss, fragmentation, and degradation. Some of the most conspicuous threats are those activities that have resulted in large scale habitat loss due to urbanization, agricultural uses, landfills, military operations, mining activities, as well as activities that fragment and degrade habitats such as roads, off-highway vehicle activity, recreational use, and grazing (Berry et al. 1996; Boarman and Sazaki 2006; Avery 1997; Jennings 1997). The introduction of non-native plant species and increases in predators such as ravens has also contributed to population declines and range contractions for many special-status plant and animal species (Boarman 2002a).

Against this backdrop of past projects within California's deserts, proposed wind and solar energy projects have the potential to further reduce and degrade native plant and animal populations, in particular sensitive species such as desert tortoise. BLM has received solar and wind applications for use of BLM land for approximately one million acres of the California Desert Conservation Area (see the **Cumulative Impacts** section). Nearby in the Nevada desert applications have been submitted for solar power facility right-of-ways on over 133,000 acres of desert landscape (USFWS 2008). In the context of this large scale habitat loss, the ISEGS project would contribute to the cumulative loss and degradation of habitat for desert plants and wildlife, including desert tortoise, within southern California's deserts.

Ivanpah Valley Past and Present Projects

The Ivanpah Valley has followed trends similar to the rest of the California desert in terms of habitat loss and degradation. **Biological Resources Table 5** lists the past and present projects within the Ivanpah Valley. The map ID numbers in this table correspond to the numbers shown on **Cumulative Impacts Figure 3.**

Biological Resources Table 5
Past and Present Projects in the Ivanpah Valley

Map ID	Project Name/Ownership	Project Description
1	Bighorn Electric Generating Station/ Reliant Energy Wholesale Generation, LLC	Operating natural gas power plant, uses dry cooling system
2	Primm Casinos: Buffalo Bill's, Primm Valley, Whiskey Pete's/ Terrible's Primm Valley Casino Resorts (MGM Mirage)	Two existing Resort and Casinos and one existing Hotel and Casino; undergoing renovation
3	Primm Valley Golf Course/ Terrible's Primm Valley Casino Resorts (MGM Mirage)	Existing golf course located south of the California/Nevada border along I-15, opened in 1997.
4	Primm Outlet Mall/ Fashion Outlets (MGM Mirage)	Existing shopping outlet with over 100 stores. Connected to the Primm Casinos by monorail.
5	Recreation Activities/ BLM	Approximately 12 permitted and organized events (championship racing, archery, kite buggying, land sailing) occur on the Dry Lake annually; approximately 5000 annual visitors/year
6	Molycorp Minerals LLC	Existing mining operation on Mountain Pass, acquired by Molycorp in 1950 and mined ever since.
7	Colosseum Mine	Inactive mining facilities occupying 284 acres on a 3,316 acre private parcel.
8	Clark Mountain and Crescent Peak Allotment	Ongoing 10-year grazing lease
9	Molycorp Evaporation Pond/Chevron	Active evaporation pond southeast of Ivanpah Dry Lake
10	AT&T Fiber-optic replacement of cables	Existing direct buried fiber-optic cable replaced from Nevada border to the Halloran Summit within existing right-of-way; project complete.
11	Existing 115-kV transmission line from El Dorado substation/SCE	Existing line passing through ISEGS site
12	Molycorp (Now Chevron-Texaco) pipeline	Runs from Molycorp south of I-15, through the Mojave National Desert Preserve to the Evaporation Pond

Biological resources of the Ivanpah Valley have been adversely affected by the projects listed above, as well as construction and continued use of major highways such as I-15 and secondary roads, unimproved roads and trails, pipelines, the Union Pacific Railroad, casinos and retail businesses, recreational developments, and electrical transmission lines and substations. Development-related habitat loss continues around the Nevada communities of Jean and Primm as well as the California community of Nipton. These activities in the Ivanpah Valley have resulted in direct loss and fragmentation of habitat, introduction of non-native species, and increased disturbance to wildlife. Urbanization, grazing, vandalism, illegal dumping, mining, off-road recreation, and construction of utility corridors, facilities and roads have contributed to the cumulative degradation of biological resources in the region. In general, actions on private lands within and adjacent to desert communities in Nevada including Las Vegas, Jean and Primm, and Barstow in California, are expected to continue to increase in proportion to increases in the human populations and access in these areas. Planned future actions, such as those that may occur as a result of the development of the Ivanpah Valley Airport, completion of rail lines, and others would continue this trend. All of these past activities have contributed to the loss of Ivanpah Valley vegetation communities, wildlife habitat, and special-status species.

Ivanpah Valley Future Projects

The Ivanpah Valley has followed trends similar to the rest of the California desert in terms of habitat loss and degradation. **Biological Resources Table 6** lists the future foreseeable projects within the Ivanpah Valley. The map ID letters in this table correspond to the numbers shown in **Cumulative Impacts Figure 3.**

Biological Resources Table 6
Future Foreseeable Projects in the Ivanpah Valley

Map ID	Project Name/Owner or Proponent	Project Description/Status
A	GEN 3 Solar, Inc/FirstSolar	A 300 MW photovoltaic development on 4,160 acres/Status: Plan of Development Letter sent 7/08
B	Ivanpah Airport (Southern Nevada Supplemental Airport)/Clark County Dept. of Aviation	The Ivanpah Valley Airport project is planned on 9.4 square miles (~6,000 acres) along I-15; Draft EIS in progress, possible construction start date of 2010, operation in 2017
C	Victorville-Las Vegas High Speed Train/ DesertXpress Enterprises	High speed train would run from Victorville to Las Vegas/Status: Scoping report completed 7/06; project proponents anticipate train operational by 2012. Proposed route is immediately northwest of the ISEGS site.
D	Pipeline Restoration/ Mojave Pipeline	Pipeline restoration adjacent to ISEGS project, similar footprint to original pipeline/ Status: meetings in Jan/Feb 2008 to discuss right-of-way

Map ID	Project Name/Owner or Proponent	Project Description/Status
E	Joint Port of Entry/Caltrans, CA Dept Food & Ag	Highway construction planned between Barstow and the Nevada state line includes: 1) a proposed point-of-entry inspection station near the Nevada border with construction likely to start in 2009 and continue for 2 years; 2) a 12-mile-long northbound truck descending lane and pavement rehabilitation (expected to be completed in the summer of 2010); and 3) regrading of median slopes, has been completed
F	Temporary Batch plant/Caltrans	Construction occurring now on widening of I-15
G	Mixed-use Development/ MGM Mirage and Jeanco Realty Development, LLC	166 acres proposed for housing, commercial businesses, new hotel-casino; includes demolition of two casinos MGM Mirage currently owns in Jean/ Status: On hold
H	Clark Mountain and Crescent Peak Allotment/ BLM	10 Year Lease grazing lease/Status: ongoing
I	Ivanpah Energy Center/ Diamond Generating Corporation	Status: On hold
J	Wind energy power plant/PPM Energy	75 MW wind energy project on 2,330 acres/Status: applications received 10/02, 10/06
K	Wind energy power plant/Clipper Wind CACA 44236	50 MW wind energy project on 3,360 acres/Status: applications received 3/02, 5/06
L	I-15 Mountain Pass Truck Lane/Caltrans	Now under construction from 8/08 to 2010
N	Upgrade to existing 115-kV transmission line from El Dorado Substation (SCE)	Construct a new Ivanpah Substation sized to accommodate 220 / 115 kV facilities, removal approximately 36 miles of a portion of existing line, construct a double circuit 220 kV line/Status: Project filing date early 2009, projected on line 2013
O	Mixed Use -Recreation	Approximately 200 Casual Use permits are issued annually (cover between 1 to 6 individuals); Status anticipate approximately 12 permitted and organized events per year l
P	Karnama Fast Food New fast food restaurant in Primm	Fast food restaurant to be built adjacent to the Primm Outlet Mall/Status: in permitting, application received 2/07
Q	Primm Solar Generating Plant/ NextLight Renewable Power, LLC	250 MW solar trough project on approximately 2,500 acres/ Status: application submitted to Las Vegas BLM Field Office

Past and current actions have significantly reduced and degraded the plant communities and wildlife habitat within the Ivanpah Valley, and the proposed project would substantially contribute to the loss of biological resources and genetic diversity of special-status species within the valley. Given the project's location on a large portion of the Ivanpah Valley, and in particular, the bajada and alluvial fans that support special-status plant species, it is reasonable to conclude that a substantial portion of the suitable habitat for these plants would be affected by construction of the ISEGS project, increasing the threat of local extirpation of the Ivanpah Valley proportion of these species' ranges. The project, combined with future proposed projects, would also significantly affect a genetically distinct subpopulation of desert tortoise within the Northeastern Mojave Recovery Unit that occurs in the Ivanpah Valley (Murphy et al. 2007, USFWS 2008).

While no precise estimate can be made of the future habitat loss associated with the proposed projects listed above, collectively these projects would remove and fragment tens of thousands of acres of additional habitat. The ISEGS project, combined with the proposed 4,000-acre First Solar development immediately to the east, would eliminate a large swath of the better desert tortoise habitat found on the west side of I-15 within the Ivanpah Valley. All of these past, present, and future proposed activities contribute to the significant loss of Ivanpah Valley vegetation communities, wildlife habitat, and special-status species. Staff considers the 4,073 -acre ISEGS project to be a substantial contributor to the cumulative loss of Ivanpah Valley's native Mojave Desert plant and wildlife communities, including the threatened desert tortoise and other special-status species. With the exception of special-status plant species, this significant cumulative impact may be reduced to less-than-significant levels with appropriate levels of compensatory mitigation, as discussed in staff's proposed Condition of Certification **BIO-17**.

IMPACT SUMMARY

Biological Resources Table 7 summarizes the impacts to biological resources resulting from ISEGS construction and operation.

Biological Resources Table 7
Summary of Impacts/Mitigation

Biological Resource	Impact/Mitigation
Mojave Desert Plant Communities & Wildlife Habitat	**Impacts:** Permanent loss of 4,073+ acres of Mojave creosote scrub and other native plant communities, including approximately 6,400 barrel cacti; permanent loss of cover, foraging, breeding habitat for wildlife; habitat fragmentation and loss of connectivity for terrestrial wildlife; disturbance/dust to nearby vegetation and wildlife; increased predation due to increased raven/predator presence; spread of non-native invasive weeds. **Mitigation**: Off-site habitat acquisition and enhancement of (**BIO-17**); implement Best Management Practices **(BIO-11)**
Waters of the State	**Impacts:** Impacts to biological functions and values of 198 acres of project area ephemeral; **Mitigation**: Acquisition and enhancement of 198 acres off-site waters (**BIO-17**);
Special-Status Plant Species	**Impact:** Direct, indirect, and cumulative impacts to eight special-status plant species. **Mitigation**: Avoid, protect, and minimize impacts to occurrences (**BIO-18**); implement weed management plan (**BIO-13**); implement Best Management Practices (**BIO-11**).
Special-Status Wildlife	
Desert tortoise *Gopherus agassizii*	**Impact:** Loss of 4,073+ acres of occupied habitat; translocation of an estimated minimum of 25 desert tortoise, resulting in reduced survivorship and reproduction for translocated individuals; fragmentation and loss of connectivity with surrounding habitat; increased risk from ravens and other predators; increased road kill hazard from construction and operations traffic; cumulative impacts to Ivanpah Valley population. Impact would be to a threatened species, and would likely be highly controversial, resulting in a significant impact with respect to NEPA significance criteria in 40 CFR 1508.27 **Mitigation**: Off-site habitat acquisition, endowment, and enhancement of suitable desert tortoise habitat (**BIO-17**); conduct desert tortoise clearance surveys and establish exclusionary fencing (**BIO-8**); develop and implement desert tortoise translocation plan (**BIO-9**); implement avoidance measures and Best Management Practices (**BIO-11**); implement raven and weed management plant (**BIO-12** and **BIO-13**)
Banded Gila monster *Heloderma suspectum cinctum*	**Impact:** Presence in project area unconfirmed; if present, potential for direct impacts, habitat loss; **Mitigation**: Compensatory mitigation for desert tortoise may also offset impacts to Gila monsters (**BIO-17**); implement Best Management Practices to avoid direct impacts (**BIO-11**).
Burrowing owl *Athene cunicularia*	**Impact**: Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting activities; **Mitigation**: Implement burrowing owl impact avoidance and mitigation measures (**BIO 16**); off-site habitat acquisition and enhancement (**BIO-17**)
Golden eagle *Aquila chrysaetos*	**Impact**: Loss of foraging habitat. **Mitigation**: Off-site habitat acquisition and enhancement (**BIO-17**); implement Best Management Practices (**BIO-11**)

Loggerhead shrike *Lanius ludovicianus*	**Impact**: Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting activities. **Mitigation**: Conduct pre-construction nesting surveys, implement avoidance measures (**BIO-15**); off-site habitat acquisition and enhancement (**BIO-17**)
Brewer's sparrow *Spizella breweri*	**Impact**: Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting activities. **Mitigation**: Conduct pre-construction nesting surveys, implement avoidance measures (**BIO-15**); off-site habitat acquisition and enhancement (**BIO-17**)
Crissal thrasher *Toxostoma crissale*	**Impact**: Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting activities. **Mitigation**: Conduct pre-construction nesting surveys, implement avoidance measures (**BIO-15**); off-site habitat acquisition and enhancement (**BIO-17**)
Le Conte's thrasher *Toxostoma lecontei*	**Impact**: Potential loss of nest, eggs, or young; loss of breeding and foraging habitat; disturbance of nesting activities. **Mitigation**: Conduct pre-construction nesting surveys, implement avoidance measures (**BIO-15**); off-site habitat acquisition and enhancement (**BIO-17**)
Nelson's bighorn sheep *Ovis canadensis nelsoni*	**Impact:** Potential loss of seasonal foraging habitat and impacts to movement corridors; **Mitigation**: Implement avoidance measures and Best Management Practices (**BIO-11**); develop water source for bighorn in the eastern part of the Clark Mountain range or in the State Line Hills (**BIO-19**).
American badger *Taxidea taxus*	**Impact:** Loss and fragmentation of habitat, loss of foraging grounds, crushing or entombing of animals during construction **Mitigation**: Conduct pre-construction surveys and implement avoidance measures (**BIO-11**); off-site habitat acquisition and enhancement (**BIO-17**)
Special-Status Plants	
Mojave milkweed *Asclepias nyctaginifolia*	**Impact:** Potential direct or indirect impacts to 16 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Desert pincushion *Coryphantha chlorantha*	**Impact**: Potential direct or indirect impacts 8 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Nine-awned pappus grass *Enneapogon desvauxii*	**Impact**: Potential direct or indirect impacts to 3 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Parish's club-cholla *Grusonia parishii*	**Impact**: Potential direct or indirect impacts to 5 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Rusby's desert-mallow *Sphaeralcea rusbyi var. eremicola*	**Impacts**: Potential direct or indirect impacts to 7 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).

COMPLIANCE WITH LORS

The proposed project must comply with state and federal laws, ordinances, regulations, and standards that address state and federally listed species, as well as other sensitive species and their habitats.

STATE LORS:

The Energy Commission has a one-stop permitting process for all thermal power plants rated 50 MW or more under the Warren-Alquist Act (Pub. Resources Code § 25500). Under the act, the Energy Commission's certificate is "in lieu of" other state, local, and regional permits (*ibid*.) The Commission's streamlined permitting process accomplishes a primary objective of the Renewable Energy Action Team, as identified in the Governor's Executive Order S-14-08 — to create a "one stop" process for permitting renewable energy generation facilities under California law. Staff has incorporated all required terms and conditions that might otherwise be included in state permits into the Energy Commission's certification process. When conditions of certification are finalized they would satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in the following state permits:

Incidental Take Permit: California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) The California Endangered Species Act (CESA) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. Construction and operation of the ISEGS project could result in the take of desert tortoise, listed as threatened under CESA. Energy Commission staff's proposed Condition of Certification **BIO-17** specifies compensatory mitigation for desert tortoise habitat loss at a 3:1 ratio, with BLM nesting their 1:1 mitigation requirement within this framework. Energy Commission staff have concluded that this funding and mitigation approach would likely be sufficient to provide full mitigation for desert tortoise, pending resolution of the issues discussed earlier in this section. However, CDFG has not yet provided concurrence that this proposed approach and level of mitigation funding would be adequate to fulfill their full mitigation standard.

Streambed Alteration Agreement: California Fish and Game Code §§ 1600 1607. Pursuant to these sections, CDFG typically regulates all changes to the natural flow, bed, or bank, of any river, stream, or lake that supports fish or wildlife resources. Construction and operation of the ISEGS would result in direct or indirect impacts to up to 198 acres of waters of the state. Staff has reviewed information supplied by the applicant (DB 2008e, CH2M Hill 2008d, CH2M Hill 2009, CH2M Hill 2009s, CH2M Hill 2009f) and has developed staff's proposed Conditions of Certification **BIO-19**. CDFG has not reviewed this condition of certification and provided only general guidance during its development. Implementation of this condition would minimize and offset impacts to state waters and would assure compliance with CDFG codes that provide protection to state waters.

FEDERAL LORS

The ISEGS project is located on federal land under BLM's jurisdiction and is therefore subject to the provisions of BLM's California Desert Conservation Area (CDCA) Plan

(Revised 1999). As an amendment to the CDCA Plan, BLM produced the Northern and Eastern Mojave (NEMO) Coordinated Management Plan (BLM 2002). This document consists of proposed management actions and alternatives for public lands in the NEMO Planning Area. The ISEGS project is located in the southeastern portion of the NEMO Planning Area Boundary.

The BLM has worked with the USFWS to develop a variety of land designations as tools to protect sensitive biological resources, including the desert tortoise. The siting of the ISEGS project considered the management direction of these designations, as described below:

- **Desert Wildlife Management Areas** (DWMA) are general areas recommended by the Desert Tortoise Recovery Plan (USFWS 1994) within which recovery efforts for the desert tortoise would be concentrated. DWMAs had no specific legal boundaries in the 1994 Recovery Plan. The BLM formalized the general DWMAs from the 1994 Recovery Plan through its planning process and administers them as Areas of Critical Environmental Concern (see below). The ISEGS project does not fall within any DWMA.
- **Area of Critical Environmental Concern** (ACEC) are specific, legally defined, BLM designations where special management is needed to protect and prevent irreparable damage to important historical, cultural, scenic values, fish and wildlife, and natural resources or to protect life and safety from natural hazards. The ISEGS project is not included within any designated ACEC.
- **Critical Habitat** consists of specific areas defined by the USFWS as areas essential for the conservation of the listed species, which support physical and biological features essential for survival and that may require special management considerations or protection. Critical habitat for the desert tortoise was designated in 1994, largely based on proposed DWMAs in the draft Recovery Plan. The ISEGS project is approximately 5 miles from the nearest desert tortoise critical habitat.

BLM provides management direction for species such as desert tortoise within the NEMO, which include five geographical areas of tortoise habitat in the planning area. These areas include an Ivanpah Valley and a North Ivanpah Valley area (BLM 2002), with the ISEGS project located within the Ivanpah Valley habitat area. Current designations for both Ivanpah areas are as Category III desert tortoise habitat (BLM 2002). Category III management goals are to limit tortoise habitat and population declines to the extent possible by mitigating impacts.

Potential take of the desert tortoise, listed as threatened by the USFWS, requires compliance with the federal Endangered Species Act (ESA) (16 USC §§ 1531 et seq.). “Take” of a federally-listed species is prohibited without an Incidental Take Permit, which would be obtained through a Section 7 consultation between BLM and the USFWS. The applicant submitted a Draft Biological Assessment for the Ivanpah Solar Electric Generating System (Ivanpah SEGS) Project (CH2M Hill 2008) in September 2008. The draft BA is currently under revision to address BLM comments and to incorporate substantial changes in the project description; a final BA will soon be available for submittal to USFWS (Meckfessel 2009) so that the formal Section 7 consultation process can be initiated.

