Appendix A

NOTICE OF PREPARATION AND COMMENT SUMMARY REPORT

MEMO

To: Cathreen Richards, County of Inyo
Josh Hart, County of Inyo

From: Jeff Henderson, PMC
Dana Hoffman, PMC

Cc: Robert Edgerton, Helix Environmental Planning
Emily Capello, Aspen Environmental Group

Date: July 18, 2014

Re: Renewable Energy General Plan Amendment
Scoping Meetings Comment Summary

This memorandum summarizes a series of scoping meetings conducted by Inyo County, Helix Environmental Planning, and PMC staff to support the Program Environmental Impact Report (Program EIR; EIR) for the Renewable Energy General Plan Amendment (REGPA; proposed project). The REGPA involves identifying new and modified General Plan goals, policies, and implementation measures, including the designation of solar energy development areas (SEDAs), based on the results of an Opportunities and Constraints Technical Study (OCTS); a background report (Inyo County 2013); previous work completed in 2011; and input from stakeholders and the public.

This summary includes key trends and findings, the approach and format of the meetings, and next steps for the preparation of the EIR. The appendices provide more detailed results from each meeting.

OVERVIEW

To assist the County in determining the focus and scope of analysis for the REGPA EIR and in accordance with the requirements of the California Environmental Quality Act (CEQA), the County issued a Notice of Preparation (NOP) on June 11, 2014, to government agencies, special service districts, organizations, and individuals with an interest in or jurisdiction over the project (see **Appendix A**). This step ensures early consultation on the scope of the EIR. The public comment period ended on July 10, 2014.

The NOP is a brief notice sent by the County as lead agency for the proposed project to inform responsible agencies, trustee agencies, and potentially affected federal, state, and local agencies that the County plans to prepare an EIR. The NOP also seeks comments regarding the scope and content of the EIR.

Inyo County conducted two public scoping sessions for the proposed project, hosted at locations identified below:

1. June 16, 2014; 5:00 pm; Olancha Fire Station; 689 Shop Street; Olancha, CA
2. June 18, 2014; 5:00 pm; Trona Golf Course; 82700 Trona Road; Trona, CA

In addition, the County conducted three public scoping meetings for the proposed project, hosted at locations identified below:

1. June 24, 2014; 6:00 pm; Statham Hall; 138 N. Jackson Street; Lone Pine, CA
2. June 25, 2014; 6:00 pm; Bishop City Hall Auditorium; 377 West Line Street; Bishop, CA
3. June 26, 2014; 6:00 pm; Tecopa Community Center; 405 Tecopa Hot Springs Road; Tecopa, CA

Altogether, these meetings were attended by 62 agency representatives and community members. Sign-in sheets and transcriptions of each meeting are provided in **Appendix B**. At each meeting, County staff provided an overview of the proposed project and potential environmental impacts, as identified in the NOP. Participants were then provided an opportunity to ask questions to clarify their understanding of the project description, and to provide comments regarding potential environmental impacts, content of the REGPA, and the current and subsequent CEQA processes associated with the REGPA.

QUESTIONS AND ANSWERS

At each scoping meeting, participants were given an opportunity to ask questions to clarify their understanding about the REGPA and CEQA process. Questions were addressed prior to the formal scoping session at each meeting. Participants offered a wide range of questions. Many questions addressed the following issues, with corresponding responses from the project team.

- **Process for and extent of CEQA streamlining provided for future project-level EIRs as a result of this Program EIR.** Staff clarified that streamlining may be allowed for project-level EIRs in the proposed SEDAs as a result of this Program EIR. However, in each case, the County will retain significant latitude to determine both a future project's need for a project-level EIR, and the level of EIR analysis that will be required.

- **Level of County authority over permitting, and authority to impose the REGPA and EIR mitigation measures on future solar projects that would occur on federally owned or Los Angeles Department of Water and Power (LADWP) land.** The County has limited jurisdiction over the approval and environmental impact analysis required for projects sited on federal or LADWP land. However, these agencies are required to consider consistency with the County's General Plan as a part of their environmental analysis under CEQA.

- **Process for the separate study of Owens Valley will proceed, and how megawatt cap requirements and boundaries for the Western County will be affected.** With the exception of the Laws SEDA, potential solar projects in the Owens Valley will be considered in a separate, subsequent planning process. However, megawatt caps and transmission policies pertaining to the Owens Valley are established in the REGPA.

SCOPING COMMENTS AND KEY FINDINGS

Scoping meeting participants provided input on a wide variety of potential environmental impacts and issues. **Table 1** presents all scoping comments offered during the meetings, organized by environmental topic area.

Three key findings emerged from scoping meeting comments.

Aesthetics and Visual Resources. Numerous comments address potential aesthetic and visual resource impacts. These include concerns about potential impacts to viewsheds and scenic vistas, especially from concentrated solar power towers. Impacts to scenic byways and unofficial wilderness areas are of special concern. Several comments also address potential light and glare impacts.

Biological Resources. Participants are also concerned about potential impacts to habitats and species present within the proposed SEDAs. Some comments focus on specific species, especially avian species. However, most comments outline a more general concern about potential impacts to biological resources within the county.

REGPA Process and Policy. Although the intent of the scoping meetings is to gather input on the environmental impacts of the REGPA, participants offered a number of policy and procedural comments and suggestions. These fit generally into two categories:

- A preference for emphasis on distributed generation and rooftop solar, rather than the emphasis the REGPA places on larger-scale solar generation.
- Economic considerations of new solar projects in the county and potential taxes or fees resulting in association with such projects. Many comments note the importance of realizing economic benefits from solar development in local communities. Participants suggested various ways to leverage community benefits, such as charging a tax per kilowatt produced or a establishing a comprehensive fee program.

Although not directly related to potential environmental impacts, these comments are also summarized in **Table 1**.

TABLE 1: SCOPING MEETING COMMENTS BY ENVIRONMENTAL TOPIC AREA

Impact	Summary	Comments	Comment Source
Aesthetics/ Visual Resources	15 comments addressing potential impacts of solar PV and concentrated solar power to scenic vistas and scenic byways, and potential for light and glare impacts, both in specific locations and generally. Includes suggested mitigation for visual impacts.	Concern about visual/aesthetic impacts of mirrors and towers associated with concentrated solar power.	Meeting 3 (Lone Pine)
		Consider potential solar thermal visual impacts.	Meeting 2 (Trona)
		Consider visual effects.	Meeting 1 (Olancha)
		Consider negative visual effects that will detract from beauty.	Meeting 2 (Trona)
		Consider positive visual effects – improvements to Trona.	Meeting 2 (Trona)
		Charleston View residents expressed concern over losing viewsheds and unofficial wilderness areas and potential wildlife impacts. Local community would not receive any direct benefit from a solar project.	Meeting 5 (Tecopa)
		Concerned about the number of solar projects being constructed throughout the desert; don't want to see them here.	Meeting 5 (Tecopa)
		Eastern Sierra Scenic Byway should be protected.	Meeting 3 (Lone Pine)
		Consider potential impacts to viewsheds surrounding the Old Spanish Trail area of Charleston View (which is part of the National Park Service). Solar development would be inappropriate near this area.	Meeting 5 (Tecopa)
		Consider scenic areas around Olancha – including scenic byway.	Meeting 1 (Olancha)
		Add more stringent language regarding light and glare – shielded, cut off, etc. (Although this is an existing General Plan policy, there is no ordinance requiring it, so a mitigation measure to require additional specific light and glare studies would be appropriate.)	Meeting 3 (Lone Pine)
		Concerned about glare and lights associated with solar projects. Desert solitude is critical, as well as night skies. Primarily concern with solar thermal.	Meeting 5 (Tecopa)
		Recommended cutouts of cattle (or elves) to cover and improve visual appearance of panels.	Meeting 3 (Lone Pine)
		Site and design concerns for solar farms.	Meeting 3 (Lone Pine)
		Provide simulations for people to see what a solar project might look like.	Meeting 1 (Olancha)

Impact	Summary	Comments	Comment Source
Agricultural & Forestry Resources	No comments		
Air Quality	4 comments relating to concerns about dust from construction activities. 1 comment relating to environmental justice.	Recommend dust mitigation or air quality mitigation prior to construction. Consider mitigation for areas not on the lake bed as well. Recommend installation of rock blanket roll out (e.g., Flexamat) or blocks of concrete on mesh (geotextile) for erosion and dust control.	Meeting 3 (Lone Pine)
		Consider dust from Searles Lake.	Meeting 2 (Trona)
		Consider dust from cleared land.	Meeting 2 (Trona)
		Discuss all potential benefits to a community and environmental justice issues.	Meeting 5 (Tecopa)
Biological Resources	10 comments relating to potential impacts to species. Includes comments related to cumulative, long-term impacts and site reclamation.	Concerned about potential avian mortality impacts from concentrated solar power.	Meeting 3 (Lone Pine)
		Consider animals in the area, birds.	Meeting 1 (Olancha)
		Concern for potential bird migration impacts in Rose Valley. Suggest study for incoming bird migration. Some concern about solar panels looking a lot like water.	Meeting 3 (Lone Pine)
		Concern for bat mortality with solar panels.	Meeting 3 (Lone Pine)
		Consider birds, squirrels, wildlife, tortoise, etc.	Meeting 2 (Trona)
		Soil contamination with use of chemicals and herbicides for weed or dust prevention is a concern for habitat sustainability. Carbons get stored in the soil and emit when disturbed.	Meeting 3 (Lone Pine)
		Describe time frames for inventory and analysis for special status species.	Meeting 5 (Tecopa)
		Consider environmental effects as associated with Owens Lake.	Meeting 1 (Olancha)
		Discuss restoration/reclamation measure(s) to be associated with individual solar projects.	Meeting 5 (Tecopa)
		Address how rehabilitation and reclamation should be completed following development – Include rehab as part of the reclamation process.	Meeting 3 (Lone Pine)
		Distributed to land already affected by other projects – consider cumulative effects.	Meeting 1 (Olancha)

Impact	Summary	Comments	Comment Source
Cultural & Historic Resources	3 comments related to importance of thermal waters as a sacred cultural resource.	Concerned about sacred sites that could be damaged by solar development; also the hot springs.	Meeting 5 (Tecopa)
		Glad areas around Death Valley Junction and Panamint Valley were removed from proposed REDAs. Anywhere there are geothermal waters would be considered sacred sites by Native Americans.	Meeting 5 (Tecopa)
		Consider importance of the County's healing thermal waters; these are considered sacred to many.	Meeting 5 (Tecopa)
Geology & Soils	2 comments related to potential negative impacts of geothermal renewable energy.	Geothermal isn't good in Searles Valley.	Meeting 2 (Trona)
		The REGPA should not and does not consider geothermal resources.	Meeting 5 (Tecopa)
Greenhouse Gas Emissions	No comments		
Hazards & Hazardous Materials	2 comments related to corrosion and waste from renewable energy production.	Corrosion – Searles Lake chemistry is hazardous.	Meeting 2 (Trona)
		Green waste for renewable energy/waste to energy.	Meeting 1 (Olancha)
Hydrology & Water Quality	3 comments related to potential impacts of water use in solar production on water sources and conservation.	Concerned about amount of water used for concentrated solar power.	Meeting 3 (Lone Pine)
		Consider potential impacts on water supply.	Meeting 2 (Trona)
		Water may need to be purchased for solar projects and should be considered in the EIR, along with water conservation measures.	Meeting 5 (Tecopa)
		Disclose how much water would be needed per MW/acreage cap.	Meeting 5 (Tecopa)
Land Use & Planning	1 comment related to negative impacts of geothermal renewable energy.	Reclamation power companies may abandon sites.	Meeting 2 (Trona)
		Conduct due diligence for individual project applicants to determine how projects could potentially impact the County.	Meeting 5 (Tecopa)
Mineral & Energy Resources	No comments.		
Noise	No comments.		

Impact	Summary	Comments	Comment Source
Population & Housing	2 comments related to increased economic activity in the area.	Jobs – need more employment.	Meeting 2 (Trona)
		Consider local community benefits.	Meeting 2 (Trona)
Public Services	1 comment relating to potential impacts to public roads and community facilities.	Consider potential impacts to roads, County facilities, and other economic effects if solar projects fail.	Meeting 3 (Lone Pine)
Recreation	2 comments relating to potential impacts of development on recreation experience.	Suggest survey/study of visitors/visitor activity be added to the EIR. What would visitors consider to be too industrial and what might really degrade their visit?	Meeting 4 (Bishop)
		Economy would die without tourism; people come here to recreate. Residents live here because of the rural nature, night skies, etc. The county's true treasures are solitude, views, and opportunities for photography.	Meeting 5 (Tecopa)
Traffic & Circulation	No comments.		
Utilities & Service Systems	No comments.		
Policy and Process	22 comments relating to changes to policy language on location and production caps for solar projects, preference for distributed generation (DG) projects over large-scale projects, and how County process will interact with federal agency and LADWP processes.	Recommend amending definition of "renewable energy" to indicate only solar, and call the project the Solar Energy General Plan Update (SEGPA).	Meeting 4 (Bishop)
		Recommend policy language change to LU 1.17 – "potential impacts from utility scale must be avoided~~, minimized, or mitigated to the extent feasible~~."	Meeting 4 (Bishop)
		Recommend policy language change: Remove "along and over" from Los Angeles Aqueduct language. Putting solar panels over the aqueduct is ugly and will cause a lot of disturbances.	Meeting 4 (Bishop)
		Suggest putting all 250 megawatts allowed for the Western County into the lake bed.	Meeting 3 (Lone Pine)
		Recommend identifying project areas and each area's MW cap more specifically.	Meeting 4 (Bishop)

Impact	Summary	Comments	Comment Source
		Triple asterisks in the caps table should be reworded to read "… only open for development up to the established cap."	Meeting 4 (Bishop)
		Do not include areas in the LADWP land management plans in the SEDAs.	Meeting 4 (Bishop)
		Preference for smaller project alternatives and not large industrial installation (point of use).	Meeting 3 (Lone Pine)
		REGPA technology and premise is flawed. DG technology should be pursued. Other technologies are locked up in the patent office.	Meeting 5 (Tecopa)
		Recommendation to remove the hatch marks in the Owens Valley on the map and call Owens Valley the "Owens Valley Study Area" with an established boundary.	Meeting 4 (Bishop)
		Recommend a heat analysis to determine if temperatures will rise in the area by adding solar panels. PV solar degrades with heat and may be too hot to be efficient.	Meeting 3 (Lone Pine)
		Solar rooftops aren't counted toward the Renewables Portfolio Standard 33%.	Meeting 2 (Trona)
		DG and community solar: cannot sell power to the grid but can use the grid. Can use net metering.	Meeting 5 (Tecopa)
		Subsidy for solar has increased prices.	Meeting 2 (Trona)
		Counties do not receive sales tax for solar.	Meeting 2 (Trona)
		If you do develop solar, the County will be compensated. This conflicts with the policy that says the County should be compensated for projects that don't develop.	Meeting 4 (Bishop)
		Describe incentives that could be exacted from private solar developers to assist local communities. Local communities should be rewarded for allowing development in their immediate area.	Meeting 5 (Tecopa)
		Tecopa/Shoshone interested in becoming a "green community" that harnesses and uses solar energy (not exported). Would like to learn how the community could do that. Seek certified green community status.	Meeting 5 (Tecopa)
		Pleased that the PEIR will consider actual locations and proposed development.	Meeting 5 (Tecopa)

Impact	Summary	Comments	Comment Source
		Consider potential transmission lines needed for solar development near Chicago Valley.	Meeting 5 (Tecopa)
		Concerned about CEC/CPUC jurisdiction. Clearly describe how much control these agencies have over this process and how the County can act independently.	Meeting 5 (Tecopa)
		Consider role of federal agencies/ required coordination on their lands.	Meeting 1 (Olancha)

NOP COMMENT LETTERS

In addition to the comments received during the scoping session meetings, the County also received 22 comment letters from the agencies and individuals listed below. Individual comment letters have been appended to this memo as **Appendix C**.

1. OPR (June 11, 2014)
2. Caltrans (June 17, 2014)
3. Joe Sonia (June 19, 2014)
4. Lone Pine Paiute (June 24, 2014)
5. Jane McDonald (June 27, 2014)
6. Earl Wilson (June 29, 2014)
7. Amy Noel (June 30, 2014)
8. NPS (July 3, 2014)
9. James Stroh (July 8, 2014)
10. Manzanar Committee (July 8, 2014)
11. CA Water Board (July 8, 2014)
12. Nature Conservancy (July 9, 2014)
13. Lone Pine Paiute (July 9, 2014)
14. Sara Manning (July 9, 2014)
15. Bishop Tribal Council (July 10, 2014)
16. Big Pine Paiute Tribe (July 10, 2014)
17. Daniel Pritchett (July 10, 2014)
18. Friends of the Inyo (July 10, 2014)
19. CBD/Sierra Club (July 10, 2014)
20. CNPS (July10, 2014)
21. Amargosa Conservancy (July 10, 2014)
22. DOW/Wilderness Society/NRDC (July 10, 2014)

NEXT STEPS

The County will document and consider comments received during the NOP scoping meetings and identified in NOP comment letters during the public review period in the Draft EIR prepared for the REGPA. The Draft EIR is anticipated to be available for public review and comment in fall 2014.

APPENDICES

A. Notice of Preparation

B. Scoping Meeting Transcriptions and Sign-In Sheets

C. NOP Comment Letters

APPENDIX A

Notice of Preparation

To: State Clearinghouse
P.O. Box 3044
Sacramento, CA 95812-3044
(Address)

From: Inyo County Planning Department
P.O. Drawer L
Independence, CA 93526
(Address)

Subject: Notice of Preparation of a Draft Environmental Impact Report

Inyo County will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Cathreen Richards, Senior Planner at the address shown above. We will need the name for a contact person in your agency.

