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Mr. George Meckfessel, Planning and Environmental Coordinator
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re: comments on the joint Final Staff Assessment/draft Environmental Impact Statement (FSA/DEIS) for the Ivanpah Solar Electric Generating System (ISEGS)

Mr. Meckfessel:
Please accept and fully consider these comments regarding the ISEGS FSA/DEIS report on behalf of The California Native Plant Society (CNPS). CNPS works to protect California's native plant heritage and preserve it for future generations. We are a non-profit organization largely run by volunteers. Our nearly 10,000 members work to promote native plant appreciation, research, and conservation through 33 chapters located statewide. We appreciate the opportunity to provide comments on the FSA/DEIS.

BIOLOGICAL RESOURCES

CNPS supports the development of alternative, green energy sources, as long as those projects do not unnecessarily degrade healthy, diverse ecosystems. The proposed ISEGS project will cause significant, avoidable, adverse impacts to native vegetation communities and significant impacts to rare plant populations on the site, and within the surrounding Ivanpah Valley area. These impacts will have permanent (i.e., effects will persist for thousands of years) effects on ecosystem functions that have been evolving within the Ivanpah Valley for millennia. The area within the proposed project footprint will be affected directly, and the areas surrounding the project footprint will be affected indirectly during project construction and operational phases.

The discretionary decisions relating to this project will be precedent-setting as the first of several large proposed utility scale renewable energy projects of similar size (several thousand acres) to be constructed and operated within Ivanpah Valley. Dozens of similar projects are proposed throughout the California Desert Conservation Area. Impacts to biological resources associated with the proposed project, and related mitigation requirements will also be precedent-setting for projects of this scale. Several projects, including this one, are being permitted at a "fast-tracked" pace, and outside of a comprehensive regional planning process, such as the BLM's Solar Energy Study Area (SESA) PEIS and/or the Desert Renewable Energy Conservation Plan (DRECP) process.

The proposed ISEGS project and other proposed projects in the Ivanpah Valley, will cumulatively impact the viability of vegetation communities and rare plant populations. Furthermore, the project will fundamentally alter the functional integrity of the landscape, and reduce the desert landscape's unique ability to sequester atmospheric carbon dioxide (a greenhouse gas) 24-hours per day.

Climate Change
Renewable energy projects, including the proposed ISEGS project, are elements of a national climate change mitigation strategy to reduce greenhouse gas emissions. Several California state, national, and international climate change reports describing climate change adaptation strategies underline the importance of protecting intact wild lands and associated wildlife corridors as a priority adaptation strategy measure.

The FSA/DEIS fails to identify and analyze the loss of carbon sequestration that will occur under the proposed project. Desert vegetation types are able to sequester atmospheric carbon dioxide (greenhouse gas) 24 hours/day, unlike other vegetation communities that are able to sequester CO2 only during daylight hours. Not only will the project, as located, adversely affect a number of rare species it will also adversely impact the diverse photosynthetic productivity of the region. The rich species composition of the site is unique in that all known photosynthetic pathways are represented. The photosynthetic activities of cool weather C3 plants, the warm weather C4 plants, and the nocturnal CAM (crassulacean acid metabolism) plants are significant. The loss of the density and diversity of cactus species would contribute to the carbon dioxide imbalance that green energy is purported to fix. CAM photosynthesis is found in cactus and succulent plants and is the most efficient photosynthetic process for fixing carbon dioxide of the three represented pathways present on site. This issue demands that a location that has already been disturbed should be the primary choice for energy development. Since this is one of many energy projects anticipated within Ivanpah Valley, and indeed throughout the CDCA, it needs to set a rational precedence and needs to be adequately analyzed in the cumulative effects section of the environmental document.

Habitat fragmentation, loss of connectivity for terrestrial wildlife, and introduction of predator and invasive weed species associated with the ISEGS project in the proposed location are anathema to an effective climate change adaptation strategy. Siting the proposed ISEGS project in the proposed location in Ivanpah Valley confounds our climate change adaptation strategy with a poorly executed climate change mitigation strategy. CNPS maintains that the solution to this problem is to build and operate the proposed ISEGS project in an alternative site away from intact wild lands. The way to maintain healthy, vibrant ecosystems is to preserve their intact nature, not to fragment them and reduce their biodiversity.

Project impacts to rare plants

Significant populations of rare plants, including *Sphaeralcea rusbyi var. eremicola* (Rusby's desert mallow), a CNPS List 1B and BLM special-status plant, occur on the proposed project site, as described in the FSA/DEIS report.