CLOSURE AND DECOMMISSIONING IMPACTS AND MITIGATION

In the future, ISEGS would experience either a planned closure or be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. A closure plan would be prepared by the project owner prior to any planned closure (BSE 2007a). To address unanticipated facility closure, an "on-site contingency plan" would be developed by the project owner, and approved by the Energy Commission Compliance Project Manager (CPM). Facility closure requirements are discussed in more detail in the **General Conditions** section of this preliminary staff assessment. Facility closure mitigation measures would also be included in BRMIMP prepared by the project owner and described in staff's Condition of Certification **BIO-7.**

The facility closure plan should address habitat restoration measures to be implemented in the event of a planned or an unexpected permanent closure, and must also include a funding mechanism to ensure sufficient funds are available for decommissioning and habitat restoration as required in Condition of Certification **LAND-1**. After the end of the project's useful life, it would be decommissioned in accordance with a Closure, Revegetation, and Rehabilitation Plan as recommended in Condition of Certification **BIO-14** and a Special-Status Plant Protection and Monitoring Plan and Special-Status Plant Remedial Action Plan as recommended in Condition of Certification **BIO-18**. Planned or unexpected permanent facility closure should address the removal of the transmission conductors since birds are known to collide with transmission line ground wires.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received comments on the Biological Resources section of the Preliminary Staff Assessment (PSA) from the following parties

- Basin Range and Watch
- California Native Plant Society
- Center for Biological Diversity
- Davis, Lynn
- Defenders of Wildlife
- Deutsche, Craig
- La Doux, Tasha
- National Parks Conservation Association
- Sierra Club, San Gorgonio Chapter
- Society for the Conservation of Big Horn Sheep
- Wilder, Jenny

Energy Commission staff has summarized these comments and provided responses below. All references to "staff" below indicate Energy Commission staff.

California Native Plant Society letter dated February 6, 2009 (CNPS 2009b)

CNPS Comment #1: The CNPS listed a series of major points of concern, including the following biological resource issues: (1)significant sensitive plant populations occur on site, and there are no known feasible mitigation techniques for rare desert plant species; (2) the site supports high cactus diversity and density; (3) summer surveys were not conducted in a known summer rainfall region; (4) the project will result in an invasion of weedy species, and (5) the cumulative impacts to sensitive desert habitats and rare plants were not adequately evaluated.

> Response: (1) Staff has concluded that there are significant populations of sensitive plant species on the ISEGS site, and that avoidance is the preferred mitigation approach to reduce project impacts to special-status plant species. Staff has suggested some avoidance strategies in the subsection discussing plant impacts and mitigation and in proposed Condition of Certification **BIO-18**. (2) Staff agrees that the site supports high cactus diversity and density; that fact contributed to staff's conclusion that project impacts to plant communities were significant according to CEQA guidelines. (3) Staff notes that the botanists conducting plant surveys for the ISEGS project include a number of recognized experts on desert plants. Energy Commission staff consulted a regional botanical experts and confirmed that the applicant's surveys could have missed summer blooming special-status plants and staff has proposed pre-construction summer surveys in **BIO-18** to address this concern (Andre 2009, Sanders 2009). (4) Staff agrees that the project would increase potential for the introduction and spread of weeds, and has therefore proposed Condition of Certification **BIO-13**, the Weed Management Plan, which includes a discussion of weed eradication and control methods. (5) Staff does not agree that cumulative impacts to sensitive desert habitats and rare plants were not adequately evaluated; staff concluded that the cumulative impacts to special-status plants species of ISEGS and other proposed projects in the area would be significant in a CEQA context.

CNPS Comment #2: CNPS notes that at least 10 CNPS-listed species are known to occur on the project site. This data was generated only because partial site surveys were conducted on site (see #5). The use of existing data base information prior to the field work would have been misleading as to the diversity and productivity of the site. The very reason field surveys are required is to discover what is on a proposed project location. It is the intent of public law to provide for the avoidance of effects to discovered sensitive resources.

> Response: As discussed in the subsection on special-status plants, staff is satisfied that the list of CNPS-listed plant species known to occur at the site is accurate and includes all special-status species potentially occurring at the ISEGS site.

CNPS Comment #3. CNPS comments that the proposed project would eliminate several square miles of occupied rare plant habitat. There are no known techniques to mitigate for the loss of rare plants and their habitat in desert environments. Avoidance is the only mitigation that is appropriate for this site. There is no known method to compensate for the loss of this rare plant habitat. Simple habitat acquisition for the

desert tortoise cannot provide adequate compensation for the loss of this high quality rare plant habitat. To be able to find comparable compensation habitat for the rare plants will require an enormous amount of fieldwork to survey private lands that might be occupied. Simple translocation of the adult plants does not perpetuate population structures for long term productivity and is an unproven mitigation for habitat destruction. The scale of destruction of subsurface ecosystem components and seed banks is impossible to mitigate.

> Response: Staff agrees that avoidance is the preferred mitigation approach to reduce project impacts to special-status plant species; that transplanting these special-status plants is not a viable mitigation option; and that the fieldwork required to find these particular species on private parcels that might be available for sale is infeasible. Staff has suggested some impact avoidance strategies in the subsection discussing plant impacts and mitigation and in staff's proposed Condition of Certification **BIO-18**.

CNPS Comment #4: CNPS concurs with the PSA's conclusion that the applicant's proposed mitigation for rare plants, animals and habitats is inadequate and that the project will have major significant adverse, permanent effects to biological resources if this project is approved at this location. Currently, there are no known mitigation actions that are successful for desert plants and habitats. The only legitimate option is, no approval at this location. If approved for this location, a land compensation ratio should be at least 5:1, especially in light of the massive push for energy development in the desert and the projected cumulative effect generated from similar projects. A compensation ration of 1:1 is absolutely inadequate because the proposed action would permanently destroy irreplaceable high quality rare plant habitat. If a compensation plan is approved it must account for a fluctuating real estate market. The value of land at this time cannot be used if it takes ten years to acquire all necessary land. The acreage must be guaranteed as compensation, not just the current value.

> Response: Staff agrees that avoidance is the preferred mitigation approach to reduce project impacts to special-status plant species, and that a 1:1 ratio would not adequately mitigate for project impacts to desert tortoise. Staff has recommended a 3:1 mitigation ratio for desert tortoise. Staff agrees that in acquiring lands at a 3:1 ratio there must be provisions for increases in land valuation increases, and assurances that the funding would be available to secure the needed acreage. The latter requirement, assurance that sufficient funding is available to fund the proposed mitigation, is a requirement to fulfill Section 2081 of the California Endangered Species Act, and would be included in the Energy Commission's final condition for desert tortoise compensation.

CNPS Comment #5: CNPS states that the Supplemental Data Response Set 1D [Botanical Survey Report] for 2007 and 2008 surveys were inadequate. Protocol development for botanical surveys neglected to include critical seasonal coverage in a region well known for its bimodal precipitation [read, summer rainfall] and known to the consultants for the project proponents. There is only a short mention of one individual cataloging a single element from the site during the late summer. This is a critical failure for the complete analysis of effects to the environment from the proposed action. The region is poorly known botanically and therefore the failure to conduct summer/fall

surveys prevents the ability to conduct a valid and complete analysis of effects of the proposed action. The revelation of the number of sensitive plants on site is an example of the poor understanding of the distribution of the flora for that region. *Oenothera cavernae* [not on the pre-survey list] was only recently discovered to occur in eastern California and there are most likely several other species yet to be documented. The presumption that a complete species account can be accomplished from previous years 'skeletal' remains fails to comprehend the ecological properties of native annual plants. The vast majority of native annual plant species disarticulate from the growing location after seed set and blow away and thus would be undetectable using the survey method used with this project. All of the surveys for annual plants were conducted in April 2008 subsequent to summer 2007 precipitation. [spring 2007 survey dates were not easily detected in the technical document].

> Response: As mentioned above, staff has proposed pre-construction summer surveys in **BIO-18** to address special-status plants, which could have been missed by the applicant's botanical surveys.

CNPS Comment #6: The species lists and site evaluation clearly highlights the proposed project location as pristine and ecologically rich. The number of rare plant species and abundances as well as several rare animal species identifies this site as warranting protection not destruction. This site is not degraded. Only a very few non-native troublesome weeds at low densities from the location, and the vast size of the disturbance from the proposed project will undoubtedly cause a serious invasion problem for the area. If the project is approved there must be a guaranteed bond of a sufficient amount to pay for the ongoing [life of the project and beyond] weed management the project will create.

> Response: Staff agrees with CNPS in their characterization of the site, as described in detail in this section. Staff also agrees that the project would increase potential for the introduction and spread of weeds, and has therefore proposed Condition of Certification **BIO-13**, preparation of a Weed Management Plan, which will include a discussion of weed eradication and control methods during construction and during the life of the project.

Society for the Conservation of Big Horn Sheep – letter dated January 14, 2009 (SCBHS 2009)

SCBHS Comment #1: The SCBHS notes that a pre-construction baseline of big-horn sheep use should be established, followed by intensive monitoring during construction and follow-up post construction. These baseline surveys and monitoring should include at least air and ground surveys of the desert sheep in the surrounding mountain ranges with perhaps some discussions regarding the bordering sheep with Nevada. The SCBHS also recommended capture work, collaring and monitoring the movement of a sampling of the local bighorns before, during and after would be crucial information needed by CDFG for proper management.

> Response: Staff notes that baseline data on big-horn sheep use of the project area would have been useful in making an assessment of the extent of impact. Instead, the applicant made the assumption that the bighorn sheep are likely to move down

into upper elevations of the Ivanpah Valley, including the ISEGS project area, to forage (CH2M Hill 2008 p. 3-7). Staff agrees that the level of survey effort suggested by SCBHS would provide useful information on this population, but would not be appropriate mitigation for potential impacts of the ISEGS project. Unless research is connected to some management action that would provide mitigation for the project impact, it cannot be required as mitigation to satisfy CEQA.

SCBHS Comment #2: The SCBHS advocated that staff consider requiring a one to one and a half mile buffer zone from the project border to the toe of the sloping mountain areas, asserting that this would help connectivity of the local population and maintain the metapopulation dynamic at work with this sheep population. SCBHS asserts this wildlife corridor is absolutely essential for a healthy and viable population and for a healthy gene pool exchange, and that the buffer zone would establish a guideline or benchmark for any future development and additional loss of habitat.

Response: The applicant shifted the proposed ISEGS project boundaries and security fencing approximately 130 to 340 feet away from adjacent hills to provide a wildlife corridor (BSE 2007a p. 5.2-54). Staff has proposed Condition of Certification **BIO-19** as mitigation for project impacts to bighorn sheep.

SCBHS Comment #3 The SCBHS comments that they are not convinced that ISEGS project water will not have an adverse effect on the surrounding springs and seeps that are so precious to the resident wildlife population. SCBHS emphasized the need for habitat improvement through additional water sources to safeguard any potential depletion and/or lack thereof.

Response: The **Soils & Water** section analyzed this issue, and concluded that the seeps and springs located in the Clark Mountain are ephemeral and located up gradient and over three miles away from the project's proposed pumping wells. The seeps and springs derive their water from precipitation further up gradient in the Clark Mountains and beyond the potential reach of any cone of depression that would result from the project's proposed groundwater pumping. Staff has therefore concluded that the project is unlikely to affect springs used by big horn sheep.

SCBHS Comment #4: The SCBHS believes in the importance of an agreement or a memorandum of understanding from all government agencies (Department of Fish & Game, Bureau of Land Management, National Park Service, etc.) to assure that habitat improvements can and will take place in and around surrounding areas controlled by these authorities. Habitat work such as water hole improvements, replacement water, new wildlife drinkers, existing spring improvements, or spring development will help offset the negative impact on this and/or other future projects.

Response: Interagency efforts are currently underway to develop regional habitat improvements such as those suggested by the SCBHS as part of the Desert Renewable Energy Conservation Plan. That effort is a more appropriate forum for discussing this kind of interagency undertakings than the ISEGS project.

SCBHS Comment #5: The SCBHS emphasizes the importance of decommissioning and full and complete reclamation of the ISEGS project site, similar to what mining companies are obliged to do after production and/or usefulness has been achieved.

Response: Staff's proposed Condition of Certification **BIO-14** addresses the reclamation of the project site at the end of the project.

SCBHS Comment #6: The SCBHS expressed concern about the disruption to plant life associated with this project, requesting that full use of plant material be made, including restoration of peripheral impacted area, for future reclamation needs.

Response: Staff's proposed Condition of Certification **BIO-14** addresses the salvage and disposition of plant material, and the reclamation of the project site at the end of the project.

SCBHS Comment #7: The SCBHS suggests exploration of a land bridge over SR I-15 to alleviate the fragmentation and loss of wildlife connectivity resulting from past highway construction and future energy development; they note that the financial burden for this undertaking should not be place totally upon Bright Source Corporation, and encourages the Energy Commission should explore this possible mitigation measure in depth.

Response: A land bridge over I-15 would not be appropriate mitigation for the ISEGS project because it would be mitigating for impacts resulting from highway construction rather than from this project. This suggestion could, however, be appropriately considered in a more regional forum such as the Desert Renewable Energy Conservation Plan (http://www.energy.ca.gov/33by2020/index.html) or the BLM Solar Programmatic Solar Environmental Impact Statement.

Craig Deutsche letter dated January 14, 2009 (PUB 2009a)

Deutsche Comment #1: Mr. Deutsche expressed concern about impacts of ISEGS on habitat, plants, and wildlife, noting that the site provides outstanding desert tortoise habitat. He also noted serious concerns about the translocating desert tortoise, with a reminder of the disastrous experience with the translocation Fort Irwin military complex expansion. Mr. Deutsche commented that there must be assurances that the ISEGS translocation will not have similar results.

Response: Staff agrees that the ISEGS project would have significant impacts on habitat, plants, and wildlife, including desert tortoise, and staff shares Mr. Deutsche's concerns about the risks of translocation to desert tortoise. Staff's proposed Condition of Certification **BIO-9** describes the requirements for preparation of a detailed draft Translocation Plan that would be reviewed and approved by staff and would need to meet the standards of the USFWS and CDFG.

Deutsche Comment #2: Mr. Deutsche notes that if impacts to the biological resources at the site cannot be suitably mitigated, and if permits for the project are nevertheless granted, then the applicant, Bright Source, must be required to provide substantial compensation for the negative impacts that result.

Response: Staff agrees that the applicant must mitigate for significant CEQA impacts and must provide compensatory mitigation to satisfy other state and federal laws such as the state and federal endangered species acts. Staff's proposed conditions of certifications describe the elements of this compensatory mitigation.

Sierra Club – San Gorgonio Chapter letter dated January 22, 2009 (SC 2009a)

SC Comment #1: The Sierra Club urged rejection of the applicant's proposed habitat acquisition ratio of 1:1, and requested that the applicant be required to provide substantial compensation for the direct, indirect, and cumulative impacts to the biological resources of the Ivanpah Basin. The Sierra Club also requested that a thorough plan for the required compensation be completed prior to any California Energy Commission (CEC) decision on the merits of the application, and that the Private Land Alternative be given full consideration by the Energy Commission.

Response: Staff has rejected the applicant's 1:1 proposal for mitigation, and agrees that substantial compensation would be required for the impacts of the ISEGS project on biological resources. Staff also agrees that a complete and thorough compensation plan should be finalized before the Energy Commission makes a decision on the project. As described in the Alternatives section, the Private Land Alternative was considered, and was found to be a site with fewer biological resources, including desert tortoise.

SC Comment #2: The Sierra Club expressed concerns that the ISEGS project would: permanently impact over 4,000 acres of occupied desert tortoise habitat and fragment and degrade adjacent habitat; result in loss of breeding and foraging habitat for special-status wildlife; impact ten special-status plant species; disrupt the foraging areas and movement corridors of mule deer and desert bighorn sheep as they travel from the Clark Mountains.

Response: Staff has proposed numerous conditions of certification to avoid, minimize, and compensate for these significant impacts to biological resources.

SC Comment #3: The Sierra Club finds Applicant's proposed compensation for desert tortoise through habitat acquisition (or an assessed financial contribution) at a 1:1 ratio to be unacceptable. The Applicant's argument for a habitat acquisition ratio of 1:1 that the Ivanpah SEGS site is not "critical habitat" ignores the long-term and continued destruction of Mojave desert tortoise habitat.

Response: Staff has recommended a mitigation ratio of 3:1, as described in staff's proposed Condition of Certification **BIO-17**.

SC Comment #4: The Sierra Club notes that ten plant species listed by the California Native Plant Society would be directly impacted by construction of Ivanpah SEGS. Of even greater concern is the fact that the project would eliminate a substantial portion of the known occurrences within California of Rusby's desert-mallow, cave evening-primrose, Mojave milkweed, and desert pincushion.

Response: Staff agrees that project impacts to these species of plants are significant according to CEQA guidelines, and has proposed Condition of Certification BIO-18 with recommended avoidance measures. The cave evening-primrose would not be affected by the proposed project.

SC Comment #5: Sierra Club contends that the applicant must be required to provide substantial compensation for the direct, indirect, and cumulative impacts to the biological resources of the Ivanpah Basin. Habitat acquisition at a ratio of 5:1 and habitat enhancement to ensure that those lands are managed and maintained for wildlife and plants in perpetuity must be the central features of this compensation. Sierra Club readily agree with Staff's conclusions regarding impacts, but cannot endorse the "compensatory mitigation approach" that staff proposes. That approach is too nebulous given the level of compensation required of the Applicant. Simplicity is a virtue here -- acquisition of habitat at a ratio of 5:1 and enhancement of that habitat should be the foundation of the required compensation.

Response: Staff has recommended a mitigation ratio of 3:1, as described in the subsection on desert tortoise impacts and mitigation in this FSA/DEIS and in staff's proposed Condition of Certification **BIO-17**. This mitigation recommendation is consistent with CDFG and Energy Commission mitigation recommendations on other recent solar projects.

Jenny Wilder letter dated January 14, 2009 (PUB 2009b)

Wilder Comment: Ms. Wilder notes that there will be significant negative impact of the ISEGS project to the natural habitat and wildlife in the area.

Response: Staff agrees with Ms. Wilder's conclusion, as described in the subsection on impacts. Staff has provided mitigation measures in the conditions of certification to reduce these impacts to less-than-significant levels.

National Parks Conservation Association letter dated January 21, 2009 (NPCA 2009a)

NPCA Comment #1: NPCA recommends that all recommendations brought forth by the Biological Opinion of the USFWS be utilized if tortoises are to be relocated to ensure compliance with section 9 of the Endangered Species Act.

Response: This FSA/DEIS includes language in the discussion of LORS compliance requiring that the terms and conditions in the USFWS Biological Opinion be included in measures to protect desert tortoise during and after project construction.

NPCA Comment #2: NPCA urges that equitable mitigation ratio (5:1) be required for mitigation of any destruction of desert tortoise habitat. According to the California Department of Fish and Game (CDFG) a ratio of 5: 1 is offered for quality tortoise habitat. NPCA recommends that analysis based on the parameters set forth by CDFG be made and a just ratio be offered based on this assessment.

Response: Staff has recommended a mitigation ratio of 3:1, as described in the subsection on desert tortoise impacts and mitigation in this FSA/DEIS and in staff's proposed Condition of Certification **BIO-17**. The CDFG has not yet provided their recommendations to staff regarding needed mitigation ratios to fulfill their full mitigation standard.

NPCA Comment #3: NPCA urges the Joint-Lead Association (JLA) to utilize the Mojave Desert Land Trust to ensure that available mitigation properties that exist as in holdings within Mojave National Preserve be given first priority for acquisition. Mojave National Preserve is one of the few remaining refugia for healthy, high density population of the desert tortoise, based on its level of protection and high quality habitat. The purchase of in-holdings within Mojave National Preserve would bolster the acreage and protection of habitat available for this thriving population of desert tortoises.