Project Title: Renewable Energy General Plan Amendment

Project Applicant, if any: N/A

Date June 10, 2014

Signature

Title Senior Planner

Telephone (760) 878-0263

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Renewable Energy General Plan Amendment

Lead Agency: Inyo County | Contact Person: Cathreen Richards
Mailing Address: P.O. Drawer L | Phone: (760) 878-0263
City: Independence | Zip: 93526 | County: Inyo

Project Location: County: Inyo | City/Nearest Community: Countywide
Cross Streets: Entirety of Inyo County | Zip Code: ____
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W | Total Acres: 10,227 Sq. Miles
Assessor's Parcel No.: Various | Section: ____ | Twp.: ____ | Range: ____ | Base: ____
Within 2 Miles: State Hwy #: 395/136/190/168/178 | Waterways: Owens River
Airports: Various | Railways: Various | Schools: Various

Document Type:

CEQA: ☒ NOP ☐ Draft EIR | NEPA: ☐ NOI | Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR ☐ EA ☐ Final Document
☐ Neg Dec (Prior SCH No.) ____ ☐ Draft EIS ☐ Other: ____
☐ Mit Neg Dec Other: ____ ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☒ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☐ Other: ____

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☒ Power: Type Solar MW Varying
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☒ Fiscal ☒ Recreation/Parks ☒ Vegetation
☒ Agricultural Land ☒ Flood Plain/Flooding ☒ Schools/Universities ☒ Water Quality
☒ Air Quality ☒ Forest Land/Fire Hazard ☒ Septic Systems ☒ Water Supply/Groundwater
☒ Archeological/Historical ☒ Geologic/Seismic ☒ Sewer Capacity ☒ Wetland/Riparian
☒ Biological Resources ☒ Minerals ☒ Soil Erosion/Compaction/Grading ☒ Growth Inducement
☐ Coastal Zone ☒ Noise ☒ Solid Waste ☒ Land Use
☒ Drainage/Absorption ☒ Population/Housing Balance ☒ Toxic/Hazardous ☒ Cumulative Effects
☒ Economic/Jobs ☒ Public Services/Facilities ☒ Traffic/Circulation ☐ Other: ____

Present Land Use/Zoning/General Plan Designation:

State and Federal; Tribal; Residential; Commercial; Industrial; Agricultural; Open Space; Natural Resources.

Project Description: *(please use a separate page if necessary)*
Please see Attachment 1 and Figure 1 for a complete project description and project location map.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

_____ Air Resources Board	_____ Office of Historic Preservation
_____ Boating & Waterways, Department of	_____ Office of Public School Construction
_____ California Emergency Management Agency	_____ Parks & Recreation, Department of
_____ California Highway Patrol	_____ Pesticide Regulation, Department of
_____ Caltrans District #9	_____ Public Utilities Commission
_____ Caltrans Division of Aeronautics	_____ Regional WQCB #6
_____ Caltrans Planning	_____ Resources Agency
_____ Central Valley Flood Protection Board	_____ Resources Recycling and Recovery, Department of
_____ Coachella Valley Mtns. Conservancy	_____ S.F. Bay Conservation & Development Comm.
_____ Coastal Commission	_____ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
_____ Colorado River Board	_____ San Joaquin River Conservancy
_____ Conservation, Department of	_____ Santa Monica Mtns. Conservancy
_____ Corrections, Department of	_____ State Lands Commission
_____ Delta Protection Commission	_____ SWRCB: Clean Water Grants
_____ Education, Department of	_____ SWRCB: Water Quality
_____ Energy Commission	_____ SWRCB: Water Rights
_____ Fish & Game Region #6	_____ Tahoe Regional Planning Agency
_____ Food & Agriculture, Department of	_____ Toxic Substances Control, Department of
_____ Forestry and Fire Protection, Department of	_____ Water Resources, Department of
_____ General Services, Department of	
_____ Health Services, Department of	_____ Other: _____
_____ Housing & Community Development	_____ Other: _____
_____ Native American Heritage Commission	

Local Public Review Period (to be filled in by lead agency)

Starting Date June 11, 2014 Ending Date July 10, 2014

Lead Agency (Complete if applicable):

Consulting Firm: HELIX Environmental Planning
Address: 11 Natoma Street, Suite 155
City/State/Zip: Folsom, CA 95630
Contact: Robert Edgerton
Phone: (916) 365-8700

Applicant: N/A
Address: _____
City/State/Zip: _____
Phone: _____

Signature of Lead Agency Representative: _____ **Date:** 6/9/14

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Description of Proposed Project

Introduction

The County of Inyo (County) is proposing to update its General Plan to include policies for solar energy development within the County. The proposed Renewable Energy General Plan Amendment (REGPA) involves identifying new and modified General Plan goals, policies, and implementation measures, including Solar Energy Development Areas (SEDA), based on the results of an Opportunities and Constraints Technical Study (OCTS); a background report (Inyo County 2013); work completed in 2011; and, input from stakeholders and the public. From this foundation of work and outreach, eight proposed SEDAs have been identified and will be analyzed in the program environmental impact report (PEIR).

This work is being done through a grant from the California Energy Commission (CEC) and consists of funds from the Renewable Resource Trust Fund. These funds were made available to the County because of its participation in the Desert Renewable Energy Conservation Plan (DRECP). The DRECP was established in May 2010, by an agreement between the CEC, California Department of Fish and Wildlife (CDFW), Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (USFWS) to guide renewable energy development in tandem with a multispecies conservation plan for the Mojave and Colorado Desert regions. Counties located within the DRECP area were also invited to participate in the DRECP efforts. Inyo County has been active in the DRECP since its inception and in March 2013 entered into a Memorandum of Understanding (MOU) with the CEC. The MOU provides the framework for a cooperative relationship between the CEC and Inyo County that focuses on effective planning and promotion of renewable energy development. To further these efforts, the County is proposing the REGPA to update its General Plan with policies designed to facilitate the responsible development of eligible renewable solar energy resources, which is the proposed project and the focus of the programmatic environmental impact report that will be prepared. The County will focus on solar energy development in its REGPA, as geothermal and hydro-electric generation is already adequately addressed in the General Plan and the Zoning Code, and wind has been excluded based on public input.

In addition to its involvement with the DRECP, the County has been active in the large scale planning for renewable energy development throughout the desert southwest by involvement in the California Transmission Planning Group, the Renewable Energy Transmission Initiative, the Solar Programmatic Environmental Impact Statement (prepared by the BLM for lands under its

jurisdiction) and the West-wide Energy Corridor Program Environmental Impact Statement. The County's involvement in these groups and initiatives has been focused on better land use and transmission opportunities for responsible renewable energy development in Inyo County. In 2010 the County adopted Title 21: the Inyo County Renewable Energy Ordinance, which was developed to encourage and guide the development of solar and wind resources in the County. In 2011, the County adopted a REGPA that was rescinded due to litigation brought forth by environmental groups over the adequacy of the CEQA document that addressed the REGPA. Subsequently, the County has initiated the development of the Draft 2013 REGPA. The County prepared a background report for the REGPA in October 2013 and held multiple stakeholder and public meetings in November and December 2013 to provide opportunities for public involvement in the process. The background report provides an overview of the County's previous and current efforts to include policies for renewable energy development in the General Plan and provides a foundation to identify areas that may be appropriate for future renewable energy development based on a set of criteria. The County also prepared the OCTS in February 2014. The OCTS combines resource and infrastructure requirements for renewable energy development with key environmental considerations in the County and with available spatial data to identify the County's renewable energy resources and potential locations where development of these resources can most feasibly occur. The OCTS identifies areas that would result in the least environmental impacts and so would present the best opportunities for streamlined processing of renewable energy development applications, and identifies levels of constraint for the identified areas.

On February 26, 2014 the Inyo County Planning Commission received a presentation on the Draft 2013 REGPA and took public comment. A revised Draft 2013 REGPA was presented to the Inyo County Board of Supervisors on April 1, 2014. In response to extensive input from the public, wind energy was removed from consideration in the REGPA. The proposed development areas as presented in the Draft 2013 REGPA were revised to utilize only existing transmission facilities in the County's western region and to guide the development to existing disturbed lands. The remaining areas in the County with potential development areas were greatly reduced also based on public input. Most of the publics' expressed concern was to renewable energy development in the Owens Valley, in large part, based on potential impacts to the visual characteristics of the valley. Alternative solar development scenarios in the Owens Valley will be considered separately. As the County continues with the REGPA, the following will used as criteria to help refine appropriate areas for solar energy development:

- areas with the highest energy generation potential;

- availability of transmission;
- studies and plans conducted by other jurisdictions and groups;
- land with the appropriate slope and development characteristics;
- areas of avoidance including, potentially, critical habitats, military concerns, cultural and historic resources, and scenic resources; and,
- the visions and goals of the public.

Solar Energy Generation

The two primary types of solar power generation technologies are photovoltaic panel systems and solar thermal trough or tower systems. A typical solar thermal power plant uses hundreds of mirrors to concentrate sunlight for boiling liquid to produce steam that spins a turbine. Solar thermal facilities have potential visual impacts from use of mirrors and, perhaps towers, and depending upon the technology employed, may require an intensive amount of water use to cool turbines. Photovoltaic panels consist of a series of cells made from a semiconductor, usually silicon, which frees electrons to create an electric current.

Desert Renewable Energy Conservation Plan

The DRECP is a regional planning effort that focuses on the areas of the Colorado and the Mojave Deserts that are located within California. The DRECP boundary encompasses approximately 35,292 square miles of the southeast portion of California stretching from the U.S.-Mexico Border northward into Inyo County. Within Inyo County, the DRECP area covers 4,668 square miles or roughly 46 percent of the County. Refer to **Figure 1** for the extent of the DRECP area within Inyo County. The DRECP was established in response to federal and state legislation enacted to promote renewable energy development, while providing for the conservation and management of plant and wildlife communities. The DRECP includes the development of solar thermal, utility-scale solar photovoltaic, wind, and other forms of renewable energy and associated infrastructure such as electric transmission lines necessary for renewable energy development. It is being prepared by a collaboration of state and federal agencies, with input from local governments, environmental organizations, industry, and other interested parties.

Pursuant to a state executive order, a Renewable Energy Action Team was assembled to be responsible for the development of the DRECP by streamlining permit review and issuance time for renewable energy projects and to recommend avoidance measures or alternatives when appropriate. The Renewable Energy Action Team developed Solar Study Areas that were

identified as potential areas for utility-scale solar development. These areas were identified based on a number of criteria, including quality of solar resources, suitable slope, proximity to roads and transmission, acreage, and the conservation value of the land. Following further study, the areas were further refined to be available for projects capable of producing 10 megawatts or more of electricity for distribution. When the final DRECP is completed, it is expected to provide binding, long-term endangered species permit assurances while facilitating the review and approval of compatible renewable energy projects. Currently the DRECP is in review with seven alternatives being considered.

Transmission Planning

The potential to develop renewable energy resources in specific areas is dependent on sufficient transmission capacity that provides for adequate delivery of the generated energy. Utilizing existing transportation planning efforts to evaluate current transmission line capabilities, the County identified necessary upgrades that may be required to carry additional electricity. These planning efforts include: (1) the mapping elements conducted by the Renewable Energy Transmission Initiative that identifies competitive renewable energy zones, (2) the DRECP Transmission Planning that evaluates areas of transmission needs, (3) the West-wide Energy Corridor Programmatic Environmental Impact Statement conducted by the BLM and the U.S. Departments of Energy, Agricultural, and Defense to identify energy corridors to facilitate future siting of energy development, including renewable energy development projects and electricity transmission and distribution facilities on federal lands, and (4) the Solar Program Environmental Impact Statement to study the availability of BLM land for solar development. The County used this information to identify SEDAs close to existing regional transmission lines so that future needs for additional capacity could be met by co-locating in already established utility right-of-ways. The County identified SEDAs that could be reached with minimal impacts by local transmission lines that are close or convenient, based on right-of-way availability.

Location and Description of the REGPA

Inyo County is located on the east side of the Sierra Nevada, in the eastern-central part of California. The eastern boundary of the County is the California state boundary line with Nevada. The locations of SEDAs were determined through the OCTS, work completed in 2011, and input from stakeholders and the public. Refer to **Figure 1** for the locations of the eight proposed SEDAs in Inyo County.

Inyo County is best described as rural. With approximately 10,227 square miles of land and 18,456 people (2010 Census), it has an approximate 1.8 persons per square-mile population

density. Most of the land in Inyo County is held in public ownership, less than 2 percent of County land is privately owned. The County has only one incorporated city, the City of Bishop. Most of the County's population lives in Bishop or in the immediately surrounding areas. The rest of the County's population lives in small towns, the majority of which are concentrated along the Highway 395 corridor located in the Owens Valley.

The County has a high-desert climate, caused by the rain shadow effect of the Sierra Nevada to the west. These climates are marked by very hot summers and very cold winters – both predominately dry. The County is part of the basin and range province that extends across most of the western United States. The basin and range province was created by faulting in the earth's crust that caused uplifting, down-dropping, and stretching of the land. The County's extreme landscape caused by these geologic forces includes the highest point in the 48 contiguous states of the United States (Mt. Whitney at 14,505 feet above mean sea level) and the lowest point (Bad Water Basin in Death Valley at 282 feet below mean sea level). Located to the east of the Sierra Nevada and west of the White and Inyo Mountains lies the arid Owens Valley, and within it, flows the Owens River. The valley is one of the deepest in the United States, and provides water to the Los Angeles which is exported via the Los Angeles Aqueduct. Inyo County has a rich history of mining and agricultural activities (primarily cattle ranching).

Project Components

The primary elements of the proposed REGPA, potential areas for development, and the solar development considered in the REGPA are described below.

General Plan Amendment

Inyo County is committed to updating its General Plan with policies for responsible renewable solar energy development.

The REGPA will be prepared to provide structure and guidance to ensure that potential development is conducted in a manner consistent with the County's overall goals for development. The policies contained in the REGPA may set the limits of where, when, how, and even if, renewable energy generation facilities will be built; and, can include provisions for actual sites identified in the County that may be appropriate for renewable energy development; what specific factors must be met before development can commence; under what conditions a facility can be built; and, requirements for the termination of a facility.

By implementing the REGPA, the County hopes to provide the proper structure and guidance for potential solar energy development and keep such development consistent with the overall vision

of the County that was adopted through a thorough public process and expressed in the current General Plan.

The REGPA will incorporate policies from the 2011 REGPA that have been modified, as well as new policies. The 2011 REGPA updated the Land Use, Public Services and Facilities, Economic Development, Conservation and Open Space and Public Safety Elements of the General Plan and focused on: (1) identifying the appropriate means to develop renewable wind and solar energy resources provided that social, economic, and environmental impacts are minimized; (2) offsetting costs to the County and lost economic development potential and mitigation of economic effects; (3) working to protect military readiness; and (4) considering conversion of lands utilized for agriculture, mining, and recreation. These policies may be amended or supplemented as a result of identified SEDAs, the stakeholder/public outreach processes, and the evaluations contained in the PEIR for incorporation into this proposed REGPA.

Solar Energy Development Areas

As part of the REGPA, the County has identified SEDAs that may be appropriate for renewable energy development exploration. They are areas viable for renewable solar energy development based on criteria developed within the confines of: (1) energy generation ability; (2) proximity to transmission; (3) the presence of biological and cultural attributes; (4) socio-economic factors; and (5) visual resources. It is also desirable that these areas be close enough to existing transmission corridors to export energy without the huge expense and environmental disruption of new transmission lines. Areas given special consideration as SEDAs include degraded lands such as brownfields, mines, landfills, and the Owens Dry Lake bed, and properties requested for consideration by property owners. Areas excluded from consideration included BLM areas of critical environmental concern and wilderness areas. The proposed SEDA's can be further refined based on information regarding cultural, historic, visual and other resources and constraints gathered during the environmental evaluation process.

The proposed SEDAs were identified based on the results of the work completed in 2011 and the OCTS prepared for the 2013 REGPA and were refined by public input. The OCTS utilized readily available spatial data to depict the County's renewable energy resource potential and analyzed the data in light of the criteria identified above. Areas identified in the OCTS as potentially appropriate for development were further reduced based on public comment. A total of eight SEDAs, have been proposed to be included for solar development in the REGPA. The Owens Valley will be evaluated separately with additional criteria, such as for distributed generation and small-scale facilities. The SEDAs have been identified as having the greatest energy generation ability while in proximity to sufficient transmission, and having the least

potential impact on known environmental resources. The PEIR process will provide the opportunity to conduct environmental reviews on the SEDAs. Caps on total development are also proposed.

Owens Valley

The results of the preliminary work done for the 2013 REGPA indicated concerns regarding development in the Owens Valley. Therefore, with the exception of the Laws SEDA, potential development within the Owens Valley is planned to be further explored more specifically through another planning process. A separate set of potential criteria for siting in the Owens Valley have been formulated: (1) only utilize existing transmission facilities and corridors; (2) guide the development to disturbed lands, including over and along the Los Angeles Aqueduct; (3) consider encouraging development at solid waste and wastewater treatment facilities, on private lands, in small-scale (e.g., roof tops) and distributed generation (20 megawatt or less) arrays, and around communities in smaller arrays (10 megawatt or less); (4) mitigate potential impacts to the environment, society, culture, and economy of the County; (5) work to avoid significant alterations to visual resources; (6) minimize intertie facilities. Although the Owens Valley may be considered, within this very specific set of potential criteria, it is not considered a SEDA and it along with the SEDAs located in the western region of the County are limited to a 250 megawatt cap on development.

Potential Environmental Impacts

The program environmental impact report (PEIR) will be prepared to assess the environmental, visual and economic impacts associated with solar energy development of the REGPA and to evaluate alternatives to determine the best approaches for avoiding, minimizing, and mitigating potential impacts. All California Environmental Quality Act (CEQA) environmental resource issues will be addressed in the PEIR; however, the level of analysis may vary based on the complexity of the issues, and the public's and agency responses to the NOP.