The project will deploy heliostats, power towers, associated building structures, pipelines, and roads across approximately 4,000 acres of ecologically intact desert habitat, where naturally functioning ecological processes predominate over recent man-made intrusions. The completed project footprint will fragment 4,000 acres of diverse and intact desert plant communities. This includes rendering large rare plant populations, into fragments of various sizes. The biological affects of ecosystem fragmentation are well documented (Saunders et al., 1991). In general, the fragmentation of rare plant habitat on the project site will lead to two fundamental changes across the landscape; 1) an increasing isolation of remnant populations, and 2) a decrease in the total amount of available habitat for remnant populations. These two phenomena will be repeated throughout Ivanpah Valley, and where rare plants occur within the footprints of proposed neighboring energy projects, and the hundreds of thousands of acres of the Greater Mojave Desert ecosystem in California, Arizona, and Nevada where hundreds of utility-scale wind and solar project applications are being proposed.

To manage for viable rare plant populations on the project site, it will be necessary to identify project-related threats to those populations. Threats include, but are not limited to, altered light regimes due to shading by heliostats, altered hydrological conditions due to intercepted and redirected rainfall patterns and mirror washing, soil compaction during construction and operational phases of the project, altered soil nutrient conditions due to modified nutrient uptake by regularly mowed vegetation, and the introduction and spread of invasive weeds. With so many threats it is difficult to understand how they ultimately affect the viability of specific plant populations or metapopulations, how the threats themselves may interact, and how to come up with effective methods to alleviate them.

For example, habitat fragmentation caused by development of the proposed ISEGS project, and other subsequent energy projects in Ivanpah Valley, will impact numerous rare plant populations, but the severity and extent of these impact is not well known. It is safe to assume that larger populations that are broken into smaller populations will suffer from a restricted exchange of pollen or seed, and this has important genetic and demographic consequences. Additionally, habitat fragmentation results in the

increase of edge effects and the deterioration of habitat quality. It may alter plant-pathogen and plant-herbivore dynamics. Due to lack of time, funding or available expertise, the full range of demographic vs. genetic stochasticity parameters are rarely integrated into population viability analyses. Until such detailed analyses become available, managers must work with scientists to maintain natural ecological processes and provide the best natural conditions for populations and metapopulations to persist. A central principle of ecosystem management is to delineate the primary threats to each species and their habitats and to minimize or eliminate these threats to the greatest possible extent.

In general, threats come in three types 1) threats imposed by changes in the environment, either by natural or human causes, 2) threats resulting from disturbance of important interactions with other species, and 3) genetic threats. Current environmental threats to the proposed ISEGS site and surrounding lands are considerable. These include climate change (e.g., altered precipitation and fire regimes), habitat fragmentation (e.g., roads, heliostat fields, structures), direct disturbance (e.g., mowing, hydrological alterations, deposition of atmospheric nitrogen) and exploitation (e.g., cactus collecting). Disturbance of biotic interactions might include destruction of key pollinator guilds, altered pathogen and herbivore interactions, and hybridization with introduced natives (e.g., CalTrans revegetation programs). An important principle that must be considered is that we lack a basic knowledge of the biological and ecological requirements required to appropriately manage many rare species. In order to prioritize management of rare plants related to any proposed project, we must understand their distributions, life-history attributes, and identify any threats to their viability. Finally, management for conservation of rare plants should always take place in the context of the key processes of their ecosystem (e.g., practices developed in the Nebraska prairies may not be appropriate in the California Deserts).

As noted in the FSA/DEIS, in CNPS's written opening testimony, and in CNPS's direct oral testimony (ISEGS Evidentiary Hearings Transcripts of 1/12/10 pp.223-253), peripheral populations are important for the long-term conservation of genetic diversity and evolutionary potential of a species, particularly within the context of uncertain climatic changes to their habitat (Hampe and Petit, 2005; Lesica and Allendorf, 1995).

CNPS would like to emphasize the contradictory approach to climate change mitigation represented by siting the project in its currently proposed location. One of the benefits of utility-scale solar projects will be their reduction of greenhouse gas emissions resulting from decreased need to rely on the combustion of fossil fuels for energy. However, if the implementation of this climate change mitigation strategy (greenhouse gas reduction) comes at the expense of reducing the native biodiversity of intact biotic communities (desert tortoise habitat, high quality vegetation alliances), and rare plant populations, then the benefit of the project is greatly reduced.

The Ivanpah Valley fan site is a large intact area of creosote-bursage scrub that is relatively free of weeds. The FSA/DEIS describes the site as "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." (FSA, Biological Resources p. 6.2-37).