Response: Staff agrees that these properties would provide suitable compensation lands.

Lynn Davis – email dated January 21, 2009 (PUB 2009c)

Davis Comment #1: Ms. Davis states that the development of the ISEGS project by Bright Source Energy, on over one million acres in our southwestern deserts will endanger or destroy many special-status plant species, degrade desert tortoise habitat to near extinction, accelerate water loss in a state desperately in need of a sustainable, long range water conservation strategy, eliminate thousands of acres of forage for Big Horn Sheep, mule deer, the endangered Golden Eagle and many other bird, animal and plant species. Immediate and cumulative affects will be catastrophic. I strongly urge, as a citizen of California, that Bright Source Energy be required to provide a FULL compensatory mitigation package. Mitigation must include like for like, acre for acre. It must meet the California Department of Fish and Game's FULL MITIGATION STANDARD.

Response: Staff agrees that the ISEGS project would result in significant impacts to desert tortoise and special-status plant species, and would contribute to significant cumulative impacts to biological resources in the Mojave Desert region, but does not agree with the other characterizations of impacts to resources such as big horn sheep and golden eagle. Staff has described the measures needed to fulfill CDFG's full mitigation standard in the subsection on desert tortoise impacts and mitigation.

Defenders of Wildlife letter dated January 23, 2009 (DOW 2009a)

DW Comment #1: Defenders of Wildlife strongly recommends that the project proponent do all it can to avoid impacts to tortoises first, then minimize those impacts that cannot be avoided, and finally, if all else fails, adequately mitigate for those impacts. To that end, Defenders strongly urges that the project follow the recommendations found in the current Desert Tortoise Recovery Plan for avoidance and minimization measures.

Response: Staff agrees that recommendations found in the current Desert Tortoise Recovery Plan (USFWS 2008a) provide appropriate guidance for avoidance and

minimization, and consulted this reference in the course of developing mitigation measures described in the section.

DW Comment #2: Defenders of Wildlife strongly opposes the 1:1 mitigation ratio proposed by the applicant; the recommended ratio for good quality tortoise habitat is 5:1. DFG determines mitigation ratios for desert tortoise based on: (1) presence of the species; (2) habitat quality; (3) disturbance level of habitat; (4) adjacent land uses; (5) connectivity; and (6) projected growth. Defenders of Wildlife would like to see an analysis of mitigation ratios addressing the above 6 parameters.

Response: Staff agrees that the applicant's proposed mitigation would not be adequate to fully mitigate for project impacts to desert tortoise. Staff also notes that the six parameters listed for development of mitigation ratios for impacts to desert tortoise were considered in staff's mitigation recommendations.

DW Comment #3: Staff should also consider the risks posed by the translocation program in structuring the compensatory mitigation program. The U.S. Army suspended its Desert Tortoise translocation program when at least 15% of the translocated tortoises died, mostly due to predation (see http://www.pe.com/localnews/inland/stories/PE_News_Local_S_tortoises10.450e731.html). The tremendous risks involved with translocation militate towards a higher compensatory mitigation ratio.

Response: Staff agrees that translocation poses a significant risk to desert tortoise. Staff's proposed Condition of Certification **BIO-9** would require preparation of a draft and final Translocation Plan, to be reviewed and approved by the staff in consultation with USWFS and CDFG. The Translocation Plan would include all possible measures to minimize harm to translocated and resident tortoise in the translocation area. The desert tortoise impact assessment and mitigation recommendations in this FSA/DEIS take into account the potential impacts associated with translocation.

DW Comment #4: Defenders of Wildlife requests that other impacts to tortoise be fully analyzed and addressed, such as new water sources that attract predators, impacts to tortoise water sources from proposed groundwater pumping, impacts from roads, and impacts from vegetation management. For example, if additional water sources will be placed on site, it could increase raven populations within the surrounding area. A raven monitoring plan would need to be included, as ravens can have a very detrimental impact on tortoises. In addition, while the project will obviously involve roads and a great deal of traffic (particularly during construction), the project application fails to consider the use of fencing to avoid impacts to the tortoise.

Response: Staff has addressed the issues raised by Defenders of Wildlife in the FSA/DEIS subsection discussing desert tortoise impacts and mitigation. Staff's proposed Condition of Certification **BIO-12** requires preparation of a Raven Management Plan. The USFWS is currently developing a raven management plan that would address some of these potential impacts on a regional basis and which would implement recommendations in the USFWS Environmental Assessment to

Implement a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise (USFWS 2008).

DW Comment #5: Defenders of Wildlife notes that the PSA mentions the use of translocation of desert tortoises as a part of the mitigation strategy. At this time Defenders is reviewing the new USFWS Guidelines for Clearance and Translocation of Desert Tortoises from the ISEGS project. We do not believe that translocation, in and of itself, provides adequate mitigation. Instead, any translocation must be in conjunction with the preservation of habitat. Further, the Translocation Plan will need to comply with the recommendations of the FWS 1994 Desert Tortoise Recovery Plan.

Response: Staff agrees that translocation is considered an avoidance measure rather than compensatory mitigation. Staff's proposed Condition of Certification BIO-9, the Translocation Plan, will be reviewed by USFWS and CDFG and will comply with the recommendations of the 1994 Desert Tortoise Recovery Plan.

DW Comment #6: Defenders urges that the Banded Gila Monster be included on the list of species to be analyzed and addressed. Recent scientific research has found that Gila monsters appear to use two overwintering sites (rocky hills and surrounding bajadas). D.F. DeNardo, et al., 2007 Desert Tortoise Council Symposium Abstract). Thus, this project could be important habitat for the Gila monster.

Response: Staff addressed potential impacts to banded Gila monsters in the PSA and FSA/DEIS. Staff's proposed Condition of Certification **BIO-11** requires that concurrent with the desert tortoise clearance survey, a biologist perform a preconstruction survey for Gila monsters in the project area, and implement appropriate impact avoidance and minimization measures if detected.

DW Comment #7: Defenders urges that the EIS/FSA assess the impacts to bighorn sheep. While the California Natural Diversity Database ("CNDDB") reports the last occurrence of bighorn sheep in this area to be in 1986, we understand that the Society for Bighorn Sheep possesses updated information showing that this project area is a wildlife corridor for bighorn sheep. Therefore, we strongly urge that this project analyze and address impact to bighorn sheep and their ability to move across the Ivanpah Valley. Furthermore, given the proposed pumping of groundwater, we strongly urge that the impacts of this pumping be analyzed and addressed with respect to potential impacts on the desert seeps and springs used by bighorn sheep.

Response: Staff is assuming in their analysis in the FSA/DEIS that the ISEGS project site is used occasionally by big horn sheep as foraging habitat. Regarding the impact of the project on seeps and springs used by big horn sheep, the **Soil & Water** section analyzed this issue, and concluded that the seeps and springs located in the Clark Mountain are ephemeral and located up gradient and over three miles away from the project's proposed pumping wells. The seeps and springs derive their water from precipitation further up gradient in the Clark Mountains and beyond the potential reach of any cone of depression that would result from the project's proposed groundwater pumping. Staff has therefore concluded that the project is unlikely to affect springs used by big horn sheep.

DW Comment #8: The project fails to acknowledge and address any impacts to the burrowing owl. In addition to being a Species of Special Concern, the burrowing owl is also protected under Fish and Game Code Section 3503.5 and the Migratory Bird Treaty Act. Impacts to burrowing owls must be assessed in the EIS/FSA. If impacts are found to exist, then the measures found in the DFG's Burrowing Owl Survey Protocol and Mitigation Guidelines should be adhered to.

> Response: Staff has addressed the potential impacts of the project on burrowing owl, and has proposed Condition of Certification BIO-16 to avoid and minimize impacts to this species. This condition incorporates the CDFG guidance referred to by the commenter (CDFG guidelines (California Burrowing Owl Consortium 1993).

DW Comment #9: The project application details impacts to some plant species, particularly the barrel cactus and Mojave yucca. However, since the original plant surveys were admittedly conducted during a dry year, we strongly urge that additional surveying be conducted this spring in order to better assess impacts to a number of special-status plants and to prescribe adequate mitigation. We do not support deferring this analysis to pre-construction surveys. Indeed, given the biodiversity found on the project site during a dry year survey, we believe that this site contains a large number and extent of rare plants. With respect to mitigation as currently proposed in the application, we also strongly urge that the environmental documents do a much more thorough job of describing adequate mitigation should a rare plant show up on the project. Right now, the project application sets forth a list of potential mitigation strategies, but commits to none and analyzes none.

> Response: Staff notes that the applicant conducted additional special-status plant surveys in 2008 in part because the 2007 surveys occurred during a dry year. This FSA/DEIS provides a detailed assessment of impacts to plants, and recommends avoidance measures to minimize these impacts in staff's proposed Condition of Certification **BIO-18**.

DW Comment #10: Defenders of Wildlife are very concerned about the extent of the impact of the proposed project on the Creosote Bush-White Bursage Barrel Cactus Community Type. With 10,000 acres of this plant community existing in 20 to 30 locations, the project appears to impact more than 1/3 of the community type. Such an impact appears to be very significant and must be fully analyzed and addressed in the EIS/FSA.

> Response: The applicant supplied information from Dr. Todd Keeler-Wolf indicating that the density of barrel cacti on the ISEGS site was too low to meet the criteria for Creosote Bush-White Bursage Barrel Cactus Community Type (CH2M Hill 2008h). Staff does not consider this plant community type to be present at the ISEGS project site.

DW Comment #11: The proposed project will reroute and fill in a number of existing ephemeral washes that flow into the Ivanpah Dry Lake. The EIS/FSA must analyze and address impacts to the Dry Lake and fairy shrimp.

Response: The applicant proposes a Low Impact Development approach on the ISEGS site and relatively little grading would occur on the site or within drainages. The applicant estimates permanent and temporary Impacts to the ephemeral drainages to be 37.66 acres from roads, construction of the power block, substations, linear facilities and other project features. Staff considers this estimate an underestimate, and considers all 198 acres of state waters potentially vulnerable to disturbance from the project.

DW Comment #12: The EIS/FSA must analyze and address the impacts of the groundwater pumping on desert species and habitat.

Response: Staff analyzed the effects of ISEGS groundwater use, which would be no more than 100 acre-feet per year, in the **Soil & Water** section of this FSA/DEIS. Staff concluded effects on groundwater would be less than significant, and that the seeps and springs located in the Clark Mountain would not be affected by pumping because they are ephemeral and located upgradient and over three miles away from the project's proposed pumping wells. The seeps and springs derive their water from precipitation further upgradient in the Clark Mountains and beyond the potential reach of any cone of depression that would result from the project's proposed groundwater pumping. Staff has therefore concluded that the project's use of 100 acre-feet/year is not likely to affect desert wildlife.

DW Comment #13: The EIS/FSA must analyze and address impacts to migratory birds from this project, including any potential impacts from the evaporation ponds.

Response: Staff has addressed potential direct and indirect impacts to migratory birds in the proposed Condition of Certification BIO-15, which requires pre-construction nest surveys and avoidance if nests are detected. No evaporation ponds are proposed as part of the ISEGS project.

Tasha La Doux letter dated January 30, 2009 (PUB 2009d)

La Doux Comment #1: Ms. La Doux stated that the negative impacts of the project to desert tortoise are significant. If the project is approved the mitigation ratio should be based on the BLM/USFWS standard mitigation requirement of 5:1. The suggestion that desert tortoise can be moved as a mitigation measure is not taking into account the high death rate (>20%) experienced by Ft. Irwin when employing a similar method. Moving tortoises has proven to be a failed mitigation measure. In addition, the long-term and cumulative negative impacts to the desert tortoise population were not addressed.

Response: BLM and USFWS do not have a standard 5:1 mitigation ratio. Staff has recommended a mitigation ratio of 3:1, as described in the subsection on desert tortoise impacts and mitigation in this FSA/DEIS and in staff's proposed Condition of Certification **BIO-17**. The CDFG has not yet provided their recommendations to staff regarding needed mitigation ratios to fulfill their full mitigation standard. Staff does not agree that cumulative impacts to desert tortoise were not adequately evaluated; in the PSA and the FSA/DEIS staff concluded that the project would contribute to the significant cumulative impact to this species.

La Doux Comment #2: The PSA fails to address the significant negative impacts of this project to the movement of Desert Bighorn Sheep and Mule Deer between mountain ranges. The PSA states that these animals are “likely” to use the Ivanpah Valley as migration corridors, when the fact is these animals undoubtedly use each and every desert valley in the process of migrating from one mountain range to the next. The long-term and cumulative negative impacts to the native ungulate populations were not addressed in the PSA.

> Response: Staff’s contacts with experts (Jaeger 2009, Wehausen 2009) and review of the literature on this subject indicates there is little information available on use of the Ivanpah Valley by big horn sheep. The evidence suggests that seasonal intermountain migrations between the Clark Mountains and the State Line Hills occur through the mountains rather than valleys. Based on the available information, staff has concluded that the ISEGS site could be used for foraging by bighorn sheep, but is not a likely pathway for sheep moving between mountain ranges; sheep moving to ranges in Nevada would move northeast rather than due east toward the project site. Sheep would be unlikely to move due east because I-15 and the Ivanpah Dry Lake would be in their path.

Basin Range and Watch letter dated January 31, 2009 (BRW 2009a)

BRW Comment #1: Basin and Range Watch questioned whether few if any mitigation practices would be available to compensate for such a great loss of biological diversity. What are these mitigation practices? Will these plants be propagated from seed? If so where would they be planted? What will happen to succulents, yuccas and Joshua trees that are displaced? Will they be moved, sold for landscaping or destroyed? What habitats would be suitable for transplanting? What locations?

> Response: Staff’s proposed Condition of Certification **BIO-14** requires the applicant to prepare a final Closure, Revegetation and Rehabilitation Plan that would describe the disposition of the salvaged succulents, yuccas and Joshua trees. Staff does not consider this salvage operation to be mitigation for impacts to the project site’s native plant communities, but rather as a contribution to the reclamation effort to revegetate areas temporarily disturbed by construction.

BRW Comment #2: Basin and Range Watch asked what mitigation would be taken to prevent the spread of noxious weeds. Would herbicides be used? If so, which ones? What risks would this have on native species and groundwater?

> Response: Staff’s proposed Condition of Certification **BIO-13** requires preparation of a Weed Management Plan, which would be based on the draft Weed Management Plan submitted by the applicant (CH2M Hill 2008e). This plan provides a discussion of weed eradication and control methods, including herbicides, and notes that all herbicide application shall be in accordance with Herbicide Treatment Standard Operating Procedures (Appendix B of the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement).

BRW Comment #3: Basin and Range Watch asked if the site would be surveyed for banded Gila monster, and if so, what methods would be used?

Response: Staff addressed potential impacts to banded Gila monsters in the PSA and FSA/DEIS. Staff's proposed Condition of Certification BIO-11 requires that concurrent with the desert tortoise clearance survey, a qualified biologist experienced with Gila monster survey and capture techniques shall perform a preconstruction survey for Gila monsters in the project area, and relocate the animal in consultation with CDFG and USFWS.

BRW Comment #4: Basin and Range Watch commented that the finding of 97 desert tortoise carcasses may indicate a problem with respiratory disease or possible some other impact. How can a project that destroys so much habitat for this species be considered when such a die off is noted? A line distance sampling survey should be conducted during activity seasons for the next couple of years before approval of this project is considered.

Response: Carcasses of desert tortoise are routinely found during surveys in suitable desert tortoise habitat; staff does not believe the number of carcasses found during the surveys at the ISEGS site indicate a die off. Staff does not believe that line distance sampling surveys for two additional years would provide new information that would change the analysis, conclusions or mitigation measures in this FSA/DEIS; staff is already assuming that the ISEGS site is good quality desert tortoise habitat, and developing a more accurate estimate of the number of tortoise inhabiting the site would not change the proposed compensatory mitigation.

BRW Comment #5: Basin and Range Watch had the following questions regarding the desert tortoise clearance surveys and translocation: (1) Will total clearance be done where all tortoises be found and removed, including digging out burrows? Please specify this. (2) Where will mitigation land be bought? (3) Will all tortoises be placed on the same mitigation land? What will be the location? Will follow-up studies be carried out to determine the success of translocation and survival? How will coyote and other predation be prevented on translocated tortoises?

Response: (1) Staff's proposed Condition of Certification **BIO-8** provides specific guidance on the conduct of desert tortoise clearance surveys, which would include excavation of potential burrows in accordance with USFWS guidelines. (2) The location of the compensatory mitigation lands for desert tortoise has not yet been specified, but staff's proposed Condition of Certification **BIO-17** would provide criteria for the location and characteristics of these lands. (3) Staff's proposed Condition of Certification **BIO-9** requires preparation of a desert tortoise Translocation Plan, which would include measures to monitor the survival of the translocated tortoise and to address potential predation on these animals.

BRW Comment #6: What kind of reduction measures would be taken to minimize raven predation on tortoises? If native predators are to be exterminated, the EIS needs to explain how this will take place. Will the same measures apply to coyotes on the translocation site? The EIS should be able to describe and admit the unattractive details that will need to be implemented for predator reduction.

Response: Staff agrees that predator control for ravens and coyotes should be thoroughly addressed in the Translocation Plan that would need to be developed to comply with staff's proposed Condition of Certification **BIO-9**.

BRW Comment #7: Basin and Range Watch asks if there will be pre-construction nesting bird surveys and if avoidance measures will be implemented. If construction takes place during the nesting season, will protection be given to nesting birds on the construction site, such as taping off the nesting area until nesting is complete for Brewer's sparrow, Le Conte's thrasher?

Response: Staff's proposed Condition of Certification **BIO-15** requires preconstruction bird surveys to be conducted prior to any construction activities occurring February 1 through August 31. If nests of any species are detected this condition requires establishment of a buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG) and development of a monitoring plan to ensure the nest is protected.

BRW Comment #8: Where would burrowing owls be relocated to?

Response: Staff's proposed Condition of Certification **BIO-16** requires pre-construction nest surveys and protection of any nests found on the project site.

BRW Comment #9: "The applicant acknowledges that Nelson's big horn sheep could occur in the project area (CH2M Hill 2008a). However, the AFC (BSG 2007a) does not provide sufficient project-specific information on use of the site by Nelson's big-horn sheep to identify areas that might provide foraging habitat and movement corridors, to assess potential impacts, or to develop appropriate mitigation measures. It may be possible to offset potential project impacts to Nelson's bighorn sheep with implementation of Condition of Certification **BIO-17**, the compensatory mitigation plan, if the plan included enhancement measures that would benefit bighorn." The PSA seems to recognize this problem of foraging habitat, but provides no solution to the problem. The project should be delayed until more attention is given to this issue.

Response: No site-specific information exists on use of the site by big-horn sheep, but based on consultation with big horn sheep experts, staff assumes that portions of the ISEGS site are occasionally used for foraging. Staff's proposed Condition of Certification **BIO-19** would mitigate for project impacts to bighorn sheep by requiring the applicant to acquire and construct an artificial water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated Wilderness.

BRW Comment #10: Transporting dangerous chemicals poses a threat to native plants and wildlife as well as people in local areas and nearby communities. This proposes an unneeded public health risk. Please make a list of potential impacts hazardous material may have on specific flora and fauna including desert tortoise, bighorn sheep, rare plants and other wildlife.

Response: The **Hazardous Materials Management** section of this FSA/DEIS provides a comprehensive assessment of the hazardous materials that would be handled, stored or transported during construction and operation of the ISEGS project. Staff has concluded after reviewing this section that, with implementation of mitigation measures recommended in that section, hazardous materials would not pose a significant risk to native plant communities or wildlife at and near the ISEGS project site.