Initial assumptions about the general environmental impacts to be addressed in the PEIR are provided below, and incorporate pertinent information from the work completed to date.

Aesthetics/Visual Resources

Inyo County is a land of scenic resources, and as a result, there are several policies and strategies in place to preserve them. The U.S. Forest Service has a program designed to preserve air quality in areas with scenic, recreational, historic or natural value. This program, called the Prevention

of Significant Deterioration, has an area identified along the western edge of Inyo County in the John Muir Wilderness. There are also several scenic byway designations from BLM and the State of California. These designations were created to help people find the best roads for auto touring and to encourage the preservation of these scenic resources. The proposed project would result in the consideration of placement of either solar modules for photovoltaic systems, or solar thermal trough or tower systems. Depending on the sizes and locations of potential solar energy facilities, they could be visually prominent and affect scenic vistas and scenic resources. Aesthetic and visual resource impacts will be evaluated in the PEIR through written and graphic analysis. The PEIR will evaluate the potential for renewable solar energy project developments to create a substantial source of glare and/or lighting that could affect nearby uses, views of the surrounding areas, or aircraft operations. As appropriate, visual resources policies regarding renewable solar energy development have been incorporated into the REGPA and may be refined through the environmental review process.

Agricultural and Foresty Resources

Inyo County supports agriculture and forestry resources. No Farmland or Williamson Act Contracts exist in the County. The PEIR will include an analysis of the potential impacts on agriculture through the displacement of uses resulting from the development of the SEDAs. The PEIR will also evaluate modifications to the Agricultural Resources Policy of the Conservation/Open Space Element of the existing General Plan.

Air Quality

Inyo County generally has good air quality; however, the Owens Valley is in non-attainment status for particulate matter less than 10 microns in diameter. Most air quality impacts associated with developing renewable solar energy projects would occur during the construction phase and would be associated with fugitive dust and criteria pollutant emissions from construction activities. The PEIR will evaluate the short and long term sources of air pollutants that may result from renewable solar energy development. The PEIR will evaluate consistency with regional and local air quality plans. The PEIR also will evaluate a new Air Quality Implementation Measure proposed to be incorporated into the General Plan as part of the Public Safety Element.

Biological Resources

The SEDAs will be further evaluated to minimize or exclude the following resource areas: Desert Wildlife Management Areas, and areas that may accommodate rare, endangered, and sensitive plant and animal species. Although the SEDAs will be identified to minimize impacts

to biological resources based on existing information, development of renewable solar energy projects under the REGPA could impact biological resources during construction and operations, and the extent of the impact could vary depending on the sizes and locations of these developments. The PEIR will evaluate the REGPA at a programmatic level for impacts to biological resources, including potential impacts on vegetation communities, wildlife habitats, wildlife movement corridors, wetlands and other waters of the U.S. and/or State, habitat conservation plans/protection ordinances, and sensitive and/or listed species.

Cultural and Historic Resources

Inyo County has an abundance of cultural and historic resources. The Paiute and Shoshone people lived in Inyo County and the areas surrounding it, long before Euro-Americas settled in the area. Their legacy can be found throughout the County in the form of burial grounds, artifacts and landscapes with cultural significance. Early Euro-American settlement also left important historic resources throughout Inyo County, from mining, ranching, and railroad artifacts to old cabins and buildings. The SEDAs included in the REGPA will be evaluated at a programmatic level for impacts to cultural resources.

Geology and Soils

Inyo County contains seismically active areas, and substantial ground shaking may occur. The PEIR will assess soil and geologic conditions, and identify hazards related to seismic activity, including the potential for liquefaction, ground-shaking, and soil failure, as well as potential environmental effects related to soil stability and erosion potential.

Greenhouse Gas Emissions

The main source of greenhouse gas emissions associated with renewable solar energy projects that may be developed under the REGPA would result from the combustion of fossil fuels during project construction. These emissions will be quantified using an acceptable methodology or model and will be evaluated consistent with CEQA requirements.

Implementation of the REGPA is expected to have an overall beneficial effect on global warming by reducing greenhouse house gas emissions associated with electrical energy production. The PEIR will address the potential impacts to greenhouse gas emissions as a result of developing and operating renewable energy projects.

Hazards and Hazardous Materials

The REGPA will be evaluated at a programmatic level for the presence of hazards or hazardous conditions that could affect construction and operation of renewable energy projects, including the location of hazardous waste sites included in state and federal databases, airport and airstrip hazard zones, emergency response routes, and wildfire hazards. The PEIR will include a disclosure and analysis of hazardous materials or operations associated with construction and operation of renewable energy developments that may affect adjacent areas and their land uses.

Hydrology and Water Quality

Renewable solar energy development projects could result in changes to project sites that could affect existing drainage systems and surface water quality. The proposed SEDAs will be evaluated in the PEIR at a programmatic level for potential hydrology and water quality issues, including impacts to floodplains, surface water and ground water. The PEIR also will evaluate a proposed new Water Resources Policy for incorporation into the General Plan as part of the Conservation/Open Space Element.

Land Use and Planning

Solar energy development could affect existing land uses. The REGPA proposes revisions to the Land Use Element of the General Plan, which will be evaluated in the PEIR. Consistency with other relevant local, regional, State and federal plans will also be addressed.

Mineral and Energy Resources

The PEIR will identify the long-term impact of development on mineral resource policies contained in local land use plans and the General Plan. The PEIR will also evaluate a proposed Mineral and Energy Resources Goal with associated policies and measures proposed for incorporation into the General Plan as part of the Conservation/Open Space Element.

Noise

The PEIR will identify potentially noise sensitive areas and will identify potential noise impacts (including vibration) to those noise sensitive areas. The operation of heavy duty equipment and other construction activities would generate potentially significant noise levels during the construction phase. Noise as a result of operation and maintenance activities, including noise resulting from increased transportation during operation of the facilities, will be considered. The PEIR also will evaluate a proposed Noise Implementation Measure for incorporation into the General Plan as part of the Public Safety Element.

Population and Housing

The PEIR will identify potential short and long term impacts to population and housing as a result of solar energy development, including short term and long term population increases and housing needs as a result of employment for construction and operations. The SEDAs will be evaluated for their potential to divide or otherwise impact existing communities.

Public Services

With the accommodation of the construction workforce during potential solar energy development there could be temporary increased demand for public services, including police and fire protection services and community facilities, such as schools. The PEIR will evaluate short term and long term impacts on public services that would directly or indirectly occur as a result of employment for construction and operations of the SEDAs. The PEIR will also evaluate a proposed new Public Services and Facilities Policy for incorporation into the General Plan as part of the Public Services and Facilities Element.

Recreation

Short and long term impacts to recreation facilities may occur as a result of employment for construction and operation of solar energy facilities. Additionally, development may impact tourism in certain areas. The PEIR will identify potential impacts to recreational facilities and tourism. The PEIR will also evaluate a proposed new Recreation Implementation Measure for incorporation into the General Plan as part of the Conservation/Open Space Element.

Traffic and Circulation

The PEIR will identify potential impacts to traffic and circulation as a result of construction and operation traffic resulting from potential solar energy development. Development could impact local roadways, intersections, and safety, as a result of roadway expansions or other improvements to accommodate the project and its associated traffic. The PEIR will evaluate impacts to traffic and circulation at a programmatic level, including potential access points for site development within the SEDAs, trip generation factors, and traffic distribution routes (including large truck/construction traffic routes).

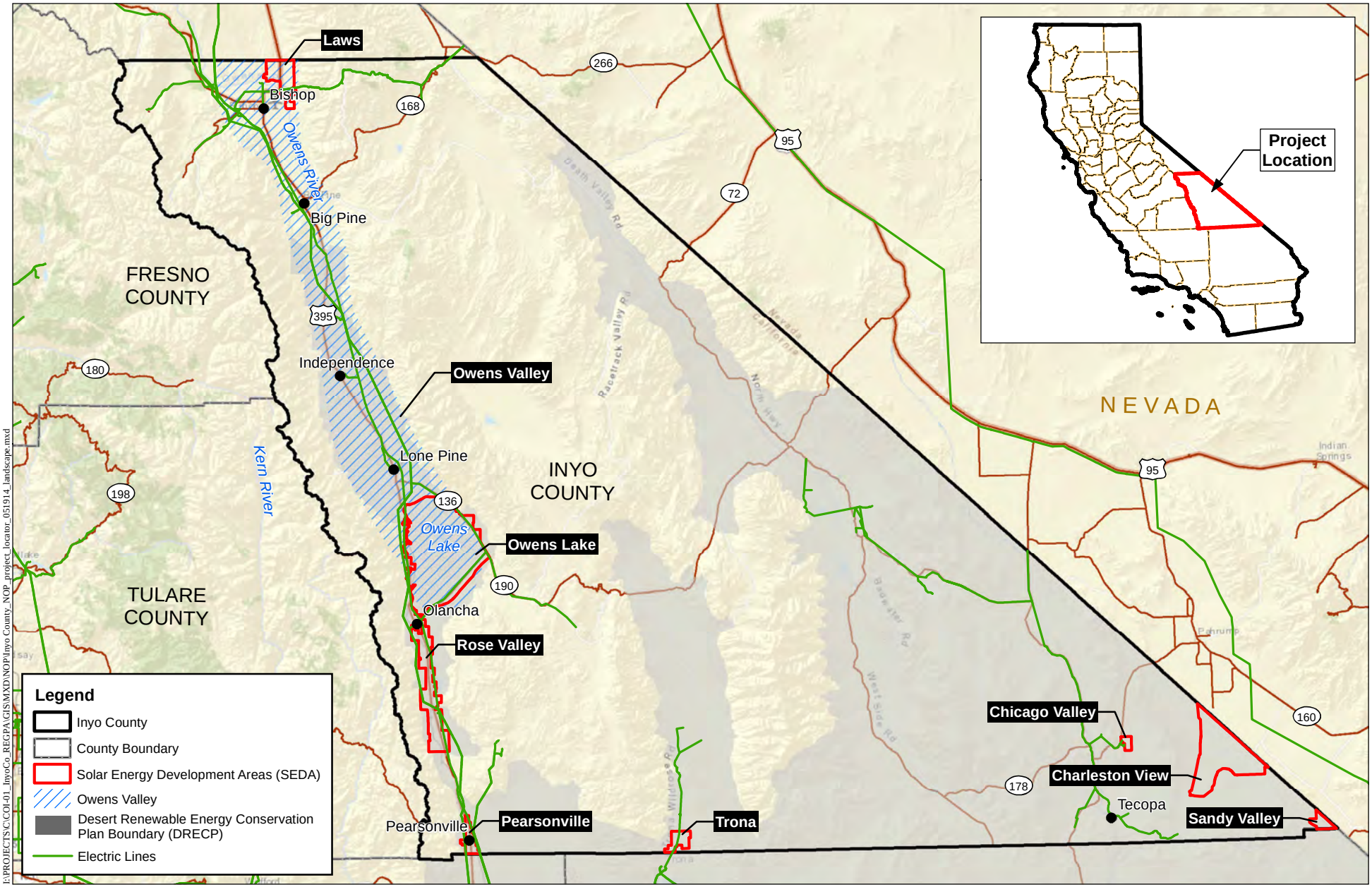
Utilities and Service Systems

Similar to the impacts to public services, solar energy development may result in short and long term impacts on utilities and service systems to accommodate increased employment for construction and operations of the development, as well as meeting the utility and service needs of the facilities themselves. The PEIR will evaluate at a programmatic level the potential impacts

of the proposed project relative to energy use, water supply, wastewater collection, treatment and disposal, and solid waste collection and disposal.

Additional Information/Resources

The County maintains an active and current website with links to additional information and background reports referenced in the NOP (including the proposed REGPA policies). To review this information electronically, please direct your Internet browser to: [http://www.inyoplanning.org/projects/REGPA.htm].



Map Date: 05/28/2014

Project Location Map

INYO COUNTY
NOTICE OF PREPARATION

Figure 1

HELIX Environmental Planning

N 0 20 Miles

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),

APPENDIX B

Inyo County REGPA
Public Scoping Meeting
Olancha
June 16, 2014
6:00 p.m.

Scoping Session

- Visual effects
- Local jobs
- Animals in the area
- Birds
- Green waste for renewable energy/waste to energy
- Acreages
- Power lines/transmission capacity
- Scenic areas around Olancha – scenic byway
- Local power subsidies/allow it here – give back to the community
- Federal agencies/coordination on their lands
- Private property money – lease/sales
- Viewshed mitigation – trees to block
- Simulations for people to see what it might look like
- Transmission costs
- Technology changes and potential changes
- Environmental effects such as the Owens Lake
- Reclamation and bonds
- Distributed to land already affected by other projects – cumulative effects

Renewable Energy General Plan Amendment PEIR Scoping Session

Monday, June 16th, 2014

Olancha Fire Station 689 Shop Street

NAME	ADDRESS	EMAIL
Rick Middleton	540 E. Fall Road	RickMiddleton53@1could.com
Jim Kakuk	551 Spring Cir / P.O. Box 107, Olancha CA	Gypsydad1@aol.com
Dieter & Cathy Beilicke	350 Lakeview Road, Haiwee/ P.O. Box 35	
Heidi H. Overman	551 Spring Cir / P.O. Box 107, Olancha CA	
John Plothgeb	350 W. Fulton, Darwin 93522	yoajon@gmail.com
Alyson Mitts	100 Olancha Law, Olancha	mitts.alyson12397@gmail.com
Ramma Barker	590 E all Rd, Olancha	
Janet Lyman	590 E all Rd, Olancha	
Beth & Ranoy Porter	P.O. Box 3-497 Lacey Lane, Olancha	randall_k_porter@yahoo.com
Jael Hoffmann	1725 S. Hwy 395	Jaelhoff@gmail.com
Jeffrey Mills	100 Olancha Lane, Olancha	Mills. Jeffrey@att.net
Noa Liff	1725 S. Hwy 395	
Betty & J.D. Biros	990 Williams Rd/ P.O. Box 118, Olancha, CA 93549	birosbl@gmail.com/ Jdbiros.jdb@gmail.com
Jim & Sylvia Hutchings	P.O. Box 233, Olancha, CA 93549	toots 154@msn.com
Chuck and Mary Stewart	385 Lacey Lane, P.O. Box 240, Olancha 93549	

Inyo County REGPA
Public Scoping Meeting
Trona
June 18, 2014

Scoping Session

- Transmission impacts to environment
- Dust from Searles Lake
- Dust from cleared land
- Dust from cleaning look
- Water
- Solar thermal visual impacts
- Corrosion – Searles Lake chemistry is hazardous
- Negative visual effects – will detract from beauty
- Positive visual effects – improvement to Trona
- Jobs – need more employment
- Utilities have incentives for rooftop solar
- Solar rooftops aren't counted towards 33%
- Counties do not receive sales tax for solar
- High percentage of power comes from rooftop
- Subsidy for solar has increased prices
- Local community benefits
- Massive heat pump systems
- Geothermal isn't good in Searles Valley
- Birds, squirrels, wildlife, tortoise, etc.
- Bioburner would be a good option – trains dead end here
- Reclamation power companies may abandon sites

Renewable Energy General Plan Amendment PEIR Scoping Session

Wednesday, June 18, 2014 5:00 p.m.

Trona Golf Course: 82700 Trona Road, Trona

NAME	ADDRESS	EMAIL
Kirk & Cathy Heseman	P.O. Box 244, Trona, CA 93592	Homewoodcnyn3@gmail.com
Jeff Chadwick	P.O. Box 1102, Trona, CA 93592	Jeff1949@comcast.net
Andrew & Francie Kasamis	P.O. Box 780/ 450 Crow Cyn Rd.	andrew.kasamis@yahoo.com
Ray Silas	P.O. Box 190, Trona CA 93592	
Jim Johnson	P.O. Box 182, Trona CA 93592	Jjohnson@wildblue.net
David Garrison	P.O. Box 1111, Trona, CA 93592	dlggarrison@gmail.com
Deborah Knight	Homewood + Crow Cyn Rd	
Jerry + Gail Dunning	P.O. Box 194/ 400 Crow Cyn 93562	Gailr42@wildblue.net
Joe Sonia	P.O. Box 306/ 1200 Homewood Cyn Rd., Trona, CA 93592	argonaut@iwvisp.com
Alan Miller	351 Crow Cyn Rd./ P.O. Box 761, Trona, CA 93592	Wgwonka@aol.com

Inyo County REGPA
Public Scoping Meeting
Lone Pine
June 24, 2014
6:00 p.m.

Cathreen Richards presented background details and summarized the project. She indicated that Rose Valley and Owens Valley are the closest SEDAs to Lone Pine. The western group shares 250 megawatts and there are acreage and megawatt caps synced to each other. Any area developed in, on, or over aqueduct will come from the western area cap. She gave an overview about changes made to the General Plan based on previous public comment.

Robert Edgerton reviewed the standard CEQA timeline and assured the public that no project is currently under way.

QUESTION AND ANSWER PERIOD:

Q: Does streamlined mean a condensed timeline, or condensed analysis?

A: *Both. The County will be sure that the project fits under the umbrella of the PEIR, then determine what level of streamlined analysis could occur (e.g., MND would be a shorter review process and might reduce levels of analysis).*

Q: If a company comes in and wants to site outside a SEDA, what happens?

A: *The REGPA covers the entire county. Purpose is to direct applicants to most desirable areas. Any applicant can come in and want to go into the Owens Valley but the County would require a full EIR.*

Q: It's in the County's hands to decide whether such a project would be subject to a full EIR?

A: *Yes.*

Q: Even after adopting the REGPA, approval of a solar facility is still discretionary?

A: *Correct.*

Q: Each SEDA has its own particular mitigation measures that are incorporated in this PEIR?

A: *This program hasn't gone down to that level yet.*

Q: Who is the lead agency? Who is the responsible agency?

A: *County is the lead agency. Responsible agencies are still to be determined, based on impact conclusions and will be worked out in the process.*

Q: Each SEDA has its own characteristics. Will there be distinct mitigation measures for each SEDA?

A: *To be determined. SEDAs will be identified individually but we're doing a countywide analysis and won't likely discuss soil differences (for example) between all SEDAs. We would consider the most impacted/sensitive soil type and mitigate it.*

Q: So the analysis really is very broad and in the Negative Declaration process, individual property related comments would be better addressed. There's a concern here with the PEIR, are we shortchanging schedule and analysis that would be needed?

A: *Analysis is required both in the EIR stage and in the Negative Declaration stage. There's no cutting any corners on the analysis. For example, biological resources – the PEIR identifies listed species in a portion of the county as a potentially significant impact – mitigation measure requiring protocol level surveys for proposed projects, similarly for geology, soils, or air quality. The County is being proactive in doing this project – we're looking at this holistically. This can protect the community and the County.*

Q: What kind of authority does the County have to set these limits?

A: The REGPA is law in the county. It would require a formal amendment to change the rules.

Q: What happens if the County is not the lead agency for a solar project and other landowners or agencies become involved?

A: *Over 98% of the County is managed by other agencies – we have limited authority in those areas. This is an issue. Other agencies have some level of autonomy and may not have to comply with the General Plan. By adding this to our General Plan, we require other agencies to consider consistency with the policy under CEQA. City of L.A., State Lands Commission, CEC, others could be lead agencies. Federal agencies may also process projects in Inyo County under their own regulations.*

Q: In this particular PEIR, the County is the lead agency. If someone proposed a project on LADWP land with City of L.A. as lead agency, what would be required?

A: *Analysis in a subsequent EIR can be incorporated by reference but they still have to comply with CEQA.*

Q: **What General Plan does the City of Los Angeles have to follow?**

A: *The City of L.A. thinks they don't have to comply with the County's General Plan, but they need to consider the County's plan. There are lots of ramifications if they don't comply.*

Q: Is there any other instance in CA where LADWP owns as much land as in Inyo County?

A: *San Francisco has land that goes out towards Hetch Hetchy. This is not uncommon.*

Q: Let's say County decides to exceed the 250 megawatt total by 20 megawatts, will we have to go through CEQA again?

A: *Yes but it would only pertain to the western side of the county.*

Q: Owens Valley will be studied separately even though it's not a SEDA. Will that be done before this process is over or will it stand separate?

A: *It's on a two-year timeline that ends after this process does.*

Q: **Some areas have been cleared for housing, then the market crashes – these areas don't recover at the same speed as in other areas. Do we know what kinds of areas will recover more quickly after solar use has run its course?**

A: *This is covered by reclamation and bonding requirements in the REGPA.*

Scoping Session (Including previous discussed topics)

- Concentrated solar energy – towers and mirrors – Water intensive for cooling, aesthetics and concern for avian mortality.
- Suggestion to put all of the 250 megawatts into the lake bed, rather than having a cap of 250 megawatt for all of western county.
- Add more stringent language for light and glare – shielded, cut off, etc. Even though this is in the General Plan policy, there is no ordinance requiring it. Recommend a mitigation measure that may require additional specific light and glare studies.
- Consider water supply impacts for thermal solar cooling.
- Soil contamination with use of chemicals and herbicides for weed or dust prevention is a concern for habitat sustainability. Carbons get stored in the soil and emit when disturbed.
- Dust mitigation or air quality mitigation recommended prior to construction. Consider mitigation for areas not on the lake bed as well. Recommend installation of rock blanket roll out (Flexamat) or blocks of concrete on mesh (geotextile) for erosion and dust control.
- A heat analysis was suggested to determine if temperature will rise in the area by adding solar panels. PV solar degrades with heat and may be too hot to be efficient.
- Concern for bird migration impacts for Rose Valley. Suggest study for incoming bird migration. There is some concern about solar panels looking a lot like water.
- Concern for bat mortality with solar panels.
- Recommended cattle cutouts (or elves) to cover panels and improve visual appearance.
- Preference for smaller project alternatives and not large industrial installation (point of use).
- Preference for smaller scale distributed solar generation on previously disturbed land
- Add language to REGPA requiring use of existing roads for access to solar sites instead of creating new ones.
- Site and design concerns for solar farms.
- Aesthetics - Eastern Sierra scenic byway should be protected.
- Consider impacts to roads, county facilities, and other economic effects if projects fail.

- Suggest background checks for potential solar applicants as part of the approval process.
- Keep existing rural and historic culture and consider impacts on County character and identity.
- Intrusion of exotic plants is a risk from construction equipment.
- Consider aesthetics of Rose Valley as a scenic corridor.
- Consider cultural resources around Owens Lake.

Renewable Energy General Plan Amendment PEIR Scoping Session

Tuesday, June 24, 2014 6:00 p.m.

Lone Pine, CA

NAME	ADDRESS	PHONE #	EMAIL
April Zrelak	Independence, CA		
Judy Wickman	Lone Pine, CA		ajwickman@mac.com
Drew Wickman	101 Dominy Road, Lone Pine, CA	760-876-5202	ajwickman@mac.com
Earl Wilson	P.O. Box 830, Lone Pine, CA 93545-0830		2Earl.Email@gmail.com
Rose Masters	Independence, CA	760-878-8235	Rosemary.Star@gmail.com
Mary Roper	P.O. Box 458, Independence, CA	760-878-2046	marya@qnet.com
Kristen Luetkemeier	Independence, CA	703-862-4395	Kristen.Luetkemeier@gmail.com

Inyo County REGPA
Public Scoping Meeting
Bishop
June 25, 2014
6:00 p.m.

Cathreen Richards quickly summarized REGPA

Robert Edgerton summarized the CEQA process, where the program currently stands and what will be next following the scoping period. He also answered questions related to the EIR.

QUESTION AND ANSWER PERIOD:

Q: What if there are comments about the wording of the policy changes?

A: *If concerned, please let us know. The public can also write the County, and comment on the DEIR when circulated.*

Q: If there is a variance from the constraints imposed in the REGPA and EIR, is a new document required?

A: *The County may require an additional streamlined analysis, or may require an EIR. This provides the County some protection against projects that aren't consistent.*

Q: The benefit of locating in a SEDA is primarily streamlined permitting?

A: *Permitting is separate from CEQA, subject to its own process. County will review proposed projects, determine if they fit under Program EIR umbrella – then determine if streamlined review is possible.*

Q: Is the County considering seeking compensation for loss of revenue if the applicant doesn't move forward with the project? Are there other policies similar to this in dealing with economic development or other areas?

A: *There are other areas in the General Plan that address that topic.*

Q: What if someone comes in and develops 100 megawatts and doesn't want to do it, then someone comes in after and wants to develop in a different place, is that allowed?

A: *No, but if that happens the County would be required to clean it up.*

Q: Do we plan to do ground work, or use existing reports?

A: *We will work mostly at plan level for the program EIR, but future development would be required to do ground work.*

Q: Is there possibility for the proposed SEDAs to change?

A: *Yes, likely through the CEQA alternatives process.*

Q: What if someone comes in to develop more than the allowed cap after the 20 years?

A: *We have added language about financial assurances and reclamation plans for initial facilities that are abandoned. The megawatts that have been reclaimed would go back into the cap.*

Q: Should the triple asterisk in the caps table be worded better regarding the total area of development?

A: *It should be reworded to "only open for development to the first developer, less for the second, less for the third."*

Q: What's going on with Owens Valley, it's too fuzzy. At some point in the process, you will need a boundary, correct?

A: *It will be determined through the subsequent planning process, not this PEIR.*

Q: If one of our constraints is to hook into existing transmission, and existing transmission is only in the Owens Valley, how will this work? How will you define proximity?

A: *A future project will have to show how it will connect to an existing intertie. We can't analyze a specific project at this program level.*

Q: The megawatt caps for Owens Valley don't align with the maps for the Western County?

A: *We may have additional mitigation in the Owens Valley, as it's being called out for separate study.*

Q: If someone were to propose a project in the Owens Valley now, or after the PEIR as proposed, they would likely need to do an EIR?

A: *Likely, yes.*

Q: Wind isn't a part of this GPA – yet renewable energy definition includes wind?

A: *It is a correct definition; we're just not planning for wind.*

Scoping Session(Including previous discussed topics)

- Recommendation to amend definition of "renewable energy" to indicate only solar since it is the only renewable source being proposed.
- Call the project the "SEGPA" rather than the "REGPA."
- Recommendation to remove the hatch marks in the Owens Valley on the map and call Owens Valley the "Owens Valley Study Area" with a boundary.
- Loss of revenue based on prior development.
- Triple asterisks in the caps table should be reworded to "only open for development up to the cap."
- LU 1.17 – "potential impacts from utility scale must be avoided, minimized, or mitigated to the extent feasible." Recommend delete everything after "avoided."
- Boundaries are important to identify the project areas more specifically. Owens Valley strategy needs to be more focused. There's little difference between having or not having a SEDA in the Owens Valley if we keep the 250 megawatt cap.

- MER 2.7 regarding reclamation – discusses how to remove a facility from a location but doesn't address rehabbing the land following development. Recommend including rehab as part of the reclamation process.
- Remove "along and over" from Los Angeles Aqueduct language. Putting solar panels over the aqueduct is ugly and will cause a lot of disturbances.
- Do not include areas in the LADWP land management plans in the SEDAs.
- E.S 1.9 – Suggest survey/study of visitors/visitor activity be added to the EIR. What would visitors consider to be too industrial and what might really degrade their visit?
- ED 4.4 – If you do develop, the County will be compensated. This conflicts with the policy that says the County should be compensated if they don't develop.

Renewable Energy General Plan Amendment PEIR Scoping Session

Wednesday, June 25, 2014 6:00 p.m.

Bishop, CA

NAME	ADDRESS	PHONE #	EMAIL
Dan Totheroh	215 Arcturis Circle, Bishop	872-2137	dtother@msn.com
Sally Manning	Big Pine Paiute Tribe	760-938-2003	s.manning@bigpinepaiute.org
Daniel Pritchell	401 East Yaney, Bishop, CA	760-873-4344	shypiolots@telis.org
Aron Backock	P.O. Box 535, Big Pine, CA	760-938-2287	Abacock@gmail.com
Mark Tillemans	P.O. Box 612, Big Pine, CA	760-878-8506	mtillemans@inyocounty.us

Inyo County REGPA
Public Scoping Meeting
Tecopa
June 26, 2014
6:00 p.m.

Scoping Session

- REGPA technology/premise is flawed. DG technology should be pursued. Other technologies are locked up in the patent office.
- Wilderness and viewsheds and wildlife are important to the County's economy. Landscape concerns.
- Economy would die without tourism; people come here to recreate. Residents live here because of the rural nature, night skies, etc. The County's true treasures are solitude, views, opportunities for photography.
- Concerned about sacred sites that could be damaged by solar development; also the hot springs could be impacted.
- Tecopa/Shoshone interested in becoming a "green community" that harnesses and uses solar energy (not exported). Would like to learn how the community could do that. Seek certified green community status.
- Glad areas around Death Valley Junction and Panamint Valley were removed from the proposed REDAs. Anywhere there are geothermal waters would be considered sacred sites by Native Americans.
- Concerned about glare and lights of solar projects. Desert solitude is critical as well as night skies. Primarily concerned with solar thermal.
- Pleased that the PEIR will consider actual locations and proposed development.
- Consider impacts to viewsheds surrounding the Old Spanish Trail area of Charleston View (which is part of the National Park Service). Inappropriate to have solar development near this area.
- Importance of the County's healing thermal waters; considered sacred to many.
- Supports the concept of a green community due to seasonal increases in utility costs.
- The REGPA should not and does not consider geothermal resources.
- Consider potential transmission lines needed for solar development near Chicago Valley.
- Conduct due diligence of individual project applicants to determine how it could impact the county.
- Concerned about the amount of solar projects being constructed throughout the desert; don't want to see them here.
- Disclose how much water would be needed per MW/acreage cap.
- Describe time frames for inventory and analysis for special status species.

- Discuss restoration/reclamation measure(s) to be associated with individual solar projects.
- Water may need to be purchased for solar projects and should be considered in the PEIR (along with water conservation measures).
- Charleston View residents expressed concern over losing viewsheds and non-official wilderness areas. Also wildlife impacts. Local community would not receive any direct benefit from a solar project.
- Describe incentives that could be exacted from private solar developers to assist local communities. Local communities should be rewarded for allowing development in their immediate area.
- Discuss all potential benefits to a community and environmental justice issues.
- Concerned about CEC/CPUC jurisdiction; potential can of worms. Clearly describe how much control they have over this process and how the County can break free of that.
- Distributed generation and community solar: cannot sell power to the grid but can use the grid. Can use net metering.

Renewable Energy General Plan Amendment PEIR Scoping Session

Thursday, June 26, 2014 6:00 p.m.

Tecopa, CA

NAME	ADDRESS	PHONE #	EMAIL
Alex DeMets			
Barbara Durham		760-786-2320	thpo@timbisha.com
Jordon Kelley	1601 Belluno Court, Las Vegas, NV 89117		jordonamcon@gmail.com
Suzi Dennett	P.O. Box 303, Tecopa, CA 92389	760-852-4130	sifpd@yahoo.com
Carl Donnett	P.O. Box 303, Tecopa, CA 92389	760-852-4130	sifpd@yahoo.com
Amy Noel	P.O. Box 25	760-852-4475	amynoel@mac.com
Susan Sorrells	P.O. Box 72		ssorrells@shesherrevillage.com
Crystal Aldrich	P.O. Box 337, Tecopa, CA 92389	760 852-4246	tecopacrystal@yahoo.com
Larry Levy	P.O. Box 153, Tecopa, CA 92389	760-852-4542	levy2717@access4less.net
Donna Cuff	P.O. Box 104, Tecopa, CA 92389	760-852-4408 / 707-696-7210	dcuff6@gmail.com
Rona Gant	P.O. Box 212, Tecopa, CA 92389	760-852-1003	ronalg7@yahoo.com
Grace O'Connall			
Frank Efonth			

APPENDIX C

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

June 11, 2014

To: Reviewing Agencies

Re: Renewable Energy General Plan Amendment
SCH# 2014061039

Attached for your review and comment is the Notice of Preparation (NOP) for the Renewable Energy General Plan Amendment draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Cathreen Richards
Inyo County
P.O. Drawer L
Independence, CA 93526

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2014061039
Project Title Renewable Energy General Plan Amendment
Lead Agency Inyo County

Type NOP Notice of Preparation

Description The County of Inyo is proposing to update its General Plan to include policies for solar energy development within the County. The proposed Renewable Energy General Plan Amendment (REGPA involves identifying new and modified General Plan goals, policies, and implementation measures, including Solar Energy Development Areas (SEDA), based on the results of an Opportunities and Constraints Technical Study (OCTS); a background report (Inyo County 2013); work completed in 2011; and, input from stakeholders and the public. From this foundation of work and outreach, eight proposed SEDAs have been identified and will be analyzed in the program environmental impact report.

Lead Agency Contact

Name Cathreen Richards
Agency Inyo County
Phone (760) 878-0263 **Fax**
email
Address P.O. Drawer L
City Independence **State** CA **Zip** 93526

Project Location

County Inyo
City
Region
Cross Streets Entirety of Inyo County
Lat / Long
Parcel No. Various
Township **Range** **Section** **Base**

Proximity to:

Highways Hwy 395/136/190/168/178
Airports Various
Railways Various
Waterways Owens River
Schools Various
Land Use State and Federal; Tribal; Residential; Commercial; Industrial; Open Space; Natural Resources

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Economics/Jobs; Fiscal Impacts; Flood Plain/Flooding; Forest Land/Fire Hazard Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Conservation; California Energy Commission; Office of Historic Preservation; Department of Parks and Recreation; Department of Fish and Wildlife, Region 6 (Inyo & Mono Region); Office of Emergency Services, California; Native American Heritage Commission; Public Utilities Commission; Department of Housing and Community Development; Caltrans, District 9 Air Resources Board; Department of Toxic Substances Control; Regional Water Quality Control Bd., Region 6 (Victorville); California Department of Justice, Attorney General's Office

Date Received 06/11/2014 **Start of Review** 06/11/2014 **End of Review** 07/10/2014

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH# 2014061039

Project Title: Renewable Energy General Plan Amendment

Lead Agency: Inyo County | Contact Person: Cathreen Richards
Mailing Address: P.O. Drawer L | Phone: (760) 878-0263
City: Independence | Zip: 93526 | County: Inyo

Project Location: County: Inyo | City/Nearest Community: Countywide
Cross Streets: Entirety of Inyo County | Zip Code: _____
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W Total Acres: 10,227 Sq. Miles
Assessor's Parcel No.: Various | Section: _____ Twp.: _____ Range: _____ Base: _____
Within 2 Miles: State Hwy #: 395/136/190/168/178 | Waterways: Owens River
Airports: Various | Railways: Various | Schools: Various

RECEIVED
JUN 11 2014
STATE CLEARING HOUSE

Document Type:

CEQA: ☒ NOP ☐ Draft EIR ☐ Early Cons ☐ Supplement/Subsequent EIR ☐ Neg Dec (Prior SCH No.) ☐ Mit Neg Dec Other: _____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other: _____

Local Action Type:

☐ General Plan Update ☒ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other: _____

Development Type:

☐ Residential: Units _____ Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
☐ Educational: _____
☐ Recreational: _____
☐ Water Facilities: Type _____ MGD _____
☐ Transportation: Type _____
☐ Mining: Mineral _____
☒ Power: Type Solar MW Varying
☐ Waste Treatment: Type _____ MGD _____
☐ Hazardous Waste: Type _____
☐ Other: _____

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☒ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☐ Coastal Zone ☒ Drainage/Absorption ☒ Economic/Jobs
☒ Fiscal ☒ Flood Plain/Flooding ☒ Forest Land/Fire Hazard ☒ Geologic/Seismic ☒ Minerals ☒ Noise ☒ Population/Housing Balance ☒ Public Services/Facilities
☒ Recreation/Parks ☒ Schools/Universities ☒ Septic Systems ☒ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☒ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation
☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☒ Wetland/Riparian ☒ Growth Inducement ☒ Land Use ☒ Cumulative Effects ☐ Other: _____

Present Land Use/Zoning/General Plan Designation:

State and Federal; Tribal; Residential; Commercial; Industrial; Agricultural; Open Space; Natural Resources.

Project Description: *(please use a separate page if necessary)*
Please see Attachment 1 and Figure 1 for a complete project description and project location map.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

NOP Distribution List

County: Inyo

SCH# 2014061039

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  Nicole Wong
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Tamya Trujillo
- [x] **Dept. of Conservation**
  Elizabeth Carpenter
- [x] **California Energy Commission**
  Eric Knight
- [ ] **Cal Fire**
  Dan Foster
- [ ] **Central Valley Flood Protection Board**
  James Herota
- [x] **Office of Historic Preservation**
  Ron Parsons
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **California Department of Resources, Recycling & Recovery**
  Sue O'Leary
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [ ] **Dept. of Water Resources** Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Wildlife**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Wildlife Region 1**
  Donald Koch
- [ ] **Fish & Wildlife Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Wildlife Region 2**
  Jeff Drongesen
- [ ] **Fish & Wildlife Region 3**
  Charles Armor
- [ ] **Fish & Wildlife Region 4**
  Julie Vance
- [ ] **Fish & Wildlife Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- [x] **Fish & Wildlife Region 6 I/M**
  Heidi Sickler
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M**
  George Isaac
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Depart. of General Services**
  Public School Construction
- [ ] **Dept. of General Services**
  Anna Garbeff
  Environmental Services Section
- [ ] **Dept. of Public Health**
  Jeffery Worth
  Dept. of Health/Drinking Water
- [ ] **Delta Stewardship Council**
  Kevan Samsam

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Michael Machado
- [x] **Cal EMA (Emergency Management Agency)**
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [x] **Public Utilities Commission**
  Leo Wong
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [ ] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [ ] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects
- [x] **Housing & Community Development**
  CEQA Coordinator
  Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Eric Federicks – South
  Susan Zanchi - North
- [ ] **Caltrans, District 4**
  Erik Alm
- [ ] **Caltrans, District 5**
  David Murray
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Dianna Watson
- [ ] **Caltrans, District 8**
  Dan Kopulsky
- [x] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Maureen El Harake

Cal EPA

Air Resources Board

- [x] All Projects
  CEQA Coordinator
- [ ] Transportation Projects
  Nesamani Kalandiyur
- [ ] Industrial Projects
  Mike Tollstrup
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [x] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
- [ ] **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- [ ] **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
- [x] **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [x] **Other** Attorney General's Office
- [ ] _____
  Conservancy

DEPARTMENT OF TRANSPORTATION
DISTRICT 9
500 SOUTH MAIN STREET
BISHOP, CA 93514
PHONE (760) 872-0785
FAX (760) 872-0754
TTY 711
www.dot.ca.gov

Serious drought.
Help save water!

June 17, 2014

Ms. Cathreen Richards
Inyo County Planning Department
P.O. Drawer L
Independence, California 93526

File: 09-INY
NOP PEIR
SCH: #2014061039

Renewable Energy General Plan Amendment (REGPA) – Notice of Preparation (NOP) of a Programmatic Environmental Impact Report (PEIR)

Dear Ms. Richards:

The California Department of Transportation (Caltrans) District 9 appreciates being able to comment during the NOP phase regarding renewable energy facility locations in Inyo County. Please consider the following in preparation of the draft PEIR and subsequent proposals:

- When proposing highway access consider access management principles, which include minimizing additional access points. Access points would be analyzed during review of specific projects; improvements for an existing or for a new access would be to Caltrans standards and under a Caltrans District 9 encroachment permit.

- For renewable energy projects it is usually the construction phase creating the greatest traffic impact. Ensure traffic analysis addresses construction vehicle routing, defines facility mitigation where merited, and proposes any necessary traffic control. If oversized vehicles are anticipated, highway routes should be verified. Oversized vehicle permits are issued through the Transportation Permits Office in Sacramento. For further information see:

  http://www.dot.ca.gov/hq/traffops/engineering/trucks/truck-length-routes.htm#step-2

  http://www.dot.ca.gov/hq/traffops/permits/

- Potential safety impacts to travelers must be considered in project design, offsets, and construction methods. Ensure that items such as fugitive dust, possible glare, and potential equipment malfunctions (e.g. turbine propellers), would not be detrimental to travelers or the highway facility.

- Ensure that any Scenic Highway issues are addressed. See:

  http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm

- Any additional overhead transmission lines crossing a State highway and lines (transmission or water) under the highway would also necessitate a Caltrans District 9 encroachment permit. If overhead lines are proposed for a designated Scenic Highway, a waiver from the California Public Utilities Commission would be required.

- Ensure no stormwater run-off greater than what is historic, is directed onto State right-of-way.

- Ensure any damage to public roadways is repaired to pre-construction phase conditions.

- Include Philip Crimmins - Caltrans Division of Aeronautics, in project review. His email is philip.crimmins@dot.ca.gov.

We value our cooperative working relationship concerning project related transportation issues for the State Highway System. Please contact me at (760) 872-0785, with any questions.

Sincerely,

GAYLE J. ROSANDER
IGR/CEQA Coordinator

c: State Clearinghouse
Philip Crimmins, Caltrans Aeronautics
Mark Reistetter, Caltrans D-9

From: Joe Sonia <argonaut@iwvisp.com>
Sent: Thursday, June 19, 2014 1:04 PM
To: Cathreen Richards
Cc: Matt Kingsley

Cathreen & Matt:

Now that I have had some time to think about all the information that you and Scott presented us with last night at the Trona Golf Club I think I have a site that will meet a majority of the criteria that will be needed for a potential photovoltaic or photo-thermal site here in Searles Valley.

This area is just south of the mouth of Homewood Canyon, in what is called the Mohawk Basin due to being where the old played out Mohawk Mine is located. This basin is at the 2800' – 2900' elevation and is a gently sloping basin that is surrounded by small peaks (see U.S.G.S.Trona Quadrangle) that is off the beaten path.
It is out of the way of the prevailing winds that rip up and down the floor of Searles Valley and the additional 1500' elevation acts as a natural classifier for air borne particulate. The surrounding small hills to the south of the basin close the area to visual pollution which of course is a consideration to all the people who are worried about the continued pristine state of the local desert.

If further development for raised elevation for additional southern exposed area for direct sun light, the back side of the south mountains rimming the south side of Homewood Canyon are available although they are a bit steep.

The advantages of this site are:

1. The Mohawk Basin is roughly 1.5 miles square and gently sloping west to east, surrounds by low hills to the south and east for limited visibility. These don't interfere with access to sunshine very much.
2.
3. It is off the beaten path with limited access.

A. The road going to the Mohawk Basin starts on private property in Crow Canyon (Melody & Robert Hotz)
B. The road is made for the most part of old compressed mine tailings and is solid.
C. The road has been in existence so long BLM can't close it, although they would like to and parts of it are on private property.
D. It is with in a mile (as the crow flies) of SCE's existing power lines that service Homewood and Crow Cyn.
E. Several private properties but up into that area, so easement for an right of way for a power line should be easy.
F. SCE's main power line (as I know it) is a 38KV-3 Phase line running out to the old lime stone quarry in Panamint Valley.
G. Water is available as BLM has three test wells (they put these in four years ago at the Ruth Mine} when they were trying to prove there was "arsenic" water in Homewood Canyon and were going to use that as an excuse to run us out of here out of "concern" for our health.

1. A pipeline right of way would have to be obtained, but the elevation change enough that once the water is out of the well they wouldn't have to pump the water.

2. A nice neat photovoltaic array could supply the power needed to pump the water out of the well to get it headed down hill to the Mohawk Basin.

H. The change in elevation helps with the “chemical” corrosion that is experienced down on the valley floor due to the unique chemistry that is generated by the lake and plant processes as well as the winter inversion layers.

The main detractor would be that the power lines from the place where they came down to SCE’s existing line might have to be retro-fitted with three phase (one more wire) and heavier gauge wires however the right of way exists .

I am sure there are several other details that I have managed to over looks but I have only been chewing on this problem for several hours now and haven’t had all that much waking time to kick the can around.

However I feel there is the potential for a tax base for Inyo County as well and some “green” jobs for some of the natives, provided BLM can be talked into letting go of some of the land they are holding for “future” generations.

If you have any additional questions I will do my best to answer them or try and direct you to somebody who might be able to answer them for you.

Thank you for your time.

Joe Sona

argonaut@iwvisp.com’

June 24, 2014

Josh Hart
Planning Director
Inyo County Planning Department

Re: June 5 2014 DRAFT REGPA Update

Mr. Hart;

We appreciate the opportunity to review the draft document and look forward to participating in the public discussion on the Renewable Energy General Plan Amendment.

In general, Lone Pine Paiute-Shoshone Reservation (LPPSR) is very pleased with the direction Inyo County is taking in regard to renewable energy development. Your department and the Board of Supervisors have been responsive to the overwhelming public desire to protect the unique environment in Inyo County while working toward reduction of fossil fuel use in electricity generation.

One issue of primary concern is an item in the SEDA Table - Megawatts and Corresponding Acreages in Solar Energy Development on page 5. The Western Group is limited to current line capacity of ~250 MW. LPPSR would like to see Owens Lake SEDA made available to accept the entire capacity, similar to Owens Valley, rather than limited to 150MW. In light of pending BACM designation for Flexamat, dust mitigation locations unsuitable for pier support in conventional solar arrays can accept ballasted panel placement. Neither excavation nor extensive decommissioning of the panel equipment would be necessary. CEQA is performed for the Flexamat placement, so only solar power plant associated structures would require analysis. Concerns resulting from impacts to vegetation, wildlife habitat, cultural resources, and air quality are moot where Flexamat will be approved BACM. The 'industrialized' lake bed construction has already compromised natural aesthetics as well.

We feel confident that acceptance of solar panels over dust mitigation sites on Owens Lake bed would be beneficial to the needs of LADWP's RE geographic distribution, fulfillment of excess line capacity and Inyo County's environmental protection. Revision of the table to allow full line capacity of 250 MW generation from the Owens Lake SEDA is needed provide that option.

Sincerely,

April Zrelak, Air Quality Coordinator
Lone Pine Paiute-Shoshone Reservation

Cc: Supervisor Arcularius
Supervisor Griffiths
Supervisor Kingsley
Supervisor Pucci
Supervisor Tillemans

Environmental and Air Quality Department
Phone: 760-876-4690
Fax: 760-876-4682
1101 E-Sha Lane, P.O. Box 747
Lone Pine, CA 93545

From: Earl Wilson <zearl.email@gmail.com>
Sent: Sunday, June 29, 2014 7:25 PM
To: Joshua Hart; Cathreen Richards
Subject: Solar bird mortality report
Attachments: Avian-mortality Report FINAL forensic report 2014.pdf

Hi,

Attached for your enjoyment.

Earl

Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis

Rebecca A. Kagan, Tabitha C. Viner, Pepper W. Trail, and Edgard O. Espinoza
National Fish and Wildlife Forensics Laboratory

Executive Summary

This report summarizes data on bird mortality at three solar energy facilities in southern California: Desert Sunlight, Genesis, and Ivanpah. These facilities use different solar technologies, but avian mortality was documented at each site. Desert Sunlight is a photovoltaic facility, Genesis employs a trough system with parabolic mirrors, and Ivanpah uses a power tower as a focal point for solar flux.

FINDINGS

Trauma was the leading cause of death documented for remains at the Desert Sunlight and Genesis sites. Trauma and solar flux injury were both major causes of mortality at the Ivanpah site. Exposure to solar flux caused singeing of feathers, which resulted in mortality in several ways. Severe singeing of flight feathers caused catastrophic loss of flying ability, leading to death by impact with the ground or other objects. Less severe singeing led to impairment of flight capability, reducing ability to forage and evade predators, leading to starvation or predation. Our examinations did not find evidence for significant tissue burns or eye damage caused by exposure to solar flux.

Cause of Death	Ivanpah	Genesis	Desert Sunlight	Total
Solar Flux	47	0	0	47
Impact trauma	24	6	19	49
Predation trauma	5	2	15	22
Trauma of undetermined cause	14	0	0	14
Electrocution	1	0	0	1
Emaciation	1	0	0	1
Undetermined (remains in poor condition)	46	17	22	85
No evident cause of death	3	6	5	14
Total	141	31	61	233

These solar facilities appear to represent “equal-opportunity” hazards for the bird species that encounter them. The remains of 71 species were identified, representing a broad range of ecological types. In body size, these ranged from hummingbirds to pelicans; in ecological type from strictly aerial feeders

(swallows) to strictly aquatic feeders (grebes) to ground feeders (roadrunners) to raptors (hawks and owls). The species identified were equally divided among resident and non-resident species, and nocturnal as well as diurnal species were represented. Although not analyzed in detail, there was also significant bat and insect mortality at the Ivanpah site, including monarch butterflies. It appears that Ivanpah may act as a **"mega-trap,"** attracting insects which in turn attract insect-eating birds, which are incapacitated by solar flux injury, thus attracting predators and creating an entire food chain vulnerable to injury and death.

			Foraging Zone			Residency Status	
SITE	No. Remains	Identifiable Remains	Air	Terr	Water	Resident	Migrant
Ivanpah	141	127	28	85	14	63	64
Genesis	31	30	12	12	6	20	10
Desert Sun	61	56	7	22	27	18	38
TOTALS	233	213	47	119	47	101	112

CONCLUSIONS AND RECOMMENDATIONS

In summary, three main causes of avian mortality were identified at these facilities: impact trauma, solar flux, and predation. Birds at all three types of solar plants were susceptible to impact trauma and predators. Predation was documented mostly at the photovoltaic site, and in many cases appeared to be associated with stranding or nonfatal impact trauma with the panels, leaving birds vulnerable to resident predators. Solar flux injury, resulting from exposures to up to 800º F, was unique to the power tower facility. Our findings demonstrate that a broad ecological variety of birds are vulnerable to morbidity and mortality at solar facilities, though some differential mortality trends were evident, such as waterbirds at Desert Sunlight, where open water sources were present; and insectivores at Ivanpah, where insects are attracted to the solar tower.

Specific hazards were identified, including vertically-oriented mirrors or other smooth reflective panels; water-like reflective or polarizing panels; actively fluxing towers; open bodies of water; aggregations of insects that attracted insectivorous birds; and resident predators. Making towers, ponds and panels less attractive or accessible to birds may mitigate deaths. Specific actions should include:

Monitoring/detection measures*:*

1) Install video cameras sufficient to provide 360 degree coverage around each tower to record birds (and bats) entering and exiting the flux

2) For at least two years (and in addition to planned monitoring protocol), conduct daily surveys for birds (at all three facilities), as well as insects and bats (in the condenser building at Ivanpah) around each tower at the base of and immediately adjacent to the towers in the area cleared of vegetation. Timing of daily surveys can be adjusted to minimize scavenger removal of carcasses as recommended by the TAC. Surveys in the late afternoon might be optimal for bird carcasses, and first light for bat carcasses.

3) Use dogs for monitoring surveys to detect dead and injured birds that have hidden themselves in the brush, both inside and outside the perimeter of the facility

4) To decrease removal of carcasses, implement appropriate raven deterrent actions

Bird Mortality Avoidance Measures*:*

1) Increase cleared area around tower at Ivanpah to decrease attractive habitat; at least out to fence

2) Retrofit visual cues to existing panels at all three facilities and incorporate into new panel design. These cues should include UV-reflective or solid, contrasting bands spaced no further than 28 cm from each other

3) Suspend power tower operation during peak migration times for indicated species

4) Avoid vertical orientation of mirrors whenever possible, for example tilt mirrors during washing

5) Properly net or otherwise cover ponds

6) Place perch deterrent devices where indicated, eg. on tower railings near the flux field

7) Employ exclusionary measures to prevent bats from roosting in and around the condenser facility at Ivanpah.

It must be emphasized that we currently have a very incomplete knowledge of the scope of avian mortality at these solar facilities. Challenges to data collection include: large facilities which are difficult to efficiently search for carcasses; vegetation and panels obscuring ground visibility; carcass loss due to scavenging; rapid degradation of carcass quality hindering cause of death and species determination; and inconsistent documentation of carcass history.

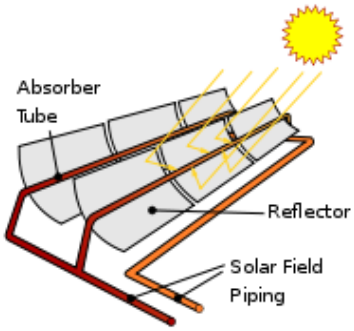
To rectify this problem, video cameras should be added to the solar towers to record bird mortality and daily surveys of the area at the base of and immediately adjacent to the towers should be conducted. At all the facilities, a protocol for systematic, statistically-rigorous searches for avian remains should be developed, emphasizing those areas where avian mortality is most likely to occur. Investigation into bat and insect mortalities at the power tower site should also be pursued.

Finally, there are presently little data available on how solar flux affects birds and insects. Studies of the temperatures experienced by objects in the flux; of the effects of high temperatures on feather structure and function; and of the behavior of insects and birds in response to the flux and related phenomena (e.g. “light clouds”) are all essential if we are to understand the scope of solar facility effects on wildlife.

Introduction

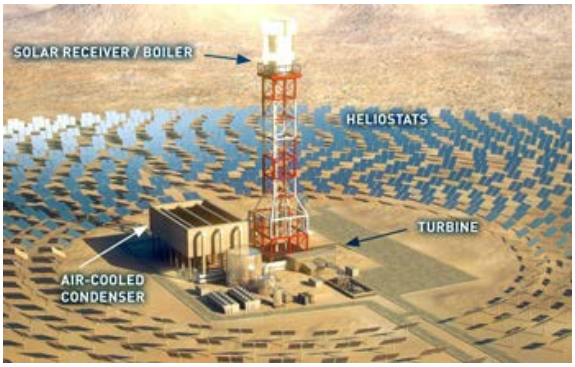
The National Fish and Wildlife Forensics Laboratory was requested to determine cause of death for birds found at facilities that generate electricity from solar energy. Solar generating facilities can be classified into three major types: photovoltaic sites, trough systems and solar power towers. There is much written about these systems so this report will not include any technical details, but simply mention the differences and their potential impact on birds.

1) **Photovoltaic systems** directly convert the sun's light into electricity. The perceived threat to birds is associated with the presence of water ponds which attract birds and from traumatic impact with the photovoltaic cells. An example of this type of solar power plant is Desert Sunlight Solar Farm (AKA First Solar).



2) **Trough systems** are composed of parabolic mirrors which focus and reflect the sun to a tube that converts the heat from the sun into electricity. The perceived threat to birds is associated with the presence of water ponds which attract birds and from traumatic impact with the trough structures. An example of this type of solar power plant is Genesis Solar Energy Project.

3) **Solar power tower**s use thousands of mirrors to reflect the solar energy to a tower, where water in a boiler is converted to steam, generating the electricity. The perceived threat to birds is associated traumatic impact with the mirrors and the danger associated with the heat produced by the mirrors. An example of this type of solar power plant is Ivanpah Solar Electric Generating System.



Methods

Carcasses were collected at the different solar power plant sites by either US Fish and Wildlife Service employees or by energy company staff. The collection of the carcasses was opportunistic; that is, not according to a pre-determined sampling schedule or protocol. There was no attempt to quantify the number of carcasses that scavengers or predators removed from the solar facilities' grounds, or to compare the distribution of carcasses inside and outside the boundaries of the solar facility sites.

Additionally, three USFWS/-OLE staff, including two Forensics Lab staff (EOE and RAK), visited the Ivanpah Solar plant from October 21 – 24, 2013. Their on-site observations are included in this report.

A total of 233 birds collected from three different facilities were examined; 141 from a solar thermal power tower site (Ivanpah, Bright Source Inc.), 31 from a parabolic trough site (Genesis, NextEra Energy Inc.) and 61 from a photovoltaic (PV) panel site (Desert Sunlight, First Solar Inc.). Nine of the Ivanpah birds were received fresh; 7 of those were necropsied during a site visit by a Forensics Laboratory pathologist (RAK). The rest of the birds were received frozen and allowed to thaw at room temperature prior to species identification and necropsy. Species determination was made by the Forensics Laboratory ornithologist (PWT) for all birds either prior to necropsy or, for those necropsied on-site, from photos and the formalin-fixed head. All data on carcass history (location of the carcass, date of collection and any additional observations) were transcribed, although these were not available for all carcasses.

As part of the gross pathological examination, whole carcasses were radiographed to help evaluate limb fractures and identify any metal foreign bodies. Alternate light source examination using an Omnichrome Spectrum 9000+ at 570 nm with a red filter helped rule in or out feather burns by highlighting subtle areas of feather charring (Viner et al., 2014). All birds or bird parts from Ivanpah without obvious burns were examined with the alternate light source, as well as any bird reportedly found near a power line and a random sub-sample of the remaining birds from Genesis and Desert Sunlight (Viner, T. C., R. A. Kagan, and J. L. Johnson, 2014, Using an alternate light source to detect electrically singed feathers and hair in a forensic setting. Forensic Science International, v. 234, p. e25-e29).

Carcass quality varied markedly. If carcasses were in good post mortem condition, representative sections of heart, lung, kidney, liver, brain and gastrointestinal tract as well as any tissues with gross lesions were collected and fixed in 10% buffered formalin. Full tissue sets were collected from the fresh specimens. Formalin-fixed tissues were routinely processed for histopathology, paraffin-embedded, cut at 4 µm and stained with hematoxylin and eosin. Tissues from 63 birds were examined microscopically: 41 from Ivanpah, 1 from Genesis and 21 from Desert Sunlight.

Birds with feather burns were graded based on the extent of the lesions. Grade 1 birds had curling of less than 50% of the flight feathers. Grade 2 birds had curling of 50% or more of the flight feathers. Grade 3 birds had curling and visible charring of contour feathers (Figure 1).

Figure 1: Three grades of flux injury based on extent and severity of burning. Grade 1 (top); Yellow-rumped Warbler with less than 50% of the flight feathers affected (note sparing of the yellow rump feathers). Grade 2 (middle); Northern Rough-winged Swallow initially found alive but unable to fly, with greater than 50% of the flight feathers affected. Grade 3 (bottom); MacGillivray's Warbler with charring of feathers around the head, neck, wings and tail.

Bird Species Recovered at Solar Power Facilities

Tables 1-4 and Appendix 1 summarize 211 identifiable bird remains recovered from the three solar facilities included in this study. These birds constitute a taxonomically diverse assemblage of 71 species, representing a broad range of ecological types. In body size, these species ranged from hummingbirds to pelicans; in ecological type from strictly aerial feeders (e.g. swifts and swallows) to strictly aquatic feeders (pelicans and cormorants) to ground feeders (roadrunners) to raptors (hawks and owls). The species identified were equally divided among resident and non-resident species. Nocturnal as well as diurnal species were represented.

In Tables 1-4 and Appendix 1, bird species are categorized into very general ecological types by foraging zone and residency status. Foraging Zones were "air" (a significant portion of foraging activity performed in the air), "terrestrial" (including foraging both in vegetation and on the ground), and "water" (foraging associated with water, including waders as well as aquatic birds). Residency Status was "resident" (for breeding or year-round residents) and "migrant" (for both passage migrants and non-breeding-season residents). For a number of species, the appropriate classification for residency status was uncertain, due to a lack of detailed knowledge of the sites. The present classification is based on published range maps, and is subject to revision as more information becomes available.

This dataset is not suitable for statistical analysis, due to the opportunistic and unstandardized collection of avian remains at the facilities, and the lack of baseline data on bird diversity and abundance at each site. Nevertheless, a few conclusions can be noted. First, these data do not support the idea that these solar facilities are attracting particular species. Of the 71 bird species identified in remains, only five species were recovered from all three sites. These five were American Coot, Mourning Dove, Lesser Nighthawk, Tree Swallow, and Brown-headed Cowbird, again emphasizing the ecological variety of birds vulnerable to mortality at the solar facilities. Over two-thirds (67%) of the species were found at only a single site

(Appendix 1). That being said, the Desert Sunlight facility had particularly high mortality among waterbirds, suggesting a need to render the ponds at that site inaccessible or unattractive to these species.

The diversity of birds dying at these solar facilities, and the differences among sites, suggest that there is no simple "fix" to reduce avian mortality. These sites appear to represent "equal-opportunity" mortality hazards for the bird species that encounter them. Actions to reduce or mitigate avian mortality at solar facilities will need to be designed on a site-specific basis, and will require much more data on the bird communities at each site, and on how mortality is occurring. Carefully-designed mortality studies might reveal significant patterns of vulnerability that are not evident in these data.

Table 1. Summary data on avian mortality at the three solar sites included in this study. See summary for discussion of Foraging Zone and Residency Status categories.

				Foraging Zone			Residency Status	
SITE	**No. Species**	**No. Remains**	**Identifiable Remains**	**Air**	**Terr**	**Water**	**Resident**	**Migrant**
Ivanpah	49	141	127	26	85	14	63	64
Genesis	15	31	30	12	12	6	20	10
Desert Sun	33	61	56	7	22	27	18	38
TOTALS	71	233	213	47	119	47	101	112

Table 2. Species identified from avian remains at the Desert Sunlight photovoltaic solar facility. MNI = minimum number of individuals of each species represented by the identifiable remains. In some cases (e.g. Cinnamon/Blue-winged Teal), closely related species could not be distinguished based on the available remains, but the Foraging Zone and Residency Status could still be coded, due to the ecological similarities of the species involved. Total identified birds = 56.

DESERT SUNLIGHT		Zone	Residency	MNI
Pied-billed Grebe	*Podilymbus podiceps*	water	migrant	1
Eared Grebe	*Podiceps nigricollis*	water	migrant	3
Sora	*Porzana carolina*	water	migrant	1
American Avocet	*Recurvirostra americana*	water	migrant	1
Cinnamon/Blue-winged Teal	*Anas discors/clypeata*	water	migrant	1
Western Grebe	*Aechmophorus occidentalis*	water	migrant	9
Brown Pelican	*Pelecanus occidentalis*	water	migrant	2
Double-crested Cormorant	*Phalacrocorax auritus*	water	migrant	2
Black-crowned Night-Heron	*Nycticorax nycticorax*	water	migrant	1
Yuma Clapper Rail	*Rallus longirostris*	water	resident	1
American Coot	*Fulica americana*	water	migrant	5
Mourning Dove	*Zenaida macroura*	terr	resident	3
White-winged Dove	*Zenaida asiatica*	terr	resident	1
Lesser Nighthawk	*Chordeiles acutipennis*	air	resident	2
Common Poorwill	*Phalaenoptilus nuttallii*	air	resident	1
Costa's Hummingbird	*Calypte costae*	air	resident	1
Ash-throated Flycatcher	*Myiarchus cinerascens*	air	resident	1
Black-throated/Sage Sparrow	*Amphispiza sp.*	terr	resident	1
Black Phoebe	*Sayornis nigricollis*	air	resident	1
Loggerhead Shrike	*Lanius ludovicianus*	terr	resident	2
Common Raven	*Corvus corax*	terr	resident	1
Horned Lark	*Eremophila alpestris*	terr	migrant	1
Tree Swallow	*Tachycineta bicolor*	air	migrant	1
Townsend's Warbler	*Setophaga townsendi*	terr	migrant	2
Common Yellowthroat	*Geothlypis trichas*	terr	migrant	1
Savannah Sparrow	*Passerculus sandwichensis*	terr	migrant	1
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	terr	migrant	1
Wilson's Warbler	*Cardellina pusilla*	terr	migrant	2
Western Tanager	*Piranga ludoviciana*	terr	migrant	2
Black-headed Grosbeak	*Pheucticus melanocephalus*	terr	migrant	1
Great-tailed Grackle	*Quiscalus mexicanus*	terr	resident	2
Brown-headed Cowbird	*Molothrus ater*	terr	resident	1

Table 3. Species identified from avian remains at the Genesis trough system solar facility. Total identified birds = 30.

GENESIS		Zone	Residency	MNI
Eared Grebe	*Podiceps nigricollis*	water	migrant	2
Great Blue Heron	*Ardea herodias*	water	migrant	1
American Kestrel	*Falco sparverius*	air	resident	1
Ring-billed Gull	*Larus delawarensis*	water	migrant	2
California Gull	*Larus californianus*	water	resident	1
White-winged Dove	*Zenaida asiatica*	terr	resident	1
Lesser Nighthawk	*Chordeiles acutipennis*	air	resident	2
Say's Phoebe	*Sayornis saya*	air	resident	2
Tree Swallow	*Tachycineta bicolor*	air	migrant	2
Cliff Swallow	*Petrochelidon pyrrhonota*	air	resident	5
Hermit Warbler	*Setophaga occidentalis*	terr	migrant	1
Black-headed Grosbeak	*Pheucticus melanocephalus*	terr	migrant	1
Chipping Sparrow	*Spizella passerina*	terr	resident	1
Bullock's Oriole	*Icterus bullockii*	terr	resident	2
Brown-headed Cowbird	*Molothrus ater*	terr	resident	6

Table 4. Species identified from avian remains at the Ivanpah power tower solar facility. Total identified birds = 127

IVANPAH		Zone	Residency	MNI
Cinnamon Teal	*Anas cyanoptera*	water	migrant	4
Cooper's Hawk	*Accipiter cooperii*	air	migrant	1
Red-shouldered Hawk	*Buteo lineatus*	terr	migrant	1
American Kestrel	*Falco sparverius*	air	resident	1
Peregrine Falcon	*Falco peregrinus*	air	resident	1
American Coot	*Fulica americana*	water	migrant	7
Sora	*Porzana carolina*	water	migrant	1
Spotted Sandpiper	*Actitis maculatus*	water	migrant	2
Greater Roadrunner	*Geococcyx californianus*	terr	resident	5
Yellow-billed Cuckoo	*Coccyzus americanus*	terr	migrant	1
Mourning Dove	*Zenaida macroura*	terr	resident	11
Barn Owl	*Tyto alba*	terr	resident	1
Lesser Nighthawk	*Chordeiles acutipennis*	air	resident	3
Common Poorwill	*Phalaenoptilus nuttallii*	air	resident	1
White-throated Swift	*Aeronautes saxatalis*	air	resident	1
Allen's/Rufous Hummingbird	*Selasphorus sp.*	air	migrant	1
Northern Flicker	*Colaptes auratus*	terr	resident	1
Ash-throated Flycatcher	*Myiarchus cinerascens*	air	resident	1
Loggerhead Shrike	*Lanius ludovicianus*	terr	resident	3
Warbling Vireo	*Vireo gilvus*	terr	migrant	1
Common Raven	*Corvus corax*	terr	resident	2
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	air	migrant	2
Tree Swallow	*Tachycineta bicolor*	air	migrant	2
Verdin	*Auriparus flaviceps*	terr	resident	3
Blue-gray Gnatcatcher	*Polioptila caerulea*	terr	resident	1
Northern Mockingbird	*Mimus polyglottos*	terr	resident	1
American Pipit	*Anthus rubescens*	terr	migrant	4
Orange-crowned Warbler	*Oreothlypis celata*	terr	migrant	1
Lucy's Warbler	*Oreothlypis luciae*	terr	resident	1
Black-throated Gray Warbler	*Setophaga nigrescens*	terr	migrant	1
Yellow-rumped Warbler	*Setophaga coronata*	air	migrant	14
Townsend's Warbler	*Setophaga townsendi*	terr	migrant	2
Yellow Warbler	*Setophaga petechia*	terr	migrant	1
Black-and-white Warbler	*Mniotilta varia*	terr	migrant	1
Wilson's Warbler	*Cardellina pusilla*	terr	migrant	2
MacGillivray's Warbler	*Oporornis tolmei*	terr	migrant	1
Western Tanager	*Piranga ludoviciana*	terr	migrant	2
Lazuli Bunting	*Passerina amoena*	terr	migrant	1
Blue Grosbeak	*Passerina caerulea*	terr	resident	1
Green-tailed Towhee	*Pipilo chlorurus*	terr	migrant	1
Brewer's Sparrow	*Spizella breweri*	terr	resident	3
Chipping Sparrow	*Spizella passerina*	terr	resident	3
Black-throated Sparrow	*Amphispiza bilineata*	terr	resident	3
Savannah Sparrow	*Passerculus sandwichensis*	terr	migrant	2
White-crowned Sparrow	*Zonotrichia leucophrys*	terr	migrant	6

IVANPAH		Zone	Residency	MNI
Pine Siskin	*Spinus pinus*	terr	migrant	1
House Finch	*Carpodacus mexicanus*	terr	resident	13
Brown-headed Cowbird	*Molothrus ater*	terr	resident	1
Great-tailed Grackle	*Quiscalus mexicanus*	terr	resident	3

Cause of Death of Birds Found at the Solar Power Plants

Photovoltaic facility (Desert Sunlight):

Sixty-one birds from 33 separate species were represented from Desert Sunlight. Due to desiccation and scavenging, a definitive cause of death could not be established for 22 of the 61 birds (see Table 5). Feathers could be examined in all cases, however, and none of the 61 bird remains submitted from the PV facility had visible evidence of feather singeing, a clear contrast with birds found at Ivanpah.

Blunt force impact trauma was determined to have been the cause of death for 19 Desert Sunlight birds including two Western Grebes (*Aechmophorus occidentalis*) and one each of 16 other species. Impact (blunt force) trauma is diagnosed by the presence of fractures and internal and/or external contusions. In particular, bruising around the legs, wings and chest are consistent with crash-landings while fractures of the head and/or neck are consistent with high-velocity, frontal impact (such as may result from impacting a mirror).

Predation was the immediate cause of death for 15 birds. Lesions supporting the finding of predation included decapitation or missing parts of the body with associated hemorrhage (9/15), and lacerations of the skin and pectoral muscles. Eight of the predated birds from Desert Sunlight were

Figure 2: Predation trauma (top) resulting in traumatic amputation of the head and neck (American Avocet) and impact trauma (bottom) causing bruising of the keel ridge of the sternum (Brown Pelican).

grebes, which are unable to easily take off from land. This suggests a link between predation and stranding and/or impact resulting from confusion of the solar panels with water (see Discussion).

Parabolic trough facility (Genesis):

Thirty-one birds were collected from this site. There were 15 species represented. Those found in the greatest numbers were Brown-headed Cowbirds and Cliff Swallows, though no more than 6 individuals from any given species were recovered. Overall, carcass quality was poor and precluded definitive cause of death determination in 17/31 birds (Table 5). Identifiable causes of death consisted of impact trauma (6/31) and predation trauma (2/31). Necropsy findings were similar to those at Desert Sunlight with fractures and hemorrhage noted grossly. Predation trauma was diagnosed in two birds, a Cliff Swallow and a Ring-billed Gull.

Power tower facility (Ivanpah):

Ivanpah is the only facility in this study that produces solar flux, which is intense radiant energy focused by the mirror array on the power-generating tower. Objects that pass through this flux, including insects and birds, encounter extreme heat, although the extent of heating depends on many variables, including the duration of exposure and the precise location in the flux beam.

From Ivanpah, 141 birds were collected and examined. Collection dates spanned a period of one year and five months (July 2012 to December 2013) and included at least seven months of construction during which time the towers were not actively fluxing (2013). There were 49 species represented (Table 4). Those found in the greatest numbers were Yellow-rumped Warblers (*Setophaga coronata;* 14), House Finches (*Carpodacus mexicanus*; 13), Mourning Doves (*Zenaida macroura*; 11) and American Coots (*Fulica americana*; 7). Yellow-rumped Warblers and House Finches were found exclusively at the power tower site.

Solar flux injury was identified as the cause of death in 47/141 birds. Solar flux burns manifested as feather curling, charring, melting and/or breakage and loss. Flight feathers of the tail and/or wings were invariably affected. Burns also tended to occur in one or more of the following areas; the sides of the body (axillae to pelvis), the dorsal coverts, the tops and/sides of the head and neck and the dorsal body wall (the back). Overlapping portions of feathers and light-colored feathers were often spared (Figures 3 and 4).

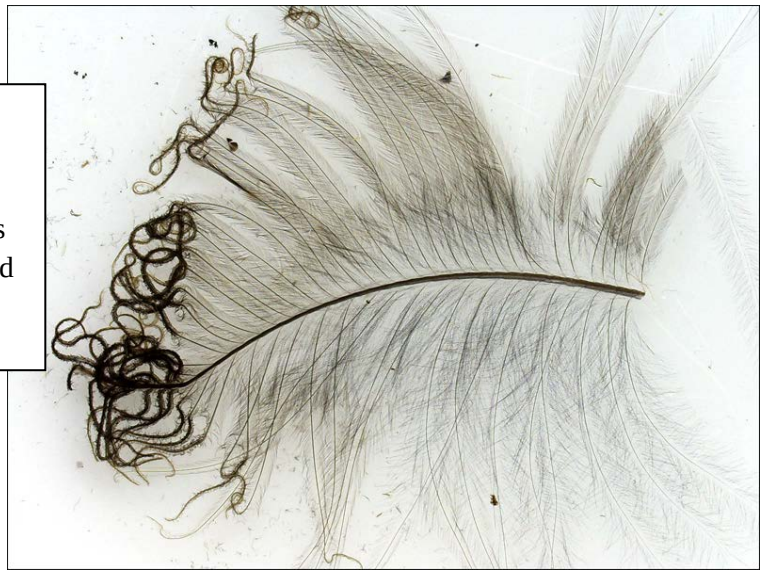


Figure 3: contour feather from the back of a House Finch with Grade 3 solar flux injury. The feather has curling and charring limited to the exposed tip.

Figure 4: Feather from a Peregrine Falcon with Grade 2 solar flux injury. Note burning of dark feather bands with relative sparing of light bands.

The yellow and red rumps of Yellow-rumped Warblers and House Finches respectively remained strikingly unaffected (See Figure 1). Charring of head feathers, in contrast, was generally diffuse across all color patterns. A pattern of spiraling bands of curled feathers across or around the body and wings was often apparent.

Table 5. Cause of death (COD) data

Cause of Death	Ivanpah	Genesis	Desert Sunlight	Total
Solar Flux	47	0	0	47
Impact trauma	24	6	19	49
Predation trauma	5	2	15	22
Trauma of undetermined cause	14	0	0	14
Electrocution	1	0	0	1
Emaciation	1	0	0	1
Undetermined (remains in poor condition)	46	17	22	85
No evident cause of death	3	6	5	14
Total	141	31	61	233

Eight birds were assigned a feather damage Grade of 1 with curling of less than 50% of the flight feathers. Six of these had other evidence of acute trauma (75%). Five birds were Grade 2, including three birds that were found alive and died shortly afterwards. Of these birds, 2 (the birds found dead) also had evidence of acute trauma. Twenty-eight birds were Grade 3; with charring of body feathers. Of these birds, 21/28

(28%) had other evidence of acute trauma. Remaining carcasses (6) were incomplete and a grade could not be assigned.

Twenty-nine birds with solar flux burns also had evidence of impact trauma. Trauma consisted of skull fractures or indentations (8), sternum fractures (4), one or more rib fractures (4), vertebral fractures (1), leg fracture (3), wing fracture (1) and/or mandible fracture (1). Other signs of trauma included acute macroscopic and/or microscopic internal hemorrhage. Location found was reported for 39 of these birds; most of the intact carcasses were found near or in a tower. One was found in the inner heliostat ring and one was found (alive) on a road between tower sites. The date of carcass collection was provided for 42/47. None were found prior to the reported first flux (2013).

Figure 5: The dorsal aspect of the wing from a Peregrine Falcon (the same bird as shown in Figure 4) with Grade 2 lesions. Note extensive curling of feathers without visible charring. This bird was found alive, unable to fly, emaciated and died shortly thereafter. These findings demonstrate fatal loss of function due to solar flux exposure in the absence of skin or other soft tissue burns.

Among the solar flux cases, a variety of bird species were affected though all but one (a raptor) was a passerine (Appendix 2). House Finches and yellow-rumped Warblers were most often represented (10/47 and 12/47 respectively). For the birds in which species could be determined (41/47), insects were a major

dietary component in all but two species. These were an unidentified hummingbird (*Selasphorus*) species (known to include insects in the diet) and a Peregrine Falcon (a species that feeds on small birds).

Four birds were reportedly found alive and taken to a wildlife rehabilitation center where they died one to a few days later (exact dates were not consistently provided). Three had Grade 2 feather burns and one had Grade 3 feather burns. None had other evidence of trauma. Body condition was reduced in all of the birds (two considered thin and two emaciated) based on a paucity of fat stores and depletion of skeletal muscling. The four birds were of four different species and consisted of three passerines and one raptor.

The second most commonly diagnosed cause of death at the Ivanpah facility was impact (or blunt force) trauma (24/141 birds). Necropsy findings were as previously described at the Desert Sunlight facility. Impact marks were reported on heliostat mirrors adjacent to the carcasses in 5 cases and mirrors were described as being vertically-oriented in 5 cases. Specific carcass locations were reported for 18 of the birds. Those birds were found in a variety of areas; below heliostats (8/18), in or near tower and powerblock buildings (4/18), on roads (2/18), below power lines (2/18), in the open (1/18) and by a desert tortoise pen (1/18).

Predation was determined to be the cause of death for five of the birds. A coot and a Mourning Dove were found with extensive trauma and hemorrhage to the head and upper body consisting of lacerations, crush trauma and/or decapitation. One of the birds (an American Coot) was found near a kit fox shelter site. One bird (Northern Mockingbird) was found near the fence line and the third (a Mourning Dove) in an alley way. Two more birds (an unidentified sparrow and an American Pipit) were observed being eaten by one of the resident Common Ravens.

Discussion of Cause of Death of Birds Found at the Solar Power Plants

Impact trauma:

Sheet glass used in commercial and residential buildings has been well-established as a hazard for birds, especially passerines (Klem 1990, 2004, 2006; Loss et al. 2014). A recent comprehensive review estimated that between 365-988 million birds die annually by impacting glass panels in the United States alone (median estimate 599 million; Loss et al. 2014). Conditions that precipitate window strike events include the positioning of vegetation on either side of the glass and the reflective properties of the window. Glass panels that reflect trees and other attractive habitat are involved in a higher number of bird collisions.

The mirrors and photovoltaic panels used at all three facilities are movable and generally directed upwardly, reflecting the sky. At the Ivanpah facility, when heliostats are oriented vertically (typically for washing or installation, personal communication, RAK) they appear to pose a greater risk for birds. Of the eight birds reported found under a heliostat, heliostats were vertically-oriented in at least 5 cases. (D Klem Jr., DC Keck, KL Marty, AJ Miller Ball, EE Niciu, and CT Platt. 2004. Effects of window angling, feeder placement, and scavengers on avian mortality at plate glass. Wilson Bulletin, 116(1):69-73; D Klem Jr. 2006. Glass: A deadly conservation issue for birds. Bird Observer 34(2):73-81; D Klem Jr. 1990.

Collisions between birds and windows: mortality and prevention. Journal of Field Ornithology 61:120–128; Loss, S.R., T. Will, S.S.Loss, and P.P. Marra. 2014. Bird-building collisions in the United States: Estimates of annual mortality and species vulnerability. Condor 116: 8-23). Studies with aquatic insects have found that vertically-oriented black glass surfaces (similar to solar panels) produced highly polarized reflected light, making them highly attractive (Kriska, G., P. Makik, I. Szivak, and G. Horvath. 2008. Glass buildings on river banks as "polarized light traps" for mass-swarming polarotactic caddis flies. Naturwissenschaften 95: 461-467).

A desert environment punctuated by a large expanse of reflective, blue panels may be reminiscent of a large body of water. Birds for which the primary habitat is water, including coots, grebes, and cormorants, were over-represented in mortalities at the Desert Sunlight facility (44%) compared to Genesis (19%) and Ivanpah (10%). Several factors may inform these observations. First, the size and continuity of the panels differs between facilities. Mirrors at Ivanpah are individual, 4 x 8' panels that appear from above as stippling in a desert background (Figure 6). Photovoltaic panels at Desert Sunlight are long banks of adjacent 27.72 x 47.25" panels (70 x 120 cm), providing a more continuous, sky/water appearance. Similarly, troughs at Genesis are banks of 5 x 5.5' panels that are up to 49-65 meters long.

Figure 6: The Ivanpah Solar Electric Generating System as seen via satellite. The mirrored panels are 5 x 8 feet.

There is growing concern about "polarized light pollution" as a source of mortality for wildlife, with evidence that photovoltaic panels may be particularly effective sources of polarized light in the environment (see Horvath et al. 2010. Reducing the maladaptive attractiveness of solar panels to polarotactic insects. Conservation Biology 24: 1644-1653, and ParkScience, Vol. 27, Number 1, 2010; available online at: http://www.nature.nps.gov/parkscience/index.cfm?ArticleID=386&ArticleTypeID=5; as well as discussion of this issue in the Desert Sunlight Final Environmental Impact Statement, Chapter 4, pp. 14-15).

Variables that may affect the illusory characteristics of solar panels are structural elements or markings that may break up the reflection. Visual markers spaced at a distance of 28 cm or less have been shown to reduce the number of window strike events on large commercial buildings (City of Toronto Green Development Standard; Bird-friendly development guidelines. March 2007). Mirrors at the Ivanpah facility are unobscured by structures or markings and present a diffuse, reflective surface. Photovoltaic panels at Desert Sunlight are arranged as large banks of small units that are 60 x 90 cm. The visually uninterrupted expanse of both these types of heliostat is larger than that which provides a solid structure visual cue to passerines. Parabolic troughs at Genesis have large, diffusely reflective surfaces between seams that periodically transect the bank of panels at 5.5' intervals. Structures within the near field, including the linear concentrator and support arms, and their reflection in the panels and may provide a visual cue to differentiate the panel as a solid structure.

The paper by Horvath et al cited above provides experimental evidence that placing a white outline and/or white grid lines on solar panels significantly reduced the attractiveness of these panels to aquatic insects, with a loss of only 1.8% in energy-producing surface area (p. 1651). While similar detailed studies have yet to be carried out with birds, this work, combined with the window strike results, suggest that significant reductions in avian mortality at solar facilities could be achieved by relatively minor modifications of panel and mirror design. This should be a priority for further research.

Finally, ponds are present on the property of the Desert Sunlight and Genesis facilities. The pond at Genesis is netted, reducing access by migratory birds, while the pond at Desert Sunlight is open to flighted wildlife. Thus, birds are both attracted to the water feature at Desert Sunlight and habituated to the presence of an accessible aquatic environment in the area. This may translate into the misinterpretation of a diffusely reflected sky or horizonal polarized light source as a body of water.

Stranding and Predation:

Predation is likely linked to panel-related impact trauma and stranding. Water birds were heavily over-represented in predation mortalities at Desert Sunlight. Of the 15 birds that died due to predation, 14 make their primary habitat on water (coots, grebes, a cormorant, and an avocet). A single White-winged Dove was the only terrestrial-based predation mortality in the submitted specimens. This is in contrast to blunt trauma mortalities at Desert Sunlight in which 8 of the 19 birds determined to have died of impact trauma were water species.

Locations of the birds when found dead were noted on several submissions. Of the birds that died of predation for which locations were known, none were located near ponds. The physiology of several of

these water birds is such that locomotion on land is difficult or impossible. Grebes in particular have very limited mobility on land and require a run across water in order to take off (Jehl, J. R., 1996. Mass mortality events of Eared Grebes in North America. Journal of Field Ornithology 67: 471-476). Thus, these birds likely did not reach their final location intentionally. Ponds at the PV and trough sites are fenced, prohibiting terrestrial access by predators. Birds on the water or banks of the pond are inaccessible to resident predators. Therefore, it is unlikely that the birds were captured at the pond and transported by a predator into the area of the panels. Attempts to land or feed on the panels because of their deceptive appearance may have injured the birds to the point that they could not escape to safety, or inadvertently stranded the birds on a substrate from which they could not take flight. We believe that an inability to quickly flee after striking the panels and stranding on the ground left these birds vulnerable to opportunistic predators. At least two types of predators, kit foxes and ravens, have been observed in residence at the power tower and PV facilities and ravens have been reported at the trough site (personal communication and observation, RAK). Additionally, histories for multiple birds found at the tower site document carcasses found near kit fox shelters or being eaten or carried by a raven.

Solar Flux:

Avian mortality due to exposure to solar flux has been previously explored and documented (McCrary, M. D., McKernan, R. L., Schreiber, R. W., Wagner, W. D., and Sciarrotta, T. C. Avian mortality at a solar energy power plant. Journal of Field Ornithology, 57(2): 135-141). Solar flux injury to the birds of this report, as expected, occurred only at the power tower facility. Flux injury grossly differed from other sources of heat injury, such as electrocution or fire. Electrocution injury requires the bridging of two contact points and is, therefore, seen almost exclusively in larger birds such as raptors. Contact points tend to be on the feet, carpi and/or head and burns are often found in these areas. Electrocution causes deep tissue damage as opposed to the surface damage of fire or solar flux. Other sequelae include amputation of limbs with burn marks on bone, blood vessel tears and pericardial hemorrhage. Burns from fires cause widespread charring and melting of feathers and soft tissues and histopathologic findings of soot inhalation or heat damage to the respiratory mucosa. None of these were characteristics of flux injury. In the flux cases small birds were over-represented, had burns generally limited to the feathers and internal injuries attributable to impact. Flux injury inconsistently resulted in charring, tended to affect feathers along the dorsal aspects of the wings and tail, and formed band-like patterns across the body (Divincenti, F. C., J. A. Moncrief, and B. A. Pruitt. 1969. Electrical injuries: a review of 65 cases. The Journal of Trauma 9: 497-507).

Proposed mechanisms of solar flux-related death follow one or a combination of the following pathways:

- impact trauma following direct heat damage to feathers and subsequent loss of flight ability
- starvation and/or thermoregulatory dysfunction following direct heat damage to feathers
- shock
- soft tissue damage following whole-body exposure to high heat
- ocular damage following exposure to bright light.

Necropsy findings from this study are most supportive of the first three mechanisms.

Loss of feather integrity has effects on a bird's ability to take off, land, sustain flight and maneuver. Tail feathers are needed for lift production and maneuverability, remiges are needed for thrust and lift and feathers along the propatagium and coverts confer smoothness to the avian airfoil. Shortening of primary flight feathers by as little as 1.6 cm with loss of secondary and tertiary remiges has been shown to eliminate take-off ability in house sparrows further demonstrating the importance of these feathers (Brown, R. E., and A. C. Cogley, 1996. Contributions of the propatagium to avian flight: Journal of Experimental Zoology 276: 112-124). Loss of relatively few flight feathers can, therefore, render a bird unable or poorly-able to fly. Birds encountering the flux field at Ivanpah may fall as far as 400 feet after feather singeing. Signs of impact trauma were often observed in birds with feather burns and are supportive of sudden loss of function (Beaufrere, H., 2009. A review of biomechanic and aerodynamic considerations of the avian thoracic limb. Journal of Avian Medicine and Surgery 23: 173-185).

Birds appear to be able to survive flux burns in the short term, as evidenced by the collection of several live birds with singed feathers. Additionally, Forensic Lab staff observed a falcon or falcon-like bird with a plume of smoke arising from the tail as it passed through the flux field. Immediately after encountering the flux, the bird exhibited a controlled loss of stability and altitude but was able to cross the perimeter fence before landing. The bird could not be further located following a brief search (personal observation, RAK and EOE). Birds that initially survive the flux exposure and are able to glide to the ground or a perch may be disabled to the point that they cannot efficiently acquire food, escape predators or thermoregulate. Observations of emaciation in association with feather burns in birds found alive is supportive of debilitation subsequent to flux exposure. More observational studies and follow-up are required to understand how many birds survive flux exposure and whether survival is always merely short-term. As demonstrated by the falcon, injured birds (particulary larger birds), may be ambulatory enough to glide or walk over the property line indicating a need to include adjacent land in carcass searches.

There was evidence of acute skin burns on the heads of some of the Grade 3 birds that were found dead. But interestingly, tissue burn effects could not be demonstrated in birds known to have survived short periods after being burned. Hyperthermia causing instantaneous death manifests as rapid burning of tissue, but when death occurs a day or later there will be signs of tissue loss, inflammation, proteinic exudate and/or cellular death leading to multisystemic organ failure. The beginnings of an inflammatory response to injury can be microscopically observed within one to a few hours after the insult and would have been expected in any of the four birds found alive. Signs of heat stroke or inhalation of hot air should have been observable a day or more after the incident. Rather, in these cases extensive feather burns on the body largely appeared to be limited to the tips of the feathers with the overlapping portions insulating the body as designed. This, in conjunction with what is likely only a few seconds or less spent in the flux, suggests that skin or internal organ damage from exposure to high temperatures in solar flux may not be a major cause of the observed mortality.

Ocular damage following light exposure was also considered but could not be demonstrated in the submitted birds. In the four birds that initially survived, there were no signs of retinal damage, inflammation or other ocular trauma. Given the small sample size, this does not preclude sight impairment as a possible sequela but clinical monitoring of survivors would be needed to draw more definitive conclusions.

Other/Undetermined:

Powerline electrocution was the cause of death for one bird (a juvenile Common Raven) at the Ivanpah facility. Electrocution at these solar facilities is a potential hazard but, thus far, appears to be an uncommon cause of death.

Smashed birds (13/233) were found at all three locations. Detailed carcass collection information was provided for 6; all were found on roads. Though poor carcass quality in all cases precluded definitive cause death determination, circumstances and carcass condition suggest vehicle trauma as the cause of deaths. The relatively low numbers of vehicle collisions may be attributed to slow on-site vehicle speeds and light traffic. Vehicle collisions, therefore, do not appear to be a major source of mortality and would be expected to decrease as construction ends.

There was a large number of birds (85/233) for which a cause of death could not be determined due to poor carcass condition. The arid, hot environment at these facilities leads to rapid carcass degradation which greatly hinders pathology examination. Results were especially poor for birds from the Genesis facility, where the cause of death(s) for 23/31 (74%) could not be determined. These results underscore the need for carcasses to be collected soon after death. More frequent, concerted carcass sweeps are advised.

Insect mortality and solar facilities as "mega-traps"

An ecological trap is a situation that results in an animal selecting a habitat that reduces its fitness relative to other available habitats (Robertson, B.A. and R.L. Hutto. 2006. A framework for understanding ecological traps and an evaluation of existing evidence. Ecology 87: 1075-1085; Robertson, B.A., J.S. Rehage, and Sih, A. 2013. Ecological novelty and the emergence of evolutionary traps. Trends in Ecology and Evolution 28: 552-560).

A wide variety of circumstances may create ecological traps, ranging from subtle (songbirds attracted to food resources in city parks, where they are vulnerable to unnaturally high populations of predators) to direct (birds are attracted to oil-filled ponds, believing it to be water, and become trapped). It appears that solar flux facilities may act as "**mega-traps,"** which we define as artificial features that attract and kill species of multiple trophic layers. The strong light emitted by these facilities attract insects, which in turn attract insect-eating birds, which are incapacitated by solar flux injury, thus attracting predators and creating an entire food chain vulnerable to injury and death.

OLE staff observed large numbers of insect carcasses throughout the Ivanpah site during their visit. In some places there were hundreds upon hundreds of butterflies (including monarchs, *Danaus plexippus*) and dragonfly carcasses. Some showed singeing, and many appeared to have just fallen from the sky. Careful observation with binoculars showed the insects were active in the bright area around the boiler at the top of the tower. It was deduced that the solar flux creates such a bright light that it is brighter than the surrounding daylight. Insects were attracted to the light and could be seen actively flying the height of the tower. Birds were also observed feeding on the insects. At times birds flew into the solar flux and ignited. Bird carcasses recovered from the site showed the typical singed feathers. The large populations of insects

may also attract indigenous bat species, which were seen roosting in structures at the base of the power tower.

Monarch butterflies in North America – both east and west of the Rocky Mountains – have been documented to be in decline (see the North American Monarch Conservation Plan, available at: http://www.mlmp.org/Resources/pdf/5431_Monarch_en.pdf). Proposed causes include general habitat loss and specific loss of milkweed, upon which the butterflies feed and reproduce. Considering the numerous monarch butterfly carcasses seen at the Ivanpah facility, it appears that solar power towers could have a significant impact on monarch populations in the desert southwest. Analysis of the insect mortality at Ivanpah, and systematic observations of bird/insect interactions around the power tower, is clearly needed.

Bird species affected by solar flux include both insectivores (e.g. swallows, swifts, flycatchers, and warblers) and raptors that prey on insect-feeding birds. Based on observations of the tower in flux and the finding of large numbers of butterflies, dragonflies and other insects at the base of the tower and in adjacent buildings it is suspected that the bright light generated by solar flux attracts insects, which in turn attracts insectivores and predators of insectivores. Waterbirds and other birds that feed on vegetation were not found to have solar flux burns. Birds were observed perching and feeding on railings at the top of the tower, apparently in response to the insect aggregations there.

Further, dead bats found at the Ivanpah site could be attracted to the large numbers of insects in the area. Nineteen bats from the condenser area of the power tower facility have been submitted to NFWFL for further evaluation. These bats belong to the Vespertilionidae and Molossidae families, which contain species considered by the Bureau of Land Management to be sensitive species in California. Preliminary evaluation revealed no apparent singing of the hair, and analysis is ongoing.

Solar flux and heat associated with solar power tower facilities

Despite repeated requests, we have been unsuccessful in obtaining technical data relating to the temperature associated with solar flux at the Ivanpah facility. The following summarizes the information we have gathered from other sources.

Figure 7 Ivanpah solar power facilities http://ivanpahsolar.com/about

The Ivanpah solar energy generating facility consists of mirrors that reflect sunlight to a tower. In the tower sits a boiler that generates steam which then powers a turbine.

At the top of a 459 foot tall tower sits a boiler (solar receiver) that is heated by the sun rays reflected by 300,000 mirrors, called solar heliostats. When the concentrated sunlight strikes the boiler tubes, it heats the water to create superheated steam. The high temperature steam is then piped from the boiler to a turbine where electricity is generated (http://ivanpahsolar.com/about visited on 01/20/2014).

If all the solar heliostats are focused on the solar tower the beams multiply the strength of sunlight by 5000 times, and this generates temperatures at the solar tower in excess of 3600° Fahrenheit (> 1982° Celsius). Since steel melts at 2750° Fahrenheit (1510° Celsius), only a percentage of heliostats are focused on the solar receiver so that) the optimal temperature at the tower is approximately 900° Fahrenheit (~482° Celsius) ("How do they do it" Wag TV for Discovery Channel, Season 3, Episode 15, "Design Airplane Parachutes, Create Solar Power, Make Sunglasses" Aired August 25, 2009).

Figure 8: Seville solar power facility (http://inhabitat.com/sevilles-solar-power-tower)

A solar steam plant in Coalinga that also uses heliostat technology for extracting oil is on record stating that the steam generator is set to about 500° Celsius. (http://abclocal.go.com/kDSn/story?section=news%2Fbusiness&id=8377469 Viewed Jan 21, 2013)

Temperatures measured by the authors at the edge of the solar complex on the surface of a heliostat were approximately 200° Fahrenheit (~93° Celsius). Therefore, there is a gradient of temperature from the edge of the solar field to the tower that ranges from 200° to 900° Fahrenheit.

There is a phenomenon that occurs when the heliostats are focused on the tower and electricity is being generated. The phenomenon can be described as either a circle of clouds around the tower or, at times, a cloud formed on the side that is receiving the solar reflection. It appears as though the tower is creating clouds. Currently we propose two hypotheses of why this "cloud" is formed. The first hypothesis is simply the presumption that the high heat associated with towers is condensing the air, and forming the

Figure 9: Tower 1 (bright white) is shown under power. Tower 2 (black) is not operating.

clouds. The second hypothesis is that this phenomenon does not represent clouds at all rather it is a place in space where the heliostats that are not being used to generate heat are focused. Under this scenario, it is a place where the mirrors focus the excess energy not being used to generate electricity.

Ivanpah employees and OLE staff noticed that close to the periphery of the tower and within the reflected solar field area, streams of smoke rise when an object crosses the solar flux fields aimed at the tower. Ivanpah employees used the term "streamers" to characterize this occurrence.

When OLE staff visited the Ivanpah Solar plant, we observed many streamer events. It is claimed that these events represent the combustion of loose debris, or insects. Although some of the events are likely that, there were instances in which the amount of smoke produced by the ignition could only be explained by a larger flammable biomass such as a bird. Indeed OLE staff observed birds entering the solar flux and igniting, consequently becoming a streamer.

OLE staff observed an average of one streamer event every two minutes. It appeared that the streamer events occurred more frequently within the "cloud" area adjacent to the tower. Therefore we hypothesize that the "cloud" has a very high temperature that is igniting all material that traverses its field.
One possible explanation of this this phenomenon is that the "cloud" is a convergent location where heliostats are "parked" when not in use. Conversely it undermines the condensation hypothesis, given that birds flying through condensation clouds will not spontaneously ignite.

Temperatures required to burn feathers

Many of the carcasses recovered from the Ivanpah Solar plant after the plant became operational showed singing of feathers as shown in Figure 10.

Figure 10: Singed feathers from a Northern Rough-winged Swallow

In order to investigate at what temperature feathers burn/singe, we exposed feathers to different air temperatures. Each feather was exposed to a stream of helium and air for 30 seconds. The results indicate that at 400° Celsius (752° Fahrenheit) after 30 seconds the feather begins to degrade. But at 450° and

Figure 11: Results of exposing feathers to different temperatures (in degrees Celsius)

500° Celsius (842° and 932° Fahrenheit respectively) the feathers singed as soon as they made contact with the superheated air (Figure 11). Therefore, when singed birds are found, it can be inferred that the temperatures in the solar flux at the time a bird flew through it was at least 400° Celsius (752° Fahrenheit). This inference is consistent with the desired operating temperature of a power tower solar boiler (482° Celsius).

The fact that a bird will catch on fire as it flies through the solar flux has been confirmed by a Chevron engineer who works at the Coalinga Chevron Steam plant, a joint venture of Chevron and BrightSource Solar. (http://abclocal.go.com/kDSn/story?section=news%2Fbusiness&id=8377469 Viewed Jan 21, 2013)

Conclusions and Recommendations

In summary, three main causes of avian mortality were identified at these facilities; impact trauma, predation and solar flux. Birds at all three types of solar plants were susceptible to impact trauma and predators. Solar flux injury was unique to the power tower facility. Solar facilities, in general, do not appear to attract particular species, rather an ecological variety of birds are vulnerable. That said, certain mortality and species trends were evident, such as waterbirds at Desert Sunlight, where open water sources were present.

Specific hazards were identified, including vertically-oriented mirrors or other smooth reflective panels; water-like reflective or polarizing panels; actively fluxing towers; open bodies of water; aggregations of insects that attracted insectivorous birds; and resident predators. Making towers, ponds and panels less attractive or accessible to birds may mitigate deaths. Specific actions include placing perch-guards on power tower railings near the flux field, properly netting or otherwise covering ponds, tilting heliostat mirrors during washing and suspending power tower operation at peak migration times.

Visual cues should be retrofitted to existing panels and incorporated into new panel design. These cues may include UV-reflective or solid, contrasting bands spaced no further than 28 cm from each other. This arrangement has been shown to significantly reduce the number of passerines hitting expanses of windows on commercial buildings. Spacing of 10 cm eliminates window strikes altogether. Further exploration of panel design and orientation should be undertaken with researchers experienced in the field (Daneil Klem Jr. of Muhlenberg College) to determine causes for the high rate of impact trauma, and designs optimized to reduce these mortalities.

Challenges to data collection included rapid degradation of carcass quality hindering cause of death and species determination; large facilities which are difficult to efficiently search for carcasses; vegetation and panels obscuring ground visibility; carcass loss due to scavenging; and inconsistent documentation of carcass history. Searcher efficiency has been shown to have varying influences on carcass recovery with anywhere from 30% to 90% detection of small birds achieved in studies done at wind plants (Erickson et al., 2005). Scavengers may also remove substantial numbers of carcasses. In studies done on agricultural fields, up to 90% of small bird carcasses were lost within 24 hours (Balcomb, 1986; Wobeser and Wobeser, 1992). OLE staff observed apparently resident ravens at the Ivanpah power tower. Ravens are efficient scavengers, and could remove large numbers of small bird carcasses from the tower vicinity. (Erickson, W. P., G. D. Johnson, and D. P. Young, Jr., 2005, A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions: U S Forest Service General Technical Report PSW, v. 191, p. 1029-1042; Balcomb, R., 1986, Songbird carcasses disappear rapidly from agricultural fields: Auk, v. 103, p. 817-820; Wobeser, G., and A. G. Wobeser, 1992, Carcass disappearance and estimation of mortality in a simulated die-off of small birds: Journal of Wildlife Diseases, v. 28, p. 548-554.)

Given these variables it is difficult to know the true scope of avian mortality at these facilities. The numbers of dead birds are likely underrepresented, perhaps vastly so. Observational and statistical studies to account for carcass loss may help us to gain a better sense of how many birds are being killed. Complete histories would help us to identify factors (such as vertical placement of mirrors) leading to mortalities. Continued monitoring is also advised as these facilities transition from construction to full operation. Of especial concern is the Ivanpah facility which was not fully-functioning at the time of the latest carcass submissions. In fact, all but 7 of the carcasses with solar flux injury and reported dates of collection were found at or prior to the USFWS site visit (October 21-24, 2013) and, therefore, represent flux mortality from a facility operating at only 33% capacity. Investigation into bat and insect mortalities at the power tower site should also be pursued.

ACKNOWLEDGMENTS

We wish to acknowledge the invaluable assistance and insights of S.A. Michael Clark and S.A. Ed Nieves.

Appendix 1. List of all 71 species recovered from the three solar energy sites. In this table, remains of closely related taxa that could not be definitively identified (e.g. Cinnamon/Blue-winged Teal and Black-throated/Sage Sparrow) are assigned to the biogeographically more likely taxon. In all such cases, the possible taxa are ecologically similar. All of these species are MBTA-listed.

SPECIES		Zone	Residency	Sites	MNI
Cinnamon Teal	*Anas cyanoptera*	water	migrant	DS,IV	5
Pied-billed Grebe	*Podilymbus podiceps*	water	migrant	DS	1
Western Grebe	*Aechmorphorus occidentalis*	water	migrant	DS	9
Eared Grebe	*Podiceps nigricollis*	water	migrant	DS,GN	5
Brown Pelican	*Pelecanus occidentalis*	water	migrant	DS	2
Double-crested Cormorant	*Phalacrocorax auritus*	water	migrant	DS	2
Great Blue Heron	*Ardea herodias*	water	migrant	GN	1
Black-crowned Night-Heron	*Nycticorax nycticorax*	water	migrant	DS	1
Cooper's Hawk	*Accipiter cooperii*	air	migrant	IV	1
Red-shouldered Hawk	*Buteo lineatus*	terr	migrant	IV	1
American Kestrel	*Falco sparverius*	air	resident	GN,IV	2
Peregrine Falcon	*Falco peregrinus*	air	resident	IV	1
American Coot	*Fulica americana*	water	migrant	DS, IV	12
Yuma Clapper Rail	*Rallus longirostris yumanensis*	water	resident	DS	1
Sora	*Porzana carolina*	water	migrant	DS,IV	2
American Avocet	*Recurvirostra americana*	water	migrant	DS	1
Spotted Sandpiper	*Actitis maculatus*	water	migrant	IV	2
Ring-billed Gull	*Larus delawarensis*	water	migrant	GN	2
California Gull	*Larus californianus*	water	resident	GN	1
Greater Roadrunner	*Geococcyx californianus*	terr	resident	IV	5
Yellow-billed Cuckoo	*Coccyzus americanus*	terr	migrant	IV	1
Mourning Dove	*Zenaida macroura*	terr	resident	DS, IV	14
White-winged Dove	*Zenaida asiatica*	terr	resident	DS,GN	2
Barn Owl	*Tyto alba*	terr	resident	IV	1
Lesser nighthawk	*Chordeiles acutipennis*	air	resident	DS,GN,IV	7
Common Poorwill	*Phalaenoptilus nuttallii*	air	resident	DS,IV	2
White-throated Swift	*Aeronautes saxatalis*	air	resident	IV	1
Costa's Hummingbird	*Calypte costae*	air	resident	DS	1
Allen's/Rufous Hummingbird	*Selasphorus sp.*	air	migrant	IV	1
Northern Flicker	*Colaptes auratus*	terr	resident	IV	1
Ash-throated Flycatcher	*Myiarchus cinerascens*	air	resident	DS,IV	2
Say's Phoebe	*Sayornis saya*	air	resident	GN	2
Black Phoebe	*Sayornis nigricollis*	air	resident	DS	1
Loggerhead shrike	*Lanius ludovicianus*	terr	resident	DS,IV	5
Warbling Vireo	*Vireo gilvus*	terr	migrant	IV	1
Common Raven	*Corvus corax*	terr	resident	DS,IV	3
Horned Lark	*Eremophila alpestris*	terr	migrant	DS	1
Tree Swallow	*Tachycineta bicolor*	air	migrant	DS,GN,IV	5

SPECIES		Zone	Residency	Sites	MNI
Cliff Swallow	*Petrochelidon pyrrhonota*	air	resident	GN	5
No. Rough-winged Swallow	*Stelgidopteryx serripennis*	air	migrant	IV	2
Verdin	*Auriparus flaviceps*	terr	resident	IV	3
Blue-gray Gnatcatcher	*Polioptila caerulea*	terr	resident	IV	1
Northern Mockingbird	*Mimus polyglottos*	terr	resident	IV	1
American Pipit	*Anthus rubescens*	terr	migrant	IV	4
Orange-crowned Warbler	*Oreothlypis celata*	terr	migrant	IV	1
Lucy's Warbler	*Oreothlypis luciae*	terr	resident	IV	1
Yellow-rumped Warbler	*Setophaga coronata*	air	migrant	IV	14
Black-throated Gray Warbler	*Setophaga nigrescens*	terr	migrant	IV	1
Hermit Warbler	*Setophaga occidentalis*	terr	migrant	GN	1
Townsend's warbler	*Setophaga townsendi*	terr	migrant	DS,IV	4
Yellow Warbler	*Setophaga petechia*	terr	migrant	IV	1
Black-and-white Warbler	*Mniotilta varia*	terr	migrant	IV	1
MacGillivray's Warbler	*Oporornis tolmei*	terr	migrant	IV	1
Wilson's Warbler	*Cardellina pusilla*	terr	migrant	DS,IV	4
Common Yellowthroat	*Geothlypis trichas*	terr	migrant	DS	1
Western Tanager	*Piranga ludoviciana*	terr	migrant	DS,IV	4
Black-headed Grosbeak	*Pheucticus melanocephalus*	terr	migrant	DS,GN	2
Lazuli Bunting