In A Manual of California Vegetation, (Sawyer et al., 2008) the authors describe threats to the Larrea tridentata-Ambrosia dumosa Shrubland Alliance (Creosote bush-white burr sage scrub) found at the proposed site as follows: "The presence of several non-native plants, particularly Brassica tournefortii, Bromus spp., and Schismus spp., has greatly increased fire frequencies and led to the degradation and destruction of many hectares of this alliance. Long-term, intensive grazing, OHV activity, mining, and military operations have also left their mark.... We need to identify, monitor, and manage areas free of these degrading influences" (page 568).

In addition, the authors state that Creosote bush-white burr sage scrub associations occurring with Pleuraphis rigida (Big galleta grass), and "those with a diverse shrub layer are G1/S1" (page 566). The G1/S1 (Global/ State) status rank means that the plant community is considered globally/state uncommon with "fewer than 6 viable occurences worldwide/statewide, and/or up to 518 hectares" (page 45). The Ivanpah site plant community has galleta grass and a diverse shrub layer. The qualities of this

site, as well as similar areas throughout the Ivanpah Valley and indeed the California Desert Conservation Area are just those types of wild lands that our climate change strategies should be addressing through protection, rather than destruction.

Rare plant surveys lack late summer/early fall-flowering taxa inventory
Approximately 40% of the plant taxa in Ivanpah Valley flower in late summer/early fall. Of these, 20-25 potential special status plants flower in the summer/fall. All of these plants require ideal conditions for growth. Surveys, no matter how thorough, when performed during seasons and in years in which specific growth conditions are absent may fail to record the presence and/or full range extent of rare plants in desert habitats.

The floristic surveys conducted by the applicant during Spring 2008 were performed well, and by well-qualified field personnel. However, floristic surveys for desert rare plants must be performed by qualified botanists over a number of years during both spring and summer/fall flowering seasons in order to maximize the probability of identifying all special status species with the potential to occur on the project site. Without an accurate inventory of plant taxa that occur on site, it is not possible to fully assess project impacts to special status plants and therefore meaningful mitigation cannot be developed.

Furthermore, the Eastern Mojave Desert is a botanical frontier where in the past few years alone, there have been a number of very significant botanical finds and where more are to be expected. Examples for Ivanpah Valley include, *Amaranthus crassipes* (near Nipton, new to California (CA)), *Oenothera cavernae* (Primm to Clark Mountain, new to CA), *Muilla coronata* (a 70-mile eastern range extension, new to Eastern San Bernardino County), *Leptochloa uninervia* (from near Nipton, new to the Mojave Desert). The *M. coronata* was found just west of the proposed ISEGS project area at the base of Clark Mountain in early spring. By the time surveys of the proposed ISEGS site were conducted in late April and May, *M. coronata* plants had dried and were not observable during the spring surveys. This later example illustrates how surveys conducted when growth conditions are adequate (as they were in spring of 2008), may be too narrow in their window of timing to detect important rare plant occurrences.

The FSA report's Special-Status Plant Impact Avoidance and Minimization measure (BIO 18) requires the applicant to conduct pre-construction surveys for both spring and summer/fall blooming taxa but only within the specified project areas. Vegetative structures of some of the spring flowering rare plants occur in localities other than those mapped the previous year. Since the purpose of pre-construction surveys is to quantify each taxon's occurrence on site, pre-construction surveys should be conducted on all project lands that are undeveloped at the time surveys are performed in order to obtain a full accounting of plant occurrences (e.g., *Asclepias nyctaginifolia* spreads underground and sends vegetative clones above ground in different locations year after year; *Enneapogon desvauxii* is an annual grass and so its distribution is ephemeral year to year). Since summer/fall surveys have yet to be performed at the project site, there is no baseline information on the presence and extent of these taxa. Therefore, summer/fall surveys need to be conducted throughout the entire site before any construction begins in order to obtain a full account of special status species on site.

Cumulative Impacts
The FSA/DEIS fails to adequately identify and analyze both the cumulative impacts and the growth inducing impacts which in this instance are closely tied together. While review of the Optisolar application has yet to begin, the high cost of the Eldorado-Ivanpah transmission upgrade provides a compelling economic incentive for approval of the Optisolar project, virtually ensuring yet another solar power project with rare plant occurrences in the northern Ivanpah Valley. Arguably, neither project alone could amortize the cost of the proposed Eldorado-Ivanpah upgrade, which involves the construction of 35 miles of high voltage lines from California into Nevada and separate telecommunications pathways. The cumulative impacts from these two projects on the northern Ivanpah Valley are not adequately assessed and the grown inducing impacts from the approval of one project on the entire area is not adequately assessed or analyzed.

Cumulative impacts to special status plants are recognized (Executive Summary, FSA/DEIS, p. 1-15) but the FSA/DEIS has failed to adequately analyze these cumulative impacts across the range of these

species and ways to avoid and minimize these impacts. In addition, as noted above, the provisions for "nesting" mitigation do not ensure that the loss of the individual plants and the cumulative impacts from those losses will in fact be adequately compensated.