BRW Comment #11: Will tortoise monitoring and exclusion fences be placed along all new pipelines constructed in both California and Nevada?

Response: Staff cannot speak to the mitigation measures that would be implemented on pipeline projects in California and Nevada except to say that any projects that would be permitted by the Energy Commission or BLM would need to comply with LORS, including protection of desert tortoise and other special-status plant and wildlife species.

BRW Comment #12: Will tortoise exclusion fences and biological monitors be present during all phases of upgrading and construction of transmission lines? Will new lines be insulated to prevent bird electrocution?

Response: Staff's proposed Condition of Certification **BIO-11** requires a biological monitor to be present for any activities that have potential to impact desert tortoise, which would include upgrading and construction of transmission lines. This condition also requires that the project owner design, install, and maintain transmission lines and all electrical components in accordance with the Avian Power Line Interaction Committee's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* to reduce the likelihood of electrocutions of large birds.

BRW Comment #13: (1) Will tortoise exclusion fences and biological monitors be present during grading of new roads in desert habitat? (2) Will tortoises encountered in burrows be removed and placed away from construction? (3)How will any Gila monsters encountered underground be dealt with to protect them? (4) Will cacti and yuccas be moved or discarded in new roads? (5) Will mitigation habitat equal to the amount of desert habitat destroyed for new roads be purchased by the applicant?

Response: (1) Staff's proposed Condition of Certification **BIO-11** requires a biological monitor to be present for any activities that have potential to impact desert tortoise, which would include new road construction. (2) Staff's proposed Condition of Certification **BIO-9** requires tortoise encountered during construction to be relocated as described in the Translocation Plan. (3) Staff's proposed Condition of Certification **BIO-11** requires that concurrent with the desert tortoise clearance survey, a biologist perform a preconstruction survey for Gila monsters in the project area, and implement appropriate impact avoidance and minimization measures if detected. (4) Staff's proposed Condition of Certification **BIO-14** addresses the salvage and disposition of plant material, including cacti or yuccas impacted by new roads. (5) Habitat impacted by new roads has been included in the calculations of acreage that would require compensatory mitigation.

BRW Comment #14: Would detention basin maintenance affect tortoises, and how will this be mitigated? Will tortoise exclusion fences be maintained? Will tortoises be allowed to access the detention basins?

Response: Detention basins are no longer included as part of the ISEGS project. Desert tortoise fences would be maintained for the life of the project as described in staff's proposed Condition of Certification **BIO-8**.

> BRW Comment #15: An herbicide would be used to eradicate noxious weeds and nonnative species." How will herbicide spraying be controlled so that toxins do not blow into adjacent deserts or accumulate in dust that blows into desert habitats nearby during windstorms?

Response: Staff's proposed Condition of Certification **BIO-13** requires preparation of a Weed Management Plan, which would be based on the draft Weed Management Plan submitted by the applicant (CH2M Hill 2008e). This plan provides a discussion of weed eradication and control methods, including herbicides, and notes that all herbicide application shall be in accordance with Herbicide Treatment Standard Operating Procedures (Appendix B of the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement).

Center for Biological Diversity letter dated July 8, 2009 (CBD 2009a)

CBD Comment #1: With the majority of the site comprised of heliostat mirrors, which only reflect and focus the sun's ray on the power tower and do not contain any superheated liquids, there may be opportunities to conserve some of the existing on-site vegetation and habitat, which would avoid and minimize the impacts to the existing biological resources. In fact, solar farms are including habitat features into their project design http://www.optisolarfarms.ca/sarnia.htm. This same type of solar technology already installed and producing solar energy in Spain includes vegetation between the mirrors. Despite the problems of habitat fragmentation, vegetation islands provide stepping stones for wildlife across the site and are an improvement over complete vegetation removal.

> Response: Staff agrees that there may be opportunities for preservation of habitat within the solar fields with the applicant's low impact development approach, and has discussed this in the subsection on impacts to special-status plant species.

CBD Comment #2: Potential Minimization by Preservation of Vegetation: One of the maintenance issues with the heliostat mirrors is dust deposition resulting in decreased efficiency. Maintaining native vegetation will help to keep the fragile soils in place on the project site, reducing the amount of soil particles that could get airborne and be deposited on the mirrors. This will in turn reduce the need for groundwater pumping to provide water to wash the mirrors. Leaving vegetation in place provides the additional benefit of not increasing the particulate matter (PM) in the already compromised Mojave Desert Air Quality Management District. We urge CEC staff to more fully explore the benefits of maintaining vegetation and habitat on site for this proposed project in the Final Staff Assessment.

Response: Staff agrees that maintaining as much vegetation as possible would help minimize soil erosion and dust, and has incorporated recommendations to preserve vegetation and revegetate where appropriate into staff's proposed Conditions of Certification **BIO-11**, **BIO-14**, and **BIO-20.**

CBD Comment #3: Desert Tortoise: Analysis of Impacts is Inadequate and the Translocation Plan is Unsupportable. The desert tortoise is continuing to decline throughout its range (USFWS 2008) despite being under federal and state Endangered Species Acts protection as threatened. Prior to 2002, the project area was designated by BLM as Category 1 habitat for desert tortoise – the best desert tortoise habitat. The Northern and Eastern Mojave Plan (BLM 2002) changed that designation, not based on any site specific science, but on the establishment of Desert Wildlife Management Areas (DWMA's) elsewhere.

Response: Staff does not agree that the analysis of impacts to desert tortoise is inadequate, and believes that the conclusion of significant impacts to this species is well supported by the analysis in this section. Staff notes that the revised Translocation Plan and subsequent submittals from the applicant, which were provided after this letter was received, have supplied much of the information that was missing from the earlier Translocation Plan. Staff is aware of the former and current BLM habitat classifications for the ISEGS project site, and based conclusions about impacts to desert tortoise on the site specific surveys and information provided by the applicant on the existing habitat conditions at the ISEGS project area.

CBD Comment #4: New science has become available since our scoping comments for the federal process (CBD scoping comment letter dated November 30, 2007). Murphy et al. (2007) undertook extensive genetic analysis across the range of the desert tortoise and identified genetically unique populations within the larger listed population. The desert tortoises located on the Ivanpah site represent a unique genetic group – the northeastern Mojave group. This localized area around the Ivanpah area is the only location of this unique genotype in California. Because these animals represent such a unique occurrence in California, adequate avoidance, minimization and mitigation must be applied to this project. The uniqueness of this population is also recognized both in the 1994 Desert Tortoise Recovery Plan (USFWS 1994) and the draft Revised Recovery Plan (USFWS 2008) as the North Eastern Mojave Recovery Unit and the Murphy et al. paper only confirms the uniqueness of this population.

Response: Staff is aware of the studies by Murphy et al. (2007) and the recommendations in the USFWS recovery plans and relied in part on these references to arrive at the conclusions described in the cumulative impact subsection.

CONCLUSIONS

The Ivanpah Solar Electric Generating System (ISEGS) project would have major impacts to the biological resources of the Ivanpah Valley, affecting many sensitive plant and wildlife species and eliminating a broad expanse of relatively undisturbed Mojave

Desert habitat. Approximately 4,073 acres of occupied desert tortoise habitat would be permanently lost and a minimum of 25 desert tortoises would need to be translocated west of the ISEGS project site. These actions require state and federal endangered species “take” authorization. In addition to direct loss of habitat, the project would fragment and degrade adjacent habitat, and could promote the spread of invasive non-native plants and desert tortoise predators such as ravens. These impacts would directly and adversely affect habitat for a threatened species (the desert tortoise), and would likely be highly controversial. Based on these factors, the proposed project would result in impacts that would be significant with respect to NEPA significance criteria in 40 CFR 1508.27.

Other special-status wildlife species potentially impacted by the project because of loss of breeding and/or foraging habitat include burrowing owl, loggerhead shrike, Crissal thrasher, golden eagle, and American badger. The project would also affect segments of approximately 2,000 ephemeral drainages on the ISEGS site, potentially resulting in direct or indirect impacts to the wildlife functions and values provided by 198 acres of waters of the state.

The ISEGS project site supports a diverse flora including numerous special-status plant species. Eight special-status plant species, only one of which is considered sensitive by BLM, would be directly impacted by construction of ISEGS. Energy Commission staff consider impacts to five of these (Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish’s club-cholla, and Rusby’s desert-mallow) to be significant according to California Environmental Quality Act guidelines because the project would eliminate a substantial portion of their documented occurrences in the state. Depending on the degree of avoidance that the applicant can achieve, staff’s proposed avoidance and minimization measures may reduce impacts to three of these species (desert pincushion, nine-awned pappus grass, and Parish’s club-cholla) to less-than-significant levels. However, impacts to Mojave milkweed and Rusby’s desert mallow would remain significant even after implementation of the special-status plant avoidance and minimization measures described in Energy Commission staff’s proposed conditions of certification.

Staff have concluded that without mitigation the ISEGS project would be a substantial contributor to the cumulatively significant loss of Ivanpah Valley’s biological resources, including the threatened desert tortoise and other special-status species. For most project impacts to biological resources staff has developed impact avoidance, minimization and mitigation measures that would reduce impacts to less-than-significant levels. **Biological Resources Table 8** provides a summary of these conditions.

BIOLOGICAL RESOURCES TABLE 8
Summary of Conditions of Certification

#	Condition of Certification
BIO-1	Designated Biologist Selection and Qualifications
BIO-2	Designated Biologist Duties
BIO-3	Biological Monitor Selection and Qualifications
BIO-4	Designated Biologist Duties
BIO-5	Designated Biologist and Biological Monitor Authority
BIO-6	Worker Environmental Awareness Program
BIO-7	Biological Resources Mitigation Implementation & Monitoring Plan
BIO-8	Desert Tortoise Clearance Surveys and Fencing
BIO-9	Desert Tortoise Translocation Plan
BIO-10	Desert Tortoise Compliance Verification
BIO-11	Impact Avoidance and Minimization Measures
BIO-12	Raven Management Plan
BIO-13	Weed Management Plan
BIO-14	Closure, Revegetation and Rehabilitation Plan
BIO-15	Pre-Construction Nest Surveys
BIO-16	Burrowing Owl Impact Avoidance and Minimization Measures
BIO-17	Desert Tortoise Compensatory Mitigation
BIO-18	Special-Status Plant Mitigation
BIO-19	Desert Tortoise Sheep Mitigation
BIO-20	Streambed Impact Avoidance and Compensation Measures

Energy Commission staff have concluded that the 2:1 compensatory mitigation, as described in staff's proposed Condition of Certification **BIO-17**, combined with the BLM 1:1 mitigation, would meet CESA's full mitigation standard pending resolution of the few issues described below. Staff considers the combination of these two mitigation approaches to be a complementary and complete mitigation package that would achieve 3:1 mitigation and would satisfy federal and state requirements for mitigating impacts to desert tortoise. However, a few issues need to be resolved before finalizing this complementary BLM-Energy Commission mitigation package:

- In Perpetuity Protection: Mitigation lands must be protected in perpetuity to satisfy CDFG requirements. For BLM mitigation, acquisition of private lands within the DWMAs and the Mojave National Preserve would satisfy this requirement because the surrounding protective land uses would prevail. If other lands were acquired that were not within such protected areas, BLM would need to provide some sort of assurances for long-term protection if these lands are to be counted as fulfilling part of CESA's full mitigation standard. To address this issue BLM has recently proposed development of deed restriction language and a Memorandum of Understanding between BLM and CDFG to offer protection to BLM-managed mitigation lands.
- Enhancement Actions: Staff has yet to develop a specific program of enhancement actions other than land acquisition that would fulfill BLM's 1:1 mitigation requirements and CESA's full mitigation standard. Proposed enhancement actions on BLM lands such as fencing and habitat restoration would need to be fully analyzed and disclosed to satisfy NEPA requirements. BLM and will collaborate with

Energy Commission staff, CDFG and the USFWS in the development of specific desert tortoise enhancement actions.

- Process for Mitigation Compliance: Staff needs to integrate CDFG and BLM mitigation processes and develop a mechanism that provides compliance monitoring of enhancement actions on BLM lands. For land acquisitions, BLM, CDFG and the Energy Commission have well developed and transparent procedures to track expenditures and acquisitions. However, a similar mechanism is needed to verify fulfillment of enhancement actions such as fencing or habitat restoration on BLM lands, and provide a process for compliance monitoring. BLM and Energy Commission staff will work together to develop a process that allows tracking and verification of enhancement actions for desert tortoise.

Energy Commission staff has determined that if these issues are resolved, the proposed land acquisitions and enhancement activities would satisfy requirements of the California Endangered Species Act. Except for the special-status plant impacts described above, this mitigation would also reduce CEQA impacts to less-than-significant levels.

The CDFG has not yet provided concurrence with this mitigation approach for desert tortoise compensation, or with staff's proposed Conditions of Certification, **BIO-9** (desert tortoise translocation plan) and **BIO-20** (streambed impact avoidance and compensation measures). These two conditions of certification serve to satisfy terms and conditions that, but for the Energy Commission's exclusive authority under the Warren Alquist Act, would have been included in the states Incidental Take Permit (California Endangered Species Act (Fish and Game Code §§ 2050 et seq.) and the Lake and Streambed Alteration Agreement (California Fish and Game Code §§ 1600 1607).

Energy Commission staff has determined that if these issues are resolved, the proposed land acquisitions and enhancement activities would satisfy requirements of the California Endangered Species Act. Except for the special-status plant impacts described above, this mitigation would also reduce CEQA impacts to less-than-significant levels.

Staff anticipates resolution of the outstanding issues by working closely and cooperatively with USFWS, CDFG, and the applicant to finalize a mitigation and enhancement plan for desert tortoise.

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

DESIGNATED BIOLOGIST SELECTION AND QUALIFICATIONS[3]

BIO-1 The project owner shall assign at least one Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist(s), with at least three references and contact information, to the Energy Commission Compliance Project Manager (CPM) and BLM's Authorized Officer for approval in consultation with CDFG and USFWS.

The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;

3. Have at least one year of field experience with biological resources found in or near the project area;

4. Meet the current USFWS Authorized Biologist qualifications criteria (USFWS 2008), demonstrate familiarity with protocols and guidelines for the desert tortoise, and be approved by the USFWS; and

5. Possess a California ESA Memorandum of Understanding pursuant to Section 2081(a) for desert tortoise.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of BLM's Authorized Officer and the CPM, in consultation with CDFG and USFWS, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 90 days prior to the start of any project-related site disturbance activities. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

[3] USFWS <www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt> designates biologists who are approved to handle tortoises as "Authorized Biologists." Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately, and have received USFWS approval. Authorized Biologists are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the Authorized Biologist. Designated Biologists are the equivalent of Authorized Biologists. Only Designated Biologists and certain Biological Monitors who have been approved by the Designated Biologist would be allowed to handle desert tortoises.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to BLM's Authorized Officer and the CPM at least 10 working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the BLM Authorized Officer and the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to BLM's Authorized Officer and the CPM and for consideration.

Designated Biologists shall complete a USFWS Qualifications Form (USFWS 2008) (www.fws.gov/ventura/speciesinfo/protocols_guidelines) and submit it to the USFWS, BLM's Authorized Officer and the CPM within 60 days prior to ground breaking for review and final approval.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s) but remains the contact for the project owner, BLM's Authorized Officer and the CPM. The Designated Biologist Duties shall include the following:

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources conditions of certification;

2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) to be submitted by the project owner;

3. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;

4. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm's way;

6. Notify the project owner and BLM's Authorized Officer and the CPM of any non-compliance with any biological resources condition of certification;

7. Respond directly to inquiries of BLM's Authorized Officer and the CPM regarding biological resource issues;

8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report;

9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>, and; and

10. Maintain the ability to be in regular, direct communication with representatives of CDFG, USFWS, BLM's Authorized Officer and the CPM, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Authorized Officer and the CPM and copies of all written reports and summaries that document biological resources compliance activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless his/her duties cease, as approved by BLM's Authorized Officer and the CPM.

BIOLOGICAL MONITOR SELECTION AND QUALIFICATIONS

BIO-3 The project owner's BLM- and CPM-approved Designated Biologist shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to BLM's Authorized Officer and the CPM. The resume shall demonstrate, to the satisfaction of the CPM the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS designated Desert Tortoise Monitor (USFWS 2008).

Biological Monitor(s) training by the Designated Biologist shall include familiarity with the conditions of certification, BRMIMP, WEAP, USFWS guidelines on desert tortoise surveys and handling procedures <www.fws.gov/ventura/speciesinfo/protocols_guidelines>.

Verification: The project owner shall submit the specified information to the BLM's Authorized Officer and the CPM for approval at least 30 days prior to the start of any project-related site disturbance activities. The Designated Biologist shall submit a written statement to BLM's Authorized Officer and the CPM confirming that individual Biological Monitor(s) has been trained including the date when training was completed. If additional biological monitors are needed during construction the specified information shall be submitted to BLM's Authorized Officer and the CPM and for approval at least 10 days prior to their first day of monitoring activities.

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BIOLOGICAL MONITOR DUTIES

BIO-4 The Biological Monitors shall assist the Designated Biologist in conducting surveys and in monitoring of mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist shall remain the contact for the project owner, BLM's Authorized Officer and the CPM.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to BLM's Authorized Officer and the CPM and copies of all written reports and summaries that document biological resources compliance activities, including those conducted by Biological Monitors. If actions may affect biological resources during operation a Biological Monitor, under the supervision of the Designated Biologist, shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties cease, as approved by BLM's Authorized Officer and the CPM.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-5 The project owner's construction/operation manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources conditions of certification.

The Designated Biologist shall have the authority to immediately stop any activity that is not in compliance with these conditions and/or order any reasonable measure to avoid take of an individual of a listed species. If required by the Designated Biologist and Biological Monitor(s) the project owner's construction/operation manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist. The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the construction/operation manager when to resume activities; and

3. Notify BLM's Authorized Officer and the CPM and if there is a halt of any activities and advise them of any corrective actions that have been taken or will be instituted as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies BLM's Authorized Officer and the CPM immediately (and no later than the morning following the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify BLM's Authorized Officer and the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by BLM's Authorized Officer and the CPM within five working days after receipt of notice that corrective action is completed, or the project owner will be notified by BLM's Authorized Officer and the CPM that coordination with other agencies will require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

BIO-6 The project owner shall develop and implement an Ivanpah SEGS-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from USFWS, CDFG, BLM's Authorized Officer and the CPM. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, subcontractors, and delivery personnel. The WEAP shall be implemented during site mobilization, ground disturbance, grading, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media, including photographs of protected species, is made available to all participants. The training presentation shall be made available in the language best understood by the participants;

2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that Gila monsters are venomous and should not be handled, and that no snakes, reptiles, or other wildlife shall be harmed;

3. Place special emphasis on desert tortoise, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;

4. Include a discussion of fire prevention measures to be implemented by workers during project activities; request workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;

5. Present the meaning of various temporary and permanent habitat protection measures;

6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and

7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: At least 60 days prior to the start of any project-related site disturbance activities, the project owner shall provide to BLM's Authorized Officer and the CPM a copy of the draft WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. At least 10 days prior to site and related facilities mobilization, the project owner shall submit two copies of the BLM- and CPM-approved final WEAP.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for at least six months after the start of commercial operation.

Throughout the life of the project, the worker education program shall be repeated annually for permanent employees, and shall be routinely administered within one week of arrival to any new construction personnel, foremen, contractors, subcontractors, and other personnel potentially working within the project area. Upon completion of the orientation, employees shall sign a form stating that they attended the program and understand all protection measures. These forms shall be maintained by the project owner and shall be made available to BLM's Authorized Officer and the CPM and upon request. Workers shall receive and be required to visibly display a hardhat sticker or certificate that they have completed the training.

During project operation, signed statements for operational personnel shall be kept on file for six months following the termination of an individual's employment.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN (BRMIMP)

BIO-7 The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the BLM-Authorized Officer and the CPM (for review and approval) and shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Desert Tortoise Translocation Plan, the Raven Management Plan, the Closure, Revegetation and Rehabilitation Plan, the Burrowing Owl Mitigation and Monitoring Plan, and the Weed Management Plan.

The BRMIMP shall be prepared in consultation with the Designated Biologist and include the following:

1. All biological resources mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;

2. All biological resources conditions of certification identified as necessary to avoid or mitigate impacts;

3. All biological resource mitigation, monitoring and compliance measures required in federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;

4. All sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;

5. All required mitigation measures for each sensitive biological resource;

6. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;

7. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction and operation;

8. Aerial photographs, at an approved scale, of all areas to be disturbed during project construction activities; include one set prior to any site or related facilities mobilization disturbance and one set subsequent to completion of project construction. Provide planned timing of aerial photography and a description of why times were chosen. Provide a final accounting of the before/after acreages and a determination of whether additional habitat compensation is necessary in the Construction Termination Report;

9. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

10. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;

11. All performance standards and remedial measures to be implemented if performance standards are not met;

12. A discussion of biological resources-related facility closure measures including a description of funding mechanism(s); and

13. A process for proposing plan modifications to BLM's Authorized Officer and the CPM and appropriate agencies for review and approval; and

Verification: The project owner shall submit the BRMIMP to the BLM Authorized Officer and the CPM at least 60 days prior to start of any project-related site disturbance activities. The BRMIMP shall contain all of the required measures included in all biological Conditions of Certification. No ground disturbance may occur prior to approval of the final BRMIMP by BLM's Authorized Officer and the CPM.

BLM's Authorized Office and the CPM, in consultation with other appropriate agencies, will determine the BRMIMP's acceptability within 45 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to BLM's Authorized Office and the CPM within five days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit

condition within at least 10 days of their receipt by the project owner. Ten days prior to site and related facilities mobilization the revised BRMIMP shall be resubmitted to BLM's Authorized Officer and the CPM.

The project owner shall notify BLM's Authorized Officer and the CPM and no less than five working days before implementing any modifications to the approved BRMIMP to obtain BLM's Authorized Officer and CPM approval.

Any changes to the approved BRMIMP must also be approved by BLM's Authorized Officer and the CPM and in consultation with appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures (construction activities that were monitored, species observed) will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Authorized Officer and the CPM, for review and approval, a written construction termination report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

DESERT TORTOISE CLEARANCE SURVEYS AND FENCING

BIO-8 The project owner shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to desert tortoise. Methods for clearance surveys, fence installation, tortoise handling, artificial burrow construction, egg handling and other procedures would be consistent with those described in the *Guidelines for Handling Desert Tortoise During Construction Projects* (Desert Tortoise Council 1999) or more current guidance provided by CDFG and USFWS. The project owner shall also implement all terms and conditions described in the Biological Opinion prepared by USFWS. These measures include, but are not limited to, the following:

1. Fence Installation. To avoid impacts to desert tortoises the proposed fence alignment shall be flagged and the alignment surveyed within 24 hours prior to the initiation of construction of tortoise-exclusion fence. Surveys shall be conducted by the Designated Biologist(s) using techniques approved by the USFWS and CDFG. Biological Monitors may assist the Designated Biologist under his or her supervision. These surveys shall provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence line. This fence line transect will cover an area approximately 90 feet wide centered on the fence alignment. Transects would be no greater than 30 feet apart. All desert tortoise burrows, and burrows constructed by other species that might be used by desert tortoises, shall be examined to assess occupancy of each burrow by desert tortoises and handled in accordance with USFWS-approved protocol.

2. Fence Installation. Prior to the initiation of construction activities for each solar plant, the project owner shall enclose the boundary of the affected solar plant with permanent chain-link fencing for security purposes and permanent desert tortoise exclusionary fencing would be attached to the bottom of the chain link fencing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.

    a. Fence Material and Installation. The permanent tortoise exclusionary fencing shall consist of galvanized hard wire cloth 1-inch by 2-inch mesh sunk 12 inches into the ground, and 24 inches above the ground (but not less than 18 inches above the ground) (USFWS 2008). The fencing shall be buried approximately 6 inches below ground or bent at a right angle towards the outside of the project site and covered with dirt, rocks or gravel to discourage the tortoise from digging under the fence

    b. Security Gates. Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. The gates may be electronically activated to open and close immediately after the vehicle(s) have entered or exited to prevent the gates from being kept open for long periods of time. Cattle grating designed to safely exclude desert tortoise shall be installed at the gated entries to discourage tortoises from gaining entry

    c. Utility Corridor Fencing. The utility rights-of-way shall be temporarily fenced on each side of the right-of-way prior to ground disturbing activities to prevent desert tortoise entry during construction. Temporary fencing must follow guidelines for permanent fencing and supporting stakes shall be sufficiently spaced to maintain fence integrity.

    d. Fence Inspections. Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing in the utility corridors, the fencing shall be regularly inspected. Permanent fencing shall be inspected monthly and during/following all major rainfall events. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within two days of observing damage. Inspections of permanent site fencing shall occur for the life of the project. Temporary fencing must be inspected weekly and, where drainages intersect the fencing, during and immediately following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

3. Clearance Surveys. Following construction of the security fence and the attached tortoise exclusion fence, the fenced area shall be cleared of tortoises by Biological Monitors under the supervision of the Designated Biologist. Two complete passes with complete coverage shall be

conducted as described above. If a desert tortoise is located on the second survey, a third survey would be conducted. Transects would be no wider than 30 feet. Each separate survey would be walked in a different direction to allow opposing angles of observation. Vegetation salvage operations shall not begin until the area is deemed free of desert tortoises.

4. Burrow Searches. During clearance surveys all potential desert tortoise burrows within the fenced area shall be inspected to determine if tortoises are present. In some cases, a fiber optic scope may be needed to determine presence or absence within a deep burrow. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined. Tortoises taken from burrows and from elsewhere on the site shall be relocated or translocated as described in the Desert Tortoise Relocation/Translocation Plan.

5. Burrow Excavation/Handling. All potential desert tortoise burrows located would be excavated by hand by a Biological Monitor, tortoises removed, and collapsed or blocked to prevent occupation by desert tortoises. Burrows inhabited by tortoises shall be excavated using hand tools under the supervision of the Designated Biologist. If excavated during May through July, the Biological Monitor would search for desert tortoise nests/eggs, which are typically located near the entrance to burrows. All desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by the Designated Biologist or a Biological Monitor in accordance with the Service-approved protocol (Desert Tortoise Council 1994, revised 1999). If the Desert Tortoise Council releases a revised protocol for handling of desert tortoises before initiation of project activities, the revised protocol would be implemented for the project.

6. Monitoring During Clearing. Following the tortoise clearance and translocation, workers and heavy equipment shall be allowed to enter the project site to perform vegetation salvage and earth work such as clearing, grubbing, leveling, trenching, and installation of heliostats. A Biological Monitor shall monitor clearing and grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be relocated or translocated as described in the Desert Tortoise Relocation/Translocation Plan to an area approved by the Designated Biologist.

7. Reporting. The Designated Biologist shall record the following information for any desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled desert tortoise as described in the paragraph below. Desert tortoise moved from within project areas shall be marked for future identification as described in

Guidelines for Handling Desert Tortoise during Construction Projects (Desert Tortoise Council 1999) or more current guidance on the USFWS website. Digital photographs of the carapace, plastron, and fourth costal scute shall be taken. Scutes shall not be notched for identification.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of desert tortoise clearance surveys the Designated Biologist shall submit a report to BLM's Authorized Officer, the CPM, USFWS, and CDFG describing how each of the mitigation measures described above has been satisfied. The report shall include the desert tortoise survey results, capture and release locations of any relocated desert tortoises, and any other information needed to demonstrate compliance with the measures described above.

DESERT TORTOISE TRANSLOCATION PLAN

BIO-9 The project owner shall develop and implement a final Desert Tortoise Relocation/Translocation Plan (Plan) that is consistent with current USFWS approved guidelines, and meets the approval of BLM, USFWS, CDFG and Energy Commission staff. The final Plan shall be based on the draft Desert Tortoise Relocation/Translocation Plan prepared by the applicant dated May 2009 and shall include all revisions deemed necessary by BLM, USFWS, CDFG and the Energy Commission staff.

Verification: Within 60 days of publication of the Energy Commission Decision the project owner shall provide BLM's Authorized Officer and the CPM with the final version of a Desert Tortoise Relocation/Translocation Plan that has been reviewed and approved by BLM, USFWS, CDFG and Energy Commission staff. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved translocation must be made only after consultation with BLM's Authorized Officer, the CPM, USFWS, and CDFG. The project owner shall notify BLM's Authorized Officer and the CPM no fewer than 5 working days before implementing any BLM- and CPM-approved modifications to the Plan.

Within 30 days after initiation of translocation activities, the Designated Biologist shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Plan have been completed, and a summary of all modifications to measures made during implementation of the Plan.

DESERT TORTOISE COMPLIANCE VERIFICATION

BIO-10 The project owner shall provide Energy Commission and BLM representatives with reasonable access to the project site and mitigation lands under the control of the project owner and shall otherwise fully cooperate with the Energy Commission's and BLM's efforts to verify the project owner's compliance with, or the effectiveness of, mitigation measures set forth in the conditions of certification. The project owner shall hold the Designated Biologist, the Energy Commission, and BLM harmless for any costs the project owner incurs in complying with the management measures, including stop work orders issued by BLM's Authorized Officer, the CPM, or

the Designated Biologist. The Designated Biologist shall do all of the following:

1. Notify BLM's Authorized Officer and the CPM and at least 14 calendar days before initiating vegetation salvage or ground-disturbing activities;

2. Immediately notify BLM's Authorized Officer and the CPM in writing if the project owner is not in compliance with any conditions of certification, including but not limited to any actual or anticipated failure to implement mitigation measures within the time periods specified in the conditions of certification;

3. Remain onsite daily while vegetation salvage, grubbing, grading and heliostat installation activities are taking place to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protective zones.

4. Maintain and check desert tortoise exclusion fences on a daily basis to ensure the integrity of the fence is maintained. The Designated Biologist shall be present onsite to monitor construction and determine fence placement during fence installation.

5. Conduct compliance inspections at a minimum of once per month after clearing, grubbing, grading, and heliostat installation activities are completed and submit a monthly compliance report to BLM's Authorized Officer and the CPM ;

6. No later than January 31 of every year the ISEGS facility remains in operation, provide BLM's Authorized Officer and the CPM an annual Listed Species Status Report, which shall include, at a minimum: 1) a general description of the status of the project site and construction activities, including actual or projected completion dates, if known; 2) a copy of the table in the BRMIMP with notes showing the current implementation status of each mitigation measure; and 3) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and compensating for project impacts;

7. Ensure that all observations of listed species and their sign during project activities are reported to the Designated Biologist for inclusion in the next monthly compliance report submitted to BLM's Authorized Officer and the CPM;

8. No later than 45 days after the first sale of power provide BLM's Authorized Officer and the CPM a Final Listed Species Mitigation Report that shall include, at a minimum: 1) a copy of the table in the BRMIMP with notes showing when each of the mitigation measures was implemented; 2) all available information about project-related incidental take of listed species; 3) information about other project impacts on the listed species;

4) construction dates; 5) an assessment of the effectiveness of conditions of certification in minimizing and compensating for project impacts; 6) recommendations on how mitigation measures might be changed to more effectively minimize and mitigate the impacts of future projects on the listed species; and 7) any other pertinent information, including the level of take of the listed species associated with the project;

9. In the event of a sighting in an active construction area (e.g., with equipment, vehicles, or workers), injury, kill, or relocation of any listed species, notify BLM's Authorized Officer, the CPM, CDFG and USFWS immediately by phone and in no event later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine what further actions, if any, are required to protect listed species;

10. Prepare written follow-up notification via FAX or electronic communication to these agencies within 2 calendar days of the incident and include the following information as relevant:

    a. If a desert tortoise is injured as a result of project related activities during construction, the Designated Biologist will immediately take it to a BLM- and CPM-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals will be paid by the project owner. Following phone notification as required above, BLM's Authorized Officer, the CPM, CDFG, and USFWS will determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

    b. If a desert tortoise is killed by project-related activities during construction, or if a desert tortoise is otherwise found dead, submit a written report with the same information as an injury report. These desert tortoises shall be salvaged according to guidelines described in *Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise* prepared by Kristin Berry, June 2001. The project owner shall pay to have these desert tortoises necropsied. The report shall include the date and time of the finding or incident.

    c. BLM's Authorized Officer and the CPM may issue the project owner a written stop work order to suspend any activity related to the construction or operation of the project for an appropriate period determined in consultation with BLM's Authorized Officer and the CPM in order to prevent or remedy a violation of one or more conditions of certification (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. The project owner shall comply with the stop work order immediately upon receipt thereof.

Verification: No later than 2 calendar days following the above required notification of a sighting, kill, or relocation of a listed species, the project owner shall deliver to BLM's Authorized Officer, the CPM, CDFG, and USFWS via FAX or electronic communication the written report from the Designated Biologist describing all reported incidents of injury, kill, or relocation of a listed species, identifying who was notified, and explaining when the incidents occurred. In the case of a sighting in an active construction area, the project owner shall, at the same time, submit a map (e.g., using Geographic Information Systems) depicting both the limits of construction and sighting location to BLM's Authorized Officer, the CPM, CDFG and USFWS.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-11 During construction the project owner shall implement all feasible measures to avoid or minimize impacts to biological resources, including the following:

1. Limit Disturbance Areas. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) shall be delineated with stakes and flagging prior to construction activities in consultation with the Designated Biologist. Spoils and topsoil shall be stockpiled in disturbed areas lacking native vegetation and which do not provide habitat for special-status species. All disturbances, project vehicles and equipment shall be confined to the flagged areas.

2. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around will do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route will be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

3. Minimize Traffic Impacts. Vehicular traffic during project construction and operation shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit shall not exceed 20 miles per hour within the project area, on maintenance roads for linear facilities, or on access roads to the ISEGS site.

4. Monitor During Construction. The Designated Biologist or Biological Monitor shall be present at the construction site during all project activities that have potential to disturb soil, vegetation, and wildlife. In areas that have not been fenced with tortoise exclusion fencing and cleared, the USFWS-approved Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities.

5. .Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with desert tortoise exclusion fencing and

cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant communities and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.

6. Avoid Use of Toxic Substances. Road surfacing and sealants as well as soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.

7. .Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat. To minimize risk of avian collisions with the heliostat towers, only flashing or strobe lights shall be installed on these towers.

8. Badger Surveys. Concurrent with the desert tortoise clearance survey, the Designated Biologist or Biological Monitors shall perform a preconstruction survey for badger dens in the project area, including areas within 250 feet of all project facilities, utility corridors, and access roads. If badger dens are found, each den shall be classified as inactive, potentially active, or definitely active. Inactive dens shall be excavated by hand and backfilled to prevent reuse by badgers. Potentially and definitely active dens shall be monitored by the Designated Biologist or Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) at the entrance. If no tracks are observed in the tracking medium after 3 nights, the den shall be excavated and backfilled by hand. If tracks are observed, the applicant shall develop and implement a trapping and relocation plan in consultation with the Designated Biologist and CDFG. BLM approval may be required prior to release of badgers on public lands.

9. Gila Monster Surveys. If a Gila monster is encountered during clearance surveys or during construction, a qualified biologist experienced with Gila monster survey and capture techniques shall capture and maintain it in a cool (<85 degrees F) environment until it can be released to a safe, suitable area beyond the construction impact zone. The biologist shall coordinate with staff and CDFG biologists in the transport and relocation of any Gila monsters encountered during project surveys, construction, or operation.

10. Avoid Vehicle Impacts to Desert Tortoise. Parking and storage shall occur within the area enclosed by desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath

the vehicle for the presence of desert tortoise. If a desert tortoise is observed, it will be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor may remove and relocate the animal to a safe location if temperatures are within the range described in the USFWS protocol (www.fws.gov/ventura/speciesinfo/protocols_guidelines and Desert Tortoise Council 1999).

11. Avoid Wildlife Pitfalls:

    a. Backfill Trenches. At the end of each work day, the Designated Biologist shall ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the area fenced with desert tortoise exclusion fencing have been backfilled. If backfilling is not feasible, all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with desert tortoise-exclusion fencing. All trenches, bores, and other excavations outside the areas permanently fenced with desert tortoise exclusion fencing shall be inspected periodically throughout the day and at the end of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual as described in the Desert Tortoise Relocation/Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

    b. Avoid Entrapment of Desert Tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground and within desert tortoise habitat (i.e., outside the permanently fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the permanently fenced area after the clearance surveys have been completed.

    c. Cap Heliostat Holes. All holes drilled for heliostats shall be capped the same day they are drilled. Caps shall remain on the holes until heliostats are inserted into the holes, and shall be securely fastened and sufficiently sturdy to cover the heliostat holes indefinitely. The caps shall exclude all wildlife, and shall be inspected weekly by the Designated Biologist or Biological Monitors to ensure that the caps remain in place and that birds and terrestrial wildlife have not become trapped.

12. Minimize Standing Water. Water applied to construction areas and dirt roads for dust abatement shall use the minimal amount needed to meet

safety and air quality standards in an effort to prevent the formation of puddles, which could attract desert tortoises, common ravens and coyotes to construction sites.

13. Dispose of Roadkilled Animals. Road killed animals or other carcasses detected in the project area or on roads near the project area shall be picked up immediately upon detection and appropriately disposed of to avoid attracting common ravens and coyotes.

14. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Designated Biologist shall be informed of any hazardous spills immediately as directed in the project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

15.. Worker Guidelines. During construction all trash and food-related waste shall be placed in self-closing containers and removed daily from the site. Workers shall not feed wildlife or bring pets to the project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on Colosseum Road and other dirt access routes within desert tortoise habitat shall not exceed 20 miles per hour.

16. Monitor Ground Disturbing Activities Prior to Site Mobilization. If ground-disturbing activities are required prior to site mobilization, such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

Verification: All mitigation measures and their implementation methods shall be included in the BRMIMP and implemented. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to BLM's Authorized Officer and the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

RAVEN MANAGEMENT PLAN

BIO-12 The project owner shall implement a Raven Management Plan that is consistent with the most current USFWS-approved raven management guidelines, and which meets the approval of USFWS, CDFG, BLM, and the Energy Commission staff. The draft Raven Management Plan submitted by

the applicant (CH2M Hill 2008f) shall provide the basis for the final plan, subject to review and revisions from USFWS, CDFG, BLM, and the Energy Commission staff.

Verification: At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer, the CPM, USFWS, and CDFG with the final version of a Raven Management Plan that has been reviewed by USFWS, CDFG, BLM, and the Energy Commission staff. The CPM and BLM's Authorized Officer will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Raven Management Plan shall be made only after consultation with BLM and Energy Commission staff, USFWS, and CDFG. The project owner shall notify BLM's Authorized Officer and the CPM no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Raven Management Plan.

Within 30 days after completion of project construction, the project owner shall provide to the CPM for review and approval, a written report identifying which items of the Raven Management Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

WEED MANAGEMENT PLAN

BIO-13 The project owner shall implement a Weed Management Plan that meets the approval of BLM and the Energy Commission staff. The draft Weed Management Plan submitted by the applicant (CH2M Hill 2008e) shall provide the basis for the final plan, subject to review and revisions from BLM and Energy Commission staff, USFWS, and CDFG. In addition to describing weed eradication and control methods, and a reporting plan for weed management during and after construction, the final Weed Management Plan shall include at least the following Best Management Practices to prevent the spread and propagation of noxious weeds:

1. Limit the size of any vegetation and/or ground disturbance to the absolute minimum, and limit ingress and egress to defined routes.

2. Maintain vehicle wash and inspection stations and closely monitor the types of materials brought onto the site.

3. Reestablish vegetation quickly on disturbed sites.

4. Monitoring and rapid implementation of control measures to ensure early detection and eradication for weed invasions.

5. Use only weed-free straw or hay bales used for sediment barrier installations, and weed-free seed.

6. Reclamation and revegetation shall occur on all temporarily disturbed areas, including pipelines, transmission lines, and staging areas.

Verification: At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of a Weed Management Plan that has been reviewed and approved by BLM, and Energy Commission staff, USFWS, and CDFG. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 15 days of receipt of the final plan. All modifications to the approved Weed Control Plan must be made only after consultation with the Energy Commission staff, BLM, USFWS, and CDFG. The project owner shall notify the CPM no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Weed Management Plan.

Within 30 days after completion of project construction, the project owner shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Weed Management Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

CLOSURE, REVEGETATION AND REHABILITATION PLAN

BIO-14 The project owner shall develop and implement a revised Closure, Revegetation and Rehabilitation Plan (Plan) in cooperation with BLM and Energy Commission staff, USFWS and CDFG to guide site restoration and closure activities, including methods proposed for revegetation of disturbed areas immediately following construction and rehabilitation and revegetation upon closure of the facility. This plan must address preconstruction salvage and relocation of succulent vegetation from the site to either an onsite or nearby nursery facility for storage and propagation of material to reclaim disturbed areas. In the case of unexpected closure, the plan should assume restoration activities could possibly take place prior to the anticipated lifespan of the plant. The Plan shall address all issues discussed in **Biological Resources Appendix-A**: *Revisions to Draft Closure, Revegetation and Rehabilitation Plan*, and shall include but is not limited to the following elements in the revised plan:

1. Plan Purpose: The plan shall explicitly identify the objective of the revegetation plan to be re-creation of the types of habitats lost during construction and operation of the proposed solar energy facility. The final revegetation plan shall include introduction of mid- to late-successional species.

2. Standards/Monitoring: Performance standards for success thresholds, weed cover, performance monitoring methods and schedule, and maintenance monitoring in the revised Plan shall be conducted as described in **Biological Resources Appendix B**.

3. Baseline Surveys – Baseline vegetation surveys for planning restoration efforts shall be conducted as described in **Biological Resources Appendix B.**

4. Vegetation Clearing: Clearing of vegetation shall be limited to areas for which final maps are provided to BLM before approval of the ROW.

Clearing of vegetation will be permitted on roads, utility routes, heliostat maintenance pathways, building and parking areas, and temporary staging areas provided these are specifically documented on a georeferenced construction alignment drawing or aerial photo or shape file, showing the exact locations of soil disturbance. BLM will consider relocating specific installations prior to the beginning of construction and during construction on a case by case basis but will not approve additional acreage beyond that addressed in the current application.

5. Vegetation Mowing; Vegetation mowing shall be limited to areas adjoining vehicle pathways used for heliostat installation to allow installation of the heliostat pylon and allow for tracking clearance under the heliostat. Vegetation mowing may be repeated during the life of the facility to maintain appropriate clearance for heliostat tracking.

6. Succulent Salvage: The revised Plan shall include a table that shows proposed succulent salvage by species the number of plants onsite, the lower threshold height for salvage, the number in each size class, and the fate of plants not salvaged. An inventory and map of proposed succulent transplants shall be provided as described in Appendix A. Information gained from succulent transplant experience gained in ISEGS 1 shall be applied to future salvage operations, as described in **Biological Resources Appendix B**.

7. Seed Handling: Seed collection, testing and application shall be conducted as described in **Biological Resources Appendix B**, with collection areas within 10 miles of the project boundaries and on similar terrain, soil, exposure, slope, and elevation to the project site.

8. Soil Preparation: Soil descriptions, compaction measurements, mulch application, soil storage, seed farming, mycorrhizal inoculation, and biological crust collection and storage shall be conducted as described in **Biological Resources Appendix B.** Soil stockpiles shall not be placed on areas that support special-status plant species or other sensitive biological resources.

9. Weed Management. Weed management activities needed to control weeds resulting from mirror washing shall be conducted as described in **Biological Resources Appendix B**.

10. Final Closure Plan**.** A Final Closure Plan, which addresses the final revegetation and rehabilitation activities upon closure and decommissioning of the project, shall be completed as part of the revised Plan. The Final Closure Plan shall include a cost estimate, adjusted for inflation, reflecting the costs of the revegetation, rehabilitation, and monitoring for the duration of time estimated to achieve the objective of re-creating plant communities impacted by the project.

Verification: No more than 30 days from the Energy Commission Decision and BLM Record of Decision the project owner shall provide BLM's Authorized Officer and the CPM with a draft version of the revised Closure, Revegetation and Rehabilitation Plan. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of the Closure, Revegetation and Rehabilitation Plan that has been reviewed and approved by BLM, USFWS, CDFG, and the Energy Commission staff. All modifications to the approved Revegetation and Reclamation Plan must be made only after consultation with BLM's Authorized Officer, the CPM, USFWS and CDFG. The project owner shall notify BLM's Authorized Officer and the CPM and no less than 5 working days before implementing any BLM- and CPM-approved modifications to the Closure, Revegetation and Rehabilitation Plan.

Within 30 days after completion of project construction for each phase of development, the project owner shall provide to BLM's Authorized Officer and the CPM for review and approval, a written report identifying which items of the Closure, Revegetation and Rehabilitation Plan have been completed, a summary of all modifications to mitigation measures made during the project's construction phase, and which items are still outstanding.

At least one year prior to planned closure and decommissioning the project owner shall submit to the BLM-Authorized Officer and the CPM a final Closure Plan for review to determine if revisions are needed. The project owner shall incorporate all required revisions to the final Closure Plan and submit to the BLM-Authorized Officer and the CPM no less than 90 days prior to the start of ground disturbing activities associated with closure and decommissioning activities.

PRE-CONSTRUCTION NEST SURVEYS

BIO-15 Pre-construction nest surveys shall be conducted if construction activities will occur from February 1 through August 31. The Designated Biologist or Biological Monitor conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques and shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the project site or within 500 feet of the boundaries of the site and linear facilities;

2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 14-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;

3. If active nests are detected during the survey, a buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG) and monitoring plan shall be developed. Nest locations shall be mapped and submitted, along with a report stating the survey results, to the CPM; and

4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated Biologist, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: At least 10 days prior to the start of any project-related ground disturbance activities, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor (s); and a list of species observed. If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest.

BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-16 The project owner shall implement the following measures for the burrowing owl:

1. Complete a pre-construction survey for burrowing owls for any areas subject to disturbance from construction no less than 30 days prior to the start of initial ground disturbance activities. If burrowing owls are present within 500 feet of the project site or linear facilities, then the CDFG burrowing owl guidelines (1995) shall be implemented;

2. Monitor burrowing owl pairs within 500 feet of any activities that exceed ambient noise and/or vibration levels;

3. Establish a 500-foot set back from any active burrow and construct additional noise/visual barriers (e.g., haystacks or plywood fencing) to shield the active burrow from construction activities. Post signs (in both English and Spanish) designating presence of sensitive area;

4. Actively relocate all owls occupying burrows that will be temporarily or permanently impacted by the project and implement the following CDFG take avoidance measures:

   a. Occupied burrows shall not be disturbed during the nesting season (February 1 – August 31) unless a qualified biologist can verify through non-invasive methods that egg laying/incubation has not begun or juveniles are foraging independently and able to fly;

   b. A qualified biologist must relocate owls, confirm that owls have left burrows prior to ground-disturbing activities, and monitor the burrows. Once evacuation is confirmed, the biologist should hand excavate burrows and then fill burrows to prevent reoccupation; and

   c. Relocation of owls shall be approved by and conducted in consultation with CDFG.

5. Submit a Burrowing Owl Mitigation and Monitoring Plan to the CPM and CDFG for review and approval prior to relocation of owls (and incorporate

it into the project's BRMIMP) as well as a construction termination report with results to CDFG and CPM 30 days after completing owl relocation and monitoring and at least 30 days prior to the start of commercial operation.

Verification: The project owner shall submit a report to CDFG, USFWS, BLM's Authorized Officer and the CPM at least 30 days prior to the start of any project-related site disturbance activities that describes when surveys were completed, observations, mitigation measures, and the results of the mitigation. If burrowing owls are to be protected on site or relocated, the project owner shall coordinate with and report to CDFG, USFWS, BLM and Energy Commission staff on these proposed activities in a Burrowing Owl Mitigation and Monitoring Plan. Within 30 days after completion of owl relocation and monitoring, and the start of ground disturbance **or** at least 90 days prior to the sale of power, the project owner shall provide to the CDFG and CPM a written construction termination report identifying how measures have been completed.

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-17 To fully mitigate for habitat loss and potential take of desert tortoise, the project owner shall provide compensatory mitigation at a 3:1 ratio for impacts to 4,073 acres or the area disturbed by the final project footprint. At least two thirds of the 3:1 mitigation to satisfy the Energy Commission's Complementary Mitigation Measures shall be achieved by acquisition, in fee title or in easement, of no less than 8,146 acres of land suitable for desert tortoise. The project owner shall provide funding for the acquisition, initial habitat improvements and long-term management endowment of these Energy Commission complementary compensation lands. The remaining third of the 3:1 compensatory mitigation, to satisfy BLM's mitigation requirements and the balance of the Energy Commission's mitigation requirements, shall be developed in accordance with BLM's desert tortoise mitigation requirements as described in the Northern and Eastern Mojave Desert Management Plan (BLM 2002). BLM's compensatory mitigation plan, serving as one third of the 3:1 mitigation ratio required to satisfy CESA, would include acquisition of up to 4,073 acres of land within the Eastern Mojave Recovery Unit, or desert tortoise habitat enhancement or rehabilitation activities that meet BLM, CDFG, USFWS and Energy Commission approval, or some combination of the two. The Energy Commission requirements for acquisition of 8,146 acres of compensation lands shall include the following:

1. Responsibility for Acquisition of Lands: The responsibility for acquisition of lands may be delegated by written agreement from the Energy Commission and CDFG to a third party, such as a non-governmental organization supportive of Mojave Desert habitat conservation. Such delegation shall be subject to approval by the CPM and CDFG, in consultation with BLM and USFWS, prior to land acquisition, enhancement or management activities. If habitat disturbance exceeds that described in this analysis, the project owner shall be responsible for funding acquisition, habitat improvements and long-term management of additional compensation lands or additional funds required to compensate for any additional habitat disturbances. Additional funds shall be based on

the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. Water and mineral rights shall be included as part of the land acquisition. Agreements to delegate land acquisition to CDFG or an approved third party and to manage compensation lands shall be implemented within 18 months of the Energy Commission's decision.

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

   a. be as close to the project site as possible;

   b. provide good quality habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;

   c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

   d. be connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover;

   e. not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

   f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration, and

   g. not contain hazardous wastes.

3. Review and Approval of Compensation Lands Prior to Acquisition. A minimum of three months prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above. Approval from CDFG and the CPM, in consultation with BLM and the USFWS, shall be required for acquisition of all parcels comprising the 8,146 acres.

4. Energy Commission Complementary Mitigation Security The project owner shall provide financial assurances to the CPM and CDFG with copies of the document(s) to BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the Energy Commission Complementary Mitigation Measures described in this condition. These funds shall be used solely for implementation of the measures associated with the project. Alternatively, financial assurance can be provided to the CPM and CDFG in the form of an irrevocable letter

of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing project activities. Prior to submittal to the CPM, the Security shall be approved by CDFG and the CPM, in consultation with BLM and the USFWS, to ensure funding in the amount of $20,446,460. This Security amount was calculated as follows and may be revised upon completion of a Property Analysis Record (PAR) or PAR-like analysis of the proposed compensation lands:

a. land acquisition costs for compensation lands, calculated at $910/acre = $7,412,860;

b. costs of initial habitat improvements to compensation lands, calculated at $250/acre = $2,036,500;

c. costs of establishing an endowment for long-term management of compensation lands, calculated at $1,350/acre = $10,997,100; and

d. total security = $20,446,460.

5. Compensation Lands Acquisition Conditions The project owner shall comply with the following conditions relating to acquisition of the Energy Commission Complementary Mitigation compensation lands after the CDFG and the CPM, in consultation with BLM and the USFWS, have approved the proposed compensation lands and received Security as applicable and as described above.

   a. Preliminary Report: The project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed 8,146 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by CDFG and the CPM, in consultation with BLM and the USFWS, California Department of General Services and, if applicable, the Fish and Game Commission and/or the Wildlife Conservation Board.

   b. Title/Conveyance: The project owner shall transfer fee title or a conservation easement to the 8,146 acres of compensation lands to CDFG under terms approved by CDFG. Alternatively, a non-profit organization qualified to manage compensation lands (pursuant to California Government Code section 65965) and approved by CDFG and the CPM may hold fee title or a conservation easement over the habitat mitigation lands. If the approved non-profit organization holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If the approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If a Security is provided, the project owner or an approved third party shall complete the proposed compensation lands acquisition within 18 months of the start of project ground-disturbing activities.

c. Initial Habitat Improvement Fund. The project owner shall fund the initial protection and habitat improvement of the 8,146 acres. Alternatively, a non-profit organization may hold the habitat improvement funds if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the habitat improvement fund must go to CDFG.

d. Long-term Management Endowment Fund. Prior to ground-disturbing project activities, the project owner shall provide to CDFG a non-wasting capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the 8,146 acres. The project owner's financial responsibility for the actual cost of mitigation shall not increase by more than 25% of the Security Amount ($20,446,460). Alternatively, a non-profit organization may hold the endowment fees if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will be held in the special deposit fund established pursuant to California Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation or similarly approved entity identified by CDFG shall manage the endowment for CDFG and with CDFG supervision.

e. Interest, Principal, and Pooling of Funds. The project owner, CDFG and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following conditions:

- Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.
- Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the 8,146 acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation or similarly approved

entity identified by CDFG will manage the endowment for CDFG with CDFG supervision.

- Pooling Endowment Funds. CDFG, or a CPM and CDFG approved non-profit organization qualified to hold endowments pursuant to California Government Code section 65965, may pool the endowment with other endowments for the operation, management, and protection of the 8,146 acres for local populations of desert tortoise. However, for reporting purposes, the endowment fund must be tracked and reported individually to the CDFG and CPM.
- Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state or state approved federal agency reviews; and overhead related to providing compensation lands.

The project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other state agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

Verification: A minimum of three months prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcels intended for purchase.

No later than 18 months following the publication of the Energy Commission Decision the project owner shall provide written verification to the CPM and CDFG that the Energy Commission Complementary Mitigation compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Alternatively, no later than 30 days prior to beginning project ground-disturbing activities, the project owner shall provide written verification of Security in accordance with this condition of certification. If Security is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of project ground-disturbing activities. Within six months of the land or easement purchase, as determined by the date on the title, the project owner, or an approved third party, shall provide CDFG and the CPM with a management plan for the Energy Commission Complementary Mitigation compensation lands and associated funds. CDFG and the CPM shall review and approve the management plan, in consultation with BLM and the USFWS.

Within 90 days after completion of project construction, the project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of habitat disturbed during project construction. If habitat disturbance exceeds 4,073 acres, the project owner shall provide a compensation plan to the CMP and CDFG for their review and approval, in consultation with BLM and the USFWS. The compensation plan shall be submitted no later than 90 days from the CPM's receipt of the final accounting, and

shall include a description of additional funds required or lands that must be purchased to compensate for the unanticipated habitat disturbances, and a schedule for that acquisition or funding inclusive of all associated endowment and enhancement costs. The amount of funding for habitat acquisition, initial habitat improvement, and long-term management endowment shall be calculated at the adjusted market value at the time of construction. The project owner's financial responsibility for the actual cost of mitigation shall not increase by more than 25% of the Security Amount ($20,446,460).

SPECIAL-STATUS PLANT IMPACT AVOIDANCE AND MINIMIZATION

BIO-18 The project owner shall implement the following measures to avoid and minimize impacts to special-status plant species. Items 2, 3, 5, 6, 7, and 10 are recommended exclusively by Energy Commission staff.

1. On-Site Plant Avoidance/Minimization Areas: To the extent feasible the project owner shall avoid and minimize disturbance to all special-status plant species within the project site. Impact avoidance and minimization efforts shall occur in all feasible locations but shall focus in particular on areas depicted in **Biological Resources Figure 2** that indicate the highest densities of Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The highest priorities for protection shall be Mojave milkweed, desert pincushion, and Rusby's desert-mallow. The project owner shall implement all feasible impact avoidance and minimization measures within the following areas:

    a. ISEGS 1 and 3: Reconfigure project features to the extent feasible within the northern portions of ISEGS 1 and 3 to avoid areas that support the highest density and diversity of special-status plant species.

    b. Construction Logistics Area: Reconfigure the layout and design of the Construction Logistics Area to maximize protection of high density and diversity special-status plant areas.

    c. Natural Gas Pipeline: Adjust the alignment of the proposed 75-foot wide natural gas pipeline and narrow the construction footprint to avoid special-status plant occurrences north of ISEGS 3.

2. Protection Goals : The project owner shall implement all feasible measures to protect 75 percent of the individuals of Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla within the project area (as mapped in Figure 5-3 of the applicant's final botanical survey report [CH2M Hill 2008x]). Each year during construction the measurement of percent protection achieved shall be calculated based on a comparison of numbers of individuals of each of these five species present in this area identified before construction compared to numbers remaining post –construction. These pre- and post-construction plant numbers shall be based on floristic surveys conducted by a qualified botanist.

3. Identify and Establish Special-Status Plant Protection Areas : The project owner shall identify Special-Status Plant Protection Areas within the project footprint as needed to achieve the 75 percent protection goal. To accurately identify the locations of these areas, pre-construction floristic surveys shall be conducted by a qualified botanist at the appropriate time of year for special-status plant identification including both spring and summer blooming periods. The surveys shall encompass all the high plant density areas depicted in **Biological Resources Figure 2** and shall extend 150 feet on both sides of the proposed gas pipeline alignment and 250 feet out from the project fenceline. The locations of the Special-Status Plant Protection Areas shall be clearly depicted on all final maps and project drawings and descriptions.

4. Protection of Adjacent Occurrences: The project owner shall identify special-status plants occurrences within 250 feet of the project fenceline during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences at least 30 days prior to the initiation of ground disturbing activities. These flagged special status plant occurrences shall be designated as Environmentally Sensitive Areas on plans and specifications, and shall be protected from accidental impacts during construction (e.g. vehicle traffic, temporary placement of soils or vegetation) and from the indirect impacts of project operation (herbicide spraying, changes in upstream hydrology, etc).

5. Develop and Implement a Special-Status Plant Protection and Monitoring Plan : The project owner shall develop and implement a Special-Status Plant Protection and Monitoring Plan for special-status plants occurring within the Special-Status Plant Protection Areas. The goal of the Special-Status Plant Protection and Monitoring Plan shall be to maintain the special-status plant species within the Special-Status Plant Protection Areas as healthy, reproductive populations that can be sustained in perpetuity. At a minimum, the Special-Status Plant Protection and Monitoring Plan shall:

   - establish baseline conditions and numbers of the plant occurrences within the Special-Status Plant Protection Areas and success standards for protection of special-status plant occurrences within the Plant Protection Areas;
   - provide information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and propagation and culture requirements for each special-status species;
   - describe measures (e.g., fencing, signage) to avoid direct construction and operation impacts to special-status plants within the Special-Status Plant Protection Areas;
   - describe measures to avoid or minimize indirect construction and operations impacts to special-status plants within the Special-Status Plant Protection Areas (e.g., runoff from mirror-washing, use of soil

stabilizers/tackifiers, alterations of hydrology from drainage diversions, erosion/sedimentation from disturbed soils upslope, herbicide drift, the spread of non-native plants, etc).

- provide a monitoring schedule and plan for assessing the numbers and condition of special-status plants within the Special-Status Plant Protection Areas; and
- identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold);

6. Develop Special-Status Plant Remedial Action Plan : The project owner shall develop a detailed Special-Status Plant Remedial Action Plan to be implemented if special-status plants within the Plant Protection Areas fail to meet success standards described in the Special-Status Plant Protection and Monitoring Plan. The Plant Remedial Action Plan shall include specifications for ex-situ/offsite conservation of seed and other propagules, and the seed bank and other symbionts contained in the topsoil where these plants occur. The remedial measures described in the Plant Remedial Action Plan shall not substitute for plant protection or other mitigation measures. The Special-Status Plant Remedial Action Plan shall include, at a minimum:
   - guidelines for pre-construction seed collection (and/or other propagules) for each of the five species;
   - specifications for collecting, storing, and preserving the upper layer of soil containing seed and important soil organisms;
   - detailed replacement planting program with biologically meaningful quantitative and qualitative success criteria (see Pavlik 1996), monitoring specifications, and triggers for remedial action; and
   - ecological specifications for suitable planting sites.

7. Seed Collection : Implementation of the Special-Status Plant Remedial Action Plan would require a source of local source of seeds/propagules. In addition, seed collection would serve to preserve germplasm in the event that all mitigation fails. The project owner shall develop and implement a Seed Collection Plan to collect and store seed for Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The source of these seeds shall be from plants proposed for removal within the project footprint. The project owner shall engage the services of a qualified contractor approved by the CPM to undertake seed collection and storage.

8. Gas Pipeline Revegetation and Monitoring: In the natural gas pipeline construction corridor where disturbed soils will be revegetated, the topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. At a minimum, the top 2 cm of the soil shall be separately stored and preserved. Topsoil salvage, storing, and replacement shall be replaced in its original vertical

orientation following pipeline installation ensuring the integrity of the top 2 cm in particular. The project owner shall prepare a Gas Pipeline Revegetation and Monitoring Plan targeted at re-establishment of Rusby's desert-mallow, desert pincushion, Mojave milkweed, and potentially other special-status plant species. The Gas Pipeline Revegetation and Monitoring Plan shall identify success criteria for re-establishment and shall continue for a period of no less than 10 years until the defined success criteria are achieved. The Gas Pipeline Revegetation and Monitoring Plan shall include measures for seeding or other remedial actions. If no individuals of Rusby's desert-mallow, desert pincushion, or Mojave milkweed, are located during the first year of monitoring.

9. Surveys on Acquired and Public Lands: The project owner shall conduct floristic surveys for Rusby's desert-mallow and Mojave milkweed on all lands that will be acquired as part of the desert tortoise compensatory mitigation requirements (see Condition of Certification **BIO-17**). Similar surveys shall be conducted for desert pincushion, nine-awned pappus grass, and Parish's club-cholla for those species for which the 75 percent on-site avoidance goal has not been achieved. The goal of the surveys shall be to identify at least the same number of occurrences on off-site lands as were impacted by the ISEGS project. If this goal is not met by surveys on proposed acquisition lands, additional surveys shall be conducted within suitable habitat on public lands until the same number of occurrences of each species that were impacted are identified. To be counted toward fulfillment of the goal the occurrences must reflect new data not previously documented in other survey efforts. The survey requirements shall include the following:

   - All surveys shall be conducted by a qualified botanist in accordance with BLM, CDFG, and CNPS plant survey guidelines;
   - Surveys shall occur the first spring after construction begins and continue each year until the same number of special-status plant occurrences are identified on acquisition lands and/or BLM lands as were impacted, or predicted to be impacted based on final site design, by the ISEGS project construction and operation;
   - For each year surveys are conducted yearly survey results shall be provided to the CPM, BLM's Authorized Officer and CDFG, and shall include CNDDB field survey forms for all special-status plant species encountered during the surveys; and
   - All field survey forms shall be submitted to the CNDDB at the time of submittal to the CPM, BLM and CDFG.
   - For each of the species for which surveys were conducted, the project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped. Locations shall be reported with GPS coordinates compatible with inclusion in a GIS database.

10. Security for Implementation of Plans : The project owner shall provide security adequate to fund implementation of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan for the life of the project, as well as the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan.

Verification: No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit final maps and design drawings depicting the location of Special-Status Plant Protection Areas within and adjacent to the project site, and shall identify the species and numbers of plants within each of the Special-Status Plant Protection Areas.

No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit draft versions of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan, the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan for review by the CPM, BLM's Authorized Agent, and CDFG. The project owner shall also provide a cost estimate for implementation of these plans which is subject to approval by the CPM, BLM's authorized agent, and the CDFG. The final plans shall be submitted for approval by the CPM, in consultation with BLM's Authorized Agent, CDFG, and CNPS within 90 days of the publication of the Commission Decision. The final plans shall be incorporated into the BRMIMP. At this time, the project owner shall also provide security sufficient to fund the implementation of the plans.

Within 30 days of the start of construction, the project owner shall submit a copy of the contract with the CPM-approved seed contractor and the check for seed collection and curation fees to the CPM.

On January 31st of each year following construction the project owner's qualified botanist shall submit a report, including CNDDB field survey forms, describing the results of off-site plant surveys to the BLM's authorized officer, the CPM, CDFG, and CNDDB. Submittal of survey reports shall continue until the same number of occurrences impacted by the project for Rusby's desert-mallow and Mojave milkweed are identified on these off-site lands as were impacted by the project. Similar reports shall be submitted for desert pincushion, nine-awned pappus grass, and Parish's club-cholla for each of those three species for which 75 percent avoidance was not achieved. For each of the species for which surveys were conducted, the project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped using GIS techniques for each species. Mapping results shall include GPS coordinates of the plants found.

The Designated Biologist shall maintain written and photographic records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM, BLM Authorized Agent, and CDFG. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report for a period not less than 10 years for the Gas Pipeline Revegetation Plan, and for the life of the project for the Special-Status Plant Protection and Monitoring Plan, and the Special-Status Plant Remedial Action Plan, including funding for the seed storage

NELSON'S BIGHORN SHEEP MITIGATION

BIO-19 To compensate for project impacts to Nelson's bighorn sheep the project owner shall finance, construct and manage an artificial water source in the eastern part of the Clark Mountain range or in the State Line Hills outside of designated Wilderness.

Verification: Within 60 days of publication of the Energy Commission Decision the project owner shall submit to the BLM's Authorized Officer, the CPM and CDFG a Draft Bighorn Sheep Mitigation Plan identifying a proposed location for the artificial water source and providing plans for its construction and management. At least 60 days prior to start of any project-related ground disturbance activities, the project owner shall provide BLM's Authorized Officer and the CPM with the final version of the Bighorn Sheep Mitigation Plan that has been reviewed and approved by BLM, CDFG, and the Energy Commission staff. BLM's Authorized Officer and the CPM will determine the plan's acceptability within 30 days of receipt of the final plan.

No later than 18 months following the publication of the Energy Commission Decision, the project owner shall provide written verification to BLM's Authorized Officer and the CPM that the construction of the artificial water source has been completed. At the same time, the project owner shall provide evidence of an agreement (Memorandum of Understanding) and a funding mechanism to provide ongoing maintenance of the water source by CDFG or some other party approved by BLM's Authorized Office and the CPM.

STREAMBED IMPACT MINIMIZATION AND COMPENSATION MEASURES

BIO-20 The project owner shall implement the following measures to avoid, minimize and mitigate for impacts to ephemeral drainages:

1. Acquire Off-Site Desert Wash: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes ephemeral washes with at least 198 acres of state jurisdictional waters. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-17** with the additional criteria that the desert wash mitigation lands: 1) include at least 198 acres of state jurisdictional waters; 2) be characterized by similar soil permeability, hydrological and biological functions as the impacted drainages; and 3) be within the same watershed as the impacted wash. The desert wash mitigation lands may be included with the desert tortoise mitigation lands ONLY if the above three criteria are met.

2. Security for Implementation of Mitigation: A security in the form of an irrevocable letter of credit, pledged savings account, or certificate of deposit for the amount of all mitigation measures pursuant to this condition of certification shall be submitted to, and approved by, the CPM, in consultation with CDFG, prior to commencing project activities within areas of CDFG jurisdiction. This amount shall be based on a cost estimate which shall be submitted to CDFG for review and to the CPM for approval within 60 days of the Energy Commission Decision's publication and prior

to commencing project activities within areas of CDFG jurisdiction. The security shall be approved by the CPM, in consultation with CDFG's legal advisors, prior to its execution, and shall allow the CPM at its discretion to recover funds immediately if the CPM, in consultation with CDFG, determines there has been a default.

3. Preparation of Management Plan: The project owner shall submit to Energy Commission CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control. No later than 12 months after publication of the Energy Commission Decision the project owner shall submit a final Management Plan for review and approval to the CPM and CDFG.

4. Right of Access and Review for Compliance Monitoring: The CPM reserves the right to enter the project site or allow CDFG to enter the project site at any time to ensure compliance with these conditions. The project owner herein grants to the CPM and to CDFG employees and/or their representatives the right to enter the project site at any time, to ensure compliance with the terms and conditions and/or to determine the impacts of storm events, maintenance activities, or other actions that might affect the restoration and revegetation efforts. The CPM and CDFG may, at the CPM's discretion, review relevant documents maintained by the operator, interview the operator's employees and agents, inspect the work site, and take other actions to assess compliance with or effectiveness of mitigation measures.

5. Notification: The project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas as noted and at least five days prior to completion of project activities in jurisdictional areas. The project owner shall notify the CPM and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of a proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project as defined below. A copy of the notifying change of conditions report shall be included in the annual reports.

   a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological

resources within or adjacent to the project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

6. Code of Regulations: The project owner shall provide a copy of the Streambed Impact Minimization and Compensation Measures from the Energy Commission Decision to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the project owner, the CPM, if the CPM in consultation with CDFG, determines that the project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:

   a. The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;

   b. New information becomes available that was not known to it in preparing the terms and conditions;

   c. The project or project activities as described in the Final Staff Assessment have changed; or

   d. The conditions affecting biological resources changed or the CPM, in consultation with CDFG, determines that project activities will result in a substantial adverse effect on the environment.

7. Best Management Practices: The project owner shall also comply with the following conditions:

   a. The project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.

   b. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

   c. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

   d. Spoil sites shall not be located within drainages or locations that may be subjected to high storm flows, where spoil shall be washed back into a drainage.

   e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage or Ivanpah Dry Lake, by project owner or any party working under contract or with the permission of the project owner shall be removed immediately.

   f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the state.

   g. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.

   h. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

Verification: No less than 90 days prior to acquisition of the parcel (s) containing 198 acres of waters of the state, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

No fewer than 30 days prior to the start of work potentially affecting waters of the state, the project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that the above best management practices will be implemented and provide a discussion of work in waters of the state in Compliance Reports for the duration of the project.

REFERENCES

The tn: 00000 in the references below indicates the transaction number under which the item is catalogued in the Energy Commission's Docket Unit. The transaction number allows for quicker search and retrieval of individual items docketed for a case or used for ease of reference and retrieval of exhibits cited in briefs and used at Evidentiary Hearings.

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Biological Resources Appendix A

Percentage of Statewide Documented Occurrences for Special Status Plant Species in the ISEGS Project

Biological Resources Appendix A - Table A-1
Percentage of Statewide Documented Element Occurrences[4] for Special-Status Plant Species in the ISEGS Project

Name Scientific (Common)	CDFG's CNDDB Rank Global/State and CNPS List	Total Documented Occurrences in CNDDB* (including project occurrences)	Additional Occurrences from Consortium of California Herbaria**	Occurrences From Other Available Data (other projects)***	Project Site Occurrences (as reported by CNDDB 8/2009)	Project Site % of Documented Occurrences in California (List 2 plants) or Globally (List 1B)
Androstephium breviflorum (**small-flowered androstephium**)	G5 S1.2, List 2.2	82	0	1	3	3/(82+1) = 4%
Asclepias nyctaginifolia (**Mojave milkweed**)	G4G5 S1, List 2.1	22	1	1	16	16/(22+1+1) = 67%
Coryphantha chlorantha **(desert pincushion)**	G2G3 S1, List 2.1	22	1	n/a	8	8/(22+1) = 35%
Enneapogon desvauxii (**nine-awned pappus grass**)	G5 S2, List 2.2	21	0	1	3	3/(21+1) = 14%
Grusonia parishii (**Parish's club-cholla)**	G3G4 S2, List 2.2	16	0	1	5	5/(16+1) = 29%
Sphaeralcea rusbyi var. *eremicola* (**Rusby's desert-mallow**)	G4T2 S2, List 1B.2	29	4	n/a	7	7/(29+4) = 21%

* Number of CNDDB element occurrences (August 2009 update)
** Number of occurrences derived from herbarium records, California Consortium of Herbaria
*** Number of occurrences derived from EA for the SCE El Dorado to Ivanpah 220 kV transmission line project

Global Rank is a reflection of the overall condition of an element throughout its global range:

G2—Imperiled	At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors;
G3—Vulnerable	At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors;
G4—Apparently Secure	Uncommon but not rare; some cause for long-term concern due to declines or other factors;
G5— Secure	Common; widespread and abundant.

Some of the G-ranks above are expressed as a range. Subspecies receive a T-rank attached to the G-rank. The G-rank refers to the whole species range, but the T-rank refers to the global condition of variety *eremicola* only.

State Rank:

[4] The term "Element Occurrence (EO)" refers to populations or groups of individuals occurring in close proximity to each other, and is defined by the CNDDB as individuals of a particular species occurring within one-quarter mile of each other. When numerous localities are documented by a reporter within very close proximity of each other, CNDDB uses this standardized and nationally accepted mapping convention, which allows a common metric for comparison, using a quarter-mile grid. Data provided to CNDDB by the applicant (CH2M Hill 2008c, Table 5-1) were mapped by CNDDB using this convention into the number of EOs shown in the column "Project Site Occurrences as reported by CNDDB 8/2009." These numbers should not be confused with numbers of individual plants.

S1— Critically Imperiled	Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province;
S2— Imperiled	Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province;
S3— Vulnerable	Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation;
? —	Indicates some uncertainty about the rank.

State Rank Extension:
0.2—threatened

Table A-1 describes the status of the special-status plants found within the project footprint in terms of Element Occurrences (EOs) rather than numbers of individual plants. An EO is defined by CDFG's CNDDB as individuals of a particular species occurring within one-quarter mile of each other. Due to incomplete data, contributors to the CNDDB sometimes do not note the number of individuals when reporting CNDDB EOs and herbaria records, and the occurrence size in terms of individual plants cannot be ascertained. To provide a common metric for comparison with the CNDDB and herbarium data, Table A-1 expresses the occurrences of special-status plant species found on the ISEGS site during the 2007 and 2008 surveys in terms of EOs. Utah vine milkweed and desert portulaca are not included because they are not mapped in the CNDDB, as is the case for most CNPS List 4 plants.

BIOLOGICAL RESOURCES APPENDIX B: Issues to Address in the Closure, Revegetation and Rehabilitation Plan

Staff has reviewed the *Closure, Revegetation and Rehabilitation Plan for the Ivanpah Solar Electric Generating System, Eastern Mojave Desert, San Bernardino County, California*, June 2009 (CH2M Hill 2009q) and identified the following issues that need to be addressed in revisions to this document.

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.
Based on 2009-06-29_Applicant_Data_Response_Set_2K_TN-52208
(Data_Response_Set_2K).

Policies

General

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Reference in Data_Response_Set_2K:

Approach: Key future actions will be cut and pasted with “will” substituted for might, should, etc.

Proposed Wording of Condition: future actions will be cut and pasted with “will” substituted for might, should, etc.

End use of the ROW after ISEGS closure

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Vague language

Reference in Data_Response_Set_2K: 1.1

Approach: The end use of the property 50 years from now is quality habitat of the types impacted by construction and operation. Contracts and permits may be amended by mutual agreement, but the current standards conform to laws and guidelines now in effect.

Proposed Wording of Condition: The objective of the revegetation plan and all related activities shall be re-creation of the types of habitat lost during construction and operation of the proposed solar energy facility. No project approvals will be issued, nor shall any plans or applications be based on other potential end uses of the property.

Shading from Mirrors

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Reference in Data_Response_Set_2K: This topic is not discussed in the draft.

Approach: Point out that shading from the mirrors is serious and can lead to competitive disadvantages to plants with the crassulacean acid metabolism photosynthetic pathway (CAM).

Proposed Wording of Condition: The fraction of the land surface that is to be occupied by mirrors will have an impact on the vegetation. Shading has selective effects on wavelengths of light that are critical to desert plants that have crassulacean acid metabolism (CAM). These plants include many succulents. Shading will inhibit growth and reduce competitive ability of CAM plant species and is considered an impact under these Conditions of Approval. Native CAM plant species that are subject to shading will be moved to a succulent storage area or an unshaded portion of the operations area. Under no circumstances shall salvaged succulents be stored within Special-Status Plant Protection Areas. Any such moves of CAM plants not already approved under other Conditions of Approval shall be specifically verified in writing by BLM or its designated representative.

Submittal of final closure, revegetation, and rehabilitation plan

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Vague language

Reference in Data_Response_Set_2K: 7.1

Approach: Specify the importance of the final plan.

Proposed Wording of Condition: The Final Closure, Revegetation, and Rehabilitation Plan (final closure plan) shall be submitted and approved by BLM prior to issuance of the permit.

STANDARDS

Introduction of mid to late successional vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: the argument against introduction of late stages of succession during the restoration effort.

Reference in Data_Response_Set_2K: 7.3.1

Approach: Draw upon examples in which later stages of succession have been introduced, and provide standards to assure an effort to introduce plants other than ruderals.

Proposed Wording of Condition: Later stages of vegetation are not impossible to establish, and late successional species can be introduced at the same time as early stage species. Late stage species are often more dependent upon soil biological conditions and soil structure but can be successful in a mixture with early stage species. Performance standards

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: The low threshold being proposed for project success in Data_Response_Set_2K. Performance standards currently proposed by the applicant will not define a successful restoration project.

Reference in Data_Response_Set_2K: 7.8.1, Table 7-6

Approach: Specific and more stringent standards for project success;

Proposed Wording of Condition: Within each mapped pre-disturbance vegetation type, success criteria will be achieved as defined by performance and abundance of native and exotic plant species. Native plants in the vegetation shall reach over the first 10 years of growth 80 percent of the initial density, absolute cover, and species richness, with progressive improvement during the 10-year period. Exotic species shall reach over the first 10 years of growth no more than 4 times the absolute cover of exotic plants in the original vegetation. Every effort shall be made to minimize invasion by exotic species, and the performance standards shall include a maximum allowable cover of exotic species.

Standard for weed cover

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Lax weed cover standards

Reference in Data_Response_Set_2K: 3.5.3 and 7.3.1.1

Approach: Reduce tolerance for weedy species in the revegetation effort

Proposed Wording of Condition: The vegetation to be introduced to the site shall consist entirely of plant species native to the northern Mojave Desert. No exotic plant species shall be included on the seed lists nor introduced with native species. Exotic species, regardless of their presence in the original vegetation, shall not be counted as successful vegetation establishment.

MONITORING

Baseline vegetation surveys

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration surveys are not suitable for planning the restoration effort.

Reference in Data_Response_Set_2K: 3.5.4

Approach: Requirement for vegetation surveys that can guide restoration planning. There will have to be thorough sampling within each vegetation type. The current plan provides fewer transects than there are vegetation types.

Proposed Wording of Condition: Pre-construction surveys of all vegetation on the subject sites shall be carried out in a manner able to guide restoration efforts and provide baseline measurements for judging project success. The entire proposed project area shall be divided into vegetation types as described by Sawyer and Keeler-Wolf. The boundaries of each vegetation type shall be mapped to GPS accuracy of one meter or less and provided to BLM as a series of shape files. Each vegetation type will have soil, terrain, exposure, elevation, and slope clearly indicated. For each vegetation type provide a list of perennials and appropriate annuals. Surveys shall be performed at a season when the year's annuals are identifiable; generally from early March through late April. Survey methodology should emphasize accuracy rather than precision. Generally it is preferred to record a large number of rapid determinations rather than a small number of detailed determinations. BLM will accept rapid methods such as the step-point method (Bonham 1988) provided transects are laid out in a manner that captures the true composition of the vegetation. The combined length of step-point transects in each vegetation type shall approximate the square root of the area of the vegetation type or at least 400 intercepts and shall be laid out to give unbiased representation of all portions of the vegetation type. Vegetation need not be divided into herb and shrub layers as long as all species intercepted by points are included in the survey. Additional species not encountered on the transects shall be recorded separately on a diversity list.

Maintenance monitoring schedule

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Maintenance monitoring schedule must be frequent during early stages

Reference in Data_Response_Set_2K: 7.8.2.1

Approach: Monitoring. Performance standards currently proposed by the applicant will not define a successful restoration project.

Proposed Wording of Condition: Maintenance monitoring shall include visual inspection of all planting areas with brief e-mail reports to the applicant and all involved agencies. Monitoring shall be scheduled once per month during the first growing season after seed application, switching to once per quarter starting in July after seed application. Monitoring may be reduced to once per year in late March through mid May of each year after the second growing season.

Performance monitoring methods

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Performance standards currently proposed by the applicant will not define a successful restoration project.

Reference in Data_Response_Set_2K: 7.8.2

Approach: Methods and schedule for performance monitoring

Proposed Wording of Condition: Performance monitoring shall be conducted annually during the spring flowering season, between mid March and mid May to assess restoration performance. Performance monitoring surveys of all vegetation on the subject sites shall be carried out in a manner able to detect project success. The entire proposed project area shall be divided into vegetation types as described by Sawyer and Keeler-Wolf. The boundaries of each vegetation type shall be compared with the baseline survey maps, and if the boundaries have changed the maps shall be updated and provided to BLM as a series of shape files. Each vegetation type will have soil, terrain, exposure, elevation, and slope clearly indicated. For each vegetation type provide a list of perennials and appropriate annuals. Surveys shall be performed at a season when the year's annuals are identifiable; generally from early March through late April. Survey methodology should emphasize accuracy rather than precision. Generally it is preferred to record a large number of rapid determinations rather than a small number of detailed determinations. BLM will accept rapid methods such as the step-point method (Bonham 1988) provided transects are laid out in a manner that captures the true composition of the vegetation. The combined length of step-point transects in each vegetation type shall approximate the square root of the area of the vegetation type or at least 400 intercepts and shall be laid out to give unbiased representation of all portions of the vegetation type. Vegetation need not be divided into herb and shrub layers as long as all species intercepted by points are included in the survey. Additional species not encountered on the transects shall be recorded separately on a diversity list.

TRANSPLANTS

Records of succulent transplantation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Lack of specificity on size and age of succulents to be transplanted.

Reference in Data_Response_Set_2K: 4.5

Approach: Present a table that shows by species the number of plants onsite, the lower threshold height for salvage, the number in each size class, and the fate of plants not salvaged.

Proposed Wording of Condition: Each area to be cleared or mowed under this application shall be surveyed in detail, and every succulent shall be inventoried and mapped. Applicant shall provide prior to breaking ground a table showing for each plant the species, height, UTM coordinates to an accuracy of one meter or less, and expected disposition of the specimen. Height above ground level shall be provided in the table. Separate height criteria will be agreed with BLM for each species of succulent. In no case shall the height criterion exclude all or most of a species, as would happen with a uniform criterion of one foot.

Succulent transplantation research

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Research responsibilities not adequately addressed

Reference in Data_Response_Set_2K: 1.3.4

Approach: Ivanpah 1 subject to experimental evaluation for methods to be used on Ivanpah 2 and 3.

Proposed Wording of Condition: Succulent transplants done during preparation of the Ivanpah 1 site shall be fully documented and shall serve as trials of methods to be used during plant salvage on the Ivanpah 2 and 3 areas. Full records shall be available immediately upon request of BLM or their designated representatives and shall contain for each transplanted specimen the species, height, number of branches or pads as appropriate, donor location by UTM coordinates, methods used to remove, transport and store the plant, period of temporary storage, location, facility description and planting medium used for storage, and frequency of watering during storage. The records shall include plant condition at the time of collection, at the time of planting at the storage area, and quarterly during storage until such time as each plant is sold, placed in the field, or dies. No salvaged individuals of desert pincushion or Parish's club-cholla shall be sold to the public. These individuals shall be carefully collected and handled in accordance with the Special-Status Plant Remedial Action Plan.

CLEARING

Clearing of vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Contradictory wording about extent of clearing.

Reference in Data_Response_Set_2K: 1.3.1, 1.3.2

Approach: No general clearing of vegetation will be carried out as stated in 1.3.2. Instead, 1.3.1 will apply.

Proposed Wording of Condition: Clearing of vegetation shall be limited to areas for which final maps are provided to BLM before approval of the ROW. Clearing of vegetation will be permitted on roads, utility routes, building and parking areas, and temporary staging areas provided these are specifically documented on a georeferenced aerial photo or shape file, showing the exact locations of soil disturbance. BLM will consider relocating specific installations prior to the beginning of construction but will not approve additional acreage under the current application.

Locations for mowing of vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Contradictory wording about extent of clearing.

Reference in Data_Response_Set_2K: 1.3.2 and 2.2.1

Approach: Mowing limited to pre-defined and agreed areas.

Proposed Wording of Condition: Vegetation within the operations area may be mowed within agreed and pre-defined limits as required for access and operation. The pre-defined limits for mowing shall be specifically documented on a georeferenced aerial photo or shape file, showing the exact locations of proposed mowing. BLM will consider relocating the boundaries of the mowed areas prior to the beginning of construction but will not approve additional acreage under the current application.

Methods for mowing vegetation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Contradictory wording about extent of clearing.

Reference in Data_Response_Set_2K: 1.3.2

Approach: Methods and height of mowing.

Proposed Wording of Condition: Mowing may be carried out only by hand-operated string trimmers or tractor-mounted flail or rotary mowers. Tractors operated within native vegetation shall be provided with low ground pressure tires. The height of the mowing blade shall be at least 15 inches.

PLANTING

Seed collection

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Seed collection procedures

Reference in Data_Response_Set_2K: 7.3.1.4

Approach: Range of species, collect from all to be destroyed.

Proposed Wording of Condition: Seed collection shall be carried out within an area mapped and provided to BLM with the project application. Special-status plant seed shall be separated from other native plant seed and handled according to the Special-Status Plant Remedial Action Plan.Future changes in seed collection area shall be negotiated separately with BLM. Collection areas shall be within 10 miles of the boundaries of the project site and shall be on similar terrain, soil, exposure, slope and elevation to the project site. Seed collection guidelines shall conform to all laws and regulations in effect at the time of collection and shall follow the guidelines for native seed collection provided by California Native Plant Society. Seed collection shall include all plant species known to be removed by construction and operation of the facility. If insufficient seeds are provided by "seed farming" and collection within 10 miles of the site, BLM may approve collection from a greater distance provided other environmental factors at the collection site are good matches to the project site.

Seed testing

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration Methods

Reference in Data_Response_Set_2K: 7.3.1.4, Table 7-1, 7.3.3.2

Approach: Seed testing

Proposed Wording of Condition: Batches of seeds collected or produced for this project shall be tested by a certified seed testing laboratory that will provide for each batch of seeds determinations of purity, germination, and seed count. Seed not sorted by plant species, including collections from under shrubs, from depressions in the soil, and from harvester ant caches, may be used to supplement defined seed batches but shall not be included in the claim of known seed applications.

Seed application

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration Methods

Reference in Data_Response_Set_2K: 7.4.1

Approach: Seed application by methods that provide good soil contact and protection from granivores. Information about the imprinting process and model specifications for imprinting contracts are available in St. John and Dixon (1996).

Proposed Wording of Condition: Seed shall be applied by methods that provide good seed-soil contact. The most successful methods in similar conditions are land imprinting

or broadcasting followed by a roller that will press seeds into the soil but not cause heavy compaction. Contrary to opinions expressed in the current application document, imprinting has often worked well on sandy loams and even pure sand. A communication to this effect is provided in an appendix from Dr. Robert Dixon, inventor of the land imprinter. Any imprinter must meet be able to form continuous imprints with two-inch berms between micro-watersheds of one square foot. Machines making imprints on only a small fraction of the soil surface shall not be substituted for Dixon imprinter. Pitting may be acceptable by agreement with BLM, with seed drilling a potential but not preferred choice.

SOIL PREPARATION

Soil description

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Vague language

Reference in Data_Response_Set_2K: 7.2.5.1

Approach: Exact contents of soil baseline characterization

Proposed Wording of Condition: A soil baseline characterization shall be conducted before ground is broken at the proposed site. The characterization shall include:

a. Profile description of three representative pedons. (A pedon is the smallest three dimensional sampling unit displaying the full range of characteristics of a particular soil and typically occupies an area ranging from about 1 to 10 square yards [Brady and Weil, 2002]).

b. Characterization of surface condition (that is, is desert pavement or cryptogamic crust present). Description of cryptogamic crust shall include major groups of organisms identified at the site (filamentous cyanobacteria, other cyanobacteria, mosses, lichens, liverworts) and the characteristics by which they were identified. No identification shall be required apart from the general list presented in this paragraph.

c. Documentation of soil macro-invertebrates (that is, presence of ants, termites, and other significant macro-invertebrates)

d. Soil texture (that is, percent sand, silt, and clay), along with a reference to a widely accepted method for making the determination.

e. Bulk density, along with a reference to a generally accepted method for making the determination.

f. Fertility (that is, nutrient status, electrical conductivity, sodium adsorption ratio), along with methods by which composite samples were collected and the laboratory methods used to determine these properties. Composite samples shall contain equal contributions from at least six randomly-located collection points within the soil donor area.

g. Organic matter content and total carbon and nitrogen content, along with a reference to generally accepted methods for making the determinations.

Soil compaction shall be determined by measurement of bulk density in grams per cubic centimeter (or numerically equivalent units). Bulk density may be determined by any of several standard measurements, but the method used must be referenced to a widely-accepted soil methodology publication. In no case shall soil be compacted to bulk density that exceeds 1.6 g/cc except where no planting is to take place. Penetrometer measurements are not a substitute for bulk density measurements.

Mulch application

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Mulch application has potential disadvantages as well as advantages.

Reference in Data_Response_Set_2K: 7.4.2

Approach: Mulch application is rarely done in this kind of restoration effort, but it could be beneficial.

Proposed Wording of Condition: Mulch application is done at the option of the operator. Mulch application to the soil shall consist of local non-weedy materials, the collection of which is incidental to other activities onsite. In no case shall mowing or grading of native vegetation be carried out for the sole purpose of generating mulch. Mulch shall be applied only to the soil surface unless the soil has already been inverted or severely disturbed through other procedures. Materials of relatively high nitrogen content, including alfalfa hay, shall not be applied.

SOIL STORAGE

Topsoil collection and storage

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Restoration Methods

Reference in Data_Response_Set_2K: 7.2.3

Approach: Require certain stockpiling procedures

Proposed Wording of Condition: Topsoil for this project shall be defined as the soil volume from the original surface to 8 inches in depth. The upper 1/4 inch may be collected separately to preserve biological crust organisms as prescribed elsewhere in these Conditions of Approval. Topsoil may not be distinguishable by color or organic content but will have most fine roots during the active growing season. Topsoil shall be stored at locations agreed to by BLM and designated for this purpose. All stockpiles shall be on ground previously disturbed for another purpose, such as roads no longer in

use. If no disturbed location is available for topsoil storage, applicant will propose locations for BLM approval, then add the material on top of native vegetation at the agreed locations. Soil shall be collected, transported, and formed into stockpiles only while the soil is dry. The vegetation in place at or immediately before topsoil collection will be healthy native vegetation with less than 15 percent absolute cover of exotic weed growth. Soil occupied by vegetation of high plant diversity shall be given priority over soil occupied by low diversity native vegetation. Soil may be collected with a front loader, bulldozer, or scraper and transported to storage areas by front loader, dump truck, or scraper. The equipment transporting the soil shall not travel across the stockpile more than the minimum number of times required to build the soil to its intended depth. If transported in scrapers, the equipment shall travel new paths at each crossing to minimize the compaction of previous layers. The depth of the stockpiles shall not exceed 4 feet in the case of sandy loam or loamy sand soils. Topsoil stockpiles shall be kept dry and covered if no vegetation is introduced, but covers shall not be allowed to promote greenhouse heating of the stockpiles. If native vegetation is grown on the stockpiles to increase seeds and soil organisms, no cover shall be required. Artificial watering may be provided at the operator's option.
Stored topsoil may be reapplied as a layer over decompacted subgrade material as a means of implementing the restoration program. The topsoil layer shall be a minimum of 3 inches in depth. In general, topsoil may be applied to about twice the land area from which it was removed. The topsoil layer shall be bonded to the subgrade with a lightly-loaded sheepsfoot roller, a land imprinter, or other implement that interlocks material from the two layers without causing bulk density in excess of 1.6 grams per cubic centimeter. Seeds may be distributed concurrently with layer bonding if a land imprinter is employed for both purposes.

Seed farming

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Unproductive uses of topsoil stockpiles under current proposal.

Reference in Data_Response_Set_2K: 7.2.3, 7.3.1.4

Approach: Seed farming

Proposed Wording of Condition: Topsoil to be stockpiled under other provisions of these conditions shall be used to grow native plant species for the purpose of producing native seeds and building beneficial microorganisms in the soil volume. All native plant species encountered in the vegetation surveys shall be in the growing rotation on the stockpiles. Most growing space shall be dedicated to the species for which the most seeds will be required. At least half by area of the growing area during each growing cycle shall be dedicated to plant species known to be good mycorrhizal host plants. These are often fast-growing, short-lived perennial grasses and composites, although representatives of many other plant families may be mycorrhizal hosts as well. Members of the families Chenopodiaceae and Amaranthaceae shall be limited to less than half the area of the soil stockpiles, with the other half occupied by known mycorrhizal host plant species.

SOIL BIOLOGY

Mycorrhizal inoculation

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Document contains no specificity about mycorrhizal inoculation.

Reference in Data_Response_Set_2K: 6.2.3

Approach: Give plant species, locations, inoculation methods, sources of inoculum, and methods of application.

Proposed Wording of Condition: Mycorrhizal inoculation shall be carried out in all planting areas having fewer than one spore per cubic centimeter of topsoil, where topsoil is defined as soil between the surface and 8 inches depth, or to bedrock if the soil is less than 8 inches in depth. Spore counts shall be carried out by methods given in Johnson et al. or other accepted methodology as approved by the BLM project manager or his designated representative. Inoculation shall result in a minimum of one spore per cubic centimeter of soil as defined for initial spore counts. No inoculation shall be required in areas where the operator is able to demonstrate that all plant species on the list of final desired vegetation are known to be non-host species. This condition might be found in saline or very alkaline soils.

Biological crust collection and storage

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: The lack of attention to soil biological crust in a setting where it should be present and should be restored.

Reference in Data_Response_Set_2K: 7.2

Approach: Point out the role of soil biological crust in protecting the soil and holding weeds at bay, and require that key components of the soil crust be restored.

Proposed Wording of Condition: Soil biological crust is defined here as a mixture of organisms that occupy and protect the surface of the soil in most desert ecosystems. The organisms often include filamentous and non-filamentous cyanobacteria, mosses, lichens, liverworts and fungi. Soil biological crust shall be preserved by collecting the upper 1/4 inch of topsoil from areas to be graded. Applicant may flag specific areas known to contain biological crust organisms or collect upper soil from the entire area. BLM or its designated representative must concur that the correct areas have been flagged if collections are to include less than the entire area over which the soil surface will be disturbed. Collections are to emphasize filamentous cyanobacteria; but other cyanobacteria, mosses, lichens, and liverworts are also considered valuable contributors to the soil biological crust and will be important in protecting against erosion and reducing weed invasion. Soil surface crust shall be air dried and stored dry in a

shaded location in containers that allow air movement, such as loose-weave fabric bags. In no case shall the stored crust be subject to wetting or direct sunlight during storage. All containers shall be clearly labeled with date and location of original collection; name and contact information of persons responsible for identifying suitable material to collect; and the persons who collected, stored, and maintained collections.

Soil biological crust shall be re-applied at the time of replanting by crumbling the stored material and broadcasting it on the surface of the soil. Stored crust material may be applied to an area up to 10 times the area from which it was collected. Approximately 10 percent of the stored material shall be broadcast on topsoil storage areas among plants being grown for seed and soil microorganisms. When the growing cycle progresses to new planting, the soil supporting biological crust shall be collected and stored by the same methods prescribed for collections from the original soil, in clearly labeled bags or other suitable containers.

WEED MANAGEMENT

Mirror wash water

Proposed Conditions of Approval for ISEGS
Ted St. John, Ph.D.
Chambers Group, Inc.

Deficiency Addressed by this Condition: Moisture from washing mirrors is not adequately addressed

Reference in Data_Response_Set_2K: 5.3

Approach: Wash water may very well cause weed growth and root diseases of nearby native plants.

Proposed Wording of Condition: Even though mirror washing will be infrequent, evaporation will not be certain to remove moisture from soil. Washing will be done at night and throughout the calendar year and is likely to collect in the upper soil at least locally. Stored moisture can support vigorous weed growth and will present a risk for root disease in nearby native plants that are adapted for soil that is usually dry. All weed growth brought on by mirror washing shall be controlled by trimming the weeds to less than six inches in height. Any native succulents or plant species of concern within the drainage area of mirror washing will be monitored quarterly. If wilting or other signs of stress occur, the plants will be moved to an unshaded portion of the operations area. Any such moves of plants not already approved under other Conditions of Approval shall be specifically verified in writing by BLM or its designated representative.

REFERENCES

Bonham, CD.

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CH2MHill

2009 Attachment DR125-3B Closure, Revegetation, and Rehabilitation Plan for the Ivanpah Solar Electric Generating System, Eastern Mojave Desert, San Bernardino County, California. Prepared for Ivanpah Solar Electric Generating System, June 2009

Sawyer, John O. and Keeler-Wolf, Todd

1995. A Manual of California Vegetation. California Native Plant Society Press, Berkeley, California.

St. John, Ted, Ph.D. and Bob Dixon, Ph.D.

1997. Land Imprinting: An overview and proposed technical specifications. Tree of Life Nursery, San Juan Capistrano, CA.

APPENDICES

Letter from Bob Dixon

Dr. Robert M. Dixon is a retired soil scientist with the USDA Agricultural Research Service in Tucson, Arizona. He spent many years studying water infiltration in desert soils and devised the land imprinter as a solution to the problem of physical crusts that develop on bare soils and inhibit infiltration. Received August 12, 2009, in response to my inquiry:

Ted,

Imprinting works well in sandy soils and is definitely superior to seed drills because imprinting provides better seed-to-soil contact and better capillary flow of moisture to the seed because of greater soil firming by imprinters. Early on, imprinting was shown to be greatly superior for establishing stands of alfalfa in sandy Minnesota soils for the 2 reasons given above. Land imprinting works well in the sandy soil of desert dry washes.

Best Regards,

Bob Dixon

Photos of successful desert restoration sites

Separate PDF

St. John and Dixon

Booklet in Separate PDF