Cumulative impacts will convert the Northern Ivanpah Valley into a de-facto solar zone and industrial zone. The cumulative impacts to species across the zone and across the stateline into the eastern Ivanpah Valley are not adequately addressed as well as the conversion of a largely natural area – the Ivanpah Valley and dry lake area as a whole—into a largely industrialized area with more than 6 large scale solar plants, the accompanying substations and power lines, glare and heat islands that will be created across the "zone."

The FSA/DEIS states that building the proposed ISEGS project at the proposed location "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." (FSA/DEIS p. 1-17), including, "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; and direct, indirect, cumulative impacts to special status plant species." (FSA/DEIS p. 6.2-72)

The cumulative impacts of the proposed ISEGS project combined with other proposed energy projects in Ivanpah Valley represent a scale of impact on functional habitat that is unprecedented in its range and pace. Cumulative impacts identified in the FSA/DEIS for the proposed project will have cumulatively considerable adverse effects to the Ivanpah Valley ecosystem as the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. The FSA/DEIS concludes that the cumulative effects of these proposed actions to the biological resources in the Ivanpah Valley will have significant, unmitigable impacts to rare plants, but falls short of requiring meaningful mitigation to address these cumulative impacts.

Rare Plant Avoidance and Minimization Measures (BIO 18) do not provide mitigation for rare plant losses

The FSA/DEIS report directs the applicant to implement several measures under "BIO 18" that are generally in agreement with CNPS policies and guidelines on rare plant mitigation requirements (CNPS 1989, CNPS 1998a, CNPS 1998b). Additionally, BIO 18 measures would provide important information on the population dynamics and population viability of the project's six reported special status plant taxa, including *Sphaeralcea rusbyi var. eremicola* (Rusby's desert mallow), a CNPS List 1B and BLM special-status plant. This data could assist in the future management of these taxa both on the proposed ISEGS project and on other projects where they might occur.

The applicant proposes to intentionally manage the "quasi-natural" vegetation under heliostat fields as rare plant refugia by fencing individual plants or groups of plants under mirrors. Efforts to manage heliostat fields as areas for rare plant protection would be experimental in nature, meaning there is no current data that assures, or provides sufficient confidence, for success. Therefore, any management plan to this effect would need to be designed in such a way as to produce results that would better inform future decisions - whether the results are positive or negative; and it would need to have benchmarks for success and for remedial action to buffer against losses that could lead to extirpation or extinction of a species. In terms of rare plant conservation under solar mirrors, there is no foundation of success to point to, but many instances of species failing in response to ecosystem fragmentation, especially when management decisions focus on preserving a population's spatial distribution patterns at the expense of hindering a population's biological processes (Thrall et al., 2000). If the proposed project is built, the opportunity for rare plant conservation, ironically, will be in the knowledge we gain by documenting the loss of populations. For mitigation to occur, at a minimum the applicant must be required to conduct off-site surveys to identify lands with additional occurrences of the special status plants that are to be

destroyed by the project, then place the lands where identified plants occur under conservation easement before being allowed to commence construction.

Vegetation surveys to determine potential desert tortoise relocation and translocation habitat quality are insufficient

Plant Surveys were performed in July/August 2009 to determine whether habitat quality of proposed desert tortoise translocation areas were of equal or greater quality than the habitat quality at the project site. This comparison used measures of perennial shrubs and succulent species abundance, richness, and diversity as surrogate indicators of desert tortoise habitat quality. The survey rationale, design, methods, and analysis contain flaws that call into question the validity of conclusions presented in the report, Vegetation Surveys for Potential Relocation and Translocation Areas (in Applicant's Supplemental Data Response, Set 2I, August 10, 2009).

An accurate assessment of desert tortoise habitat quality must take into account the quantity and quality of food sources available. Highest quality food for desert tortoise are native annual plants, whose protein and water content provide the optimum opportunity to rehydrate and flush salts concentrated during hibernation from their bladders, and to accumulate the energy necessary to mate successfully (Pavlik 2008). The surveys were conducted in the middle of summer when few annuals are present.

The report does not provide a rationale for the number of sampling sites chosen, or whether the sites were chosen at random. No statistical test was performed to compare similarities/differences between project and proposed translocation sites, so conclusions cannot be confirmed to any level of significance.

The California Native Plant Society appreciates the opportunity to provide these comments regarding the ISEGS FSA/DEIS. Our goal in this regard is to assist the BLM to develop the best possible environmental review in a timely manner that provides effective, long-term protective measures for preserving our biological resources in the California Desert while addressing the permitting process for renewable energy projects.

Respectfully,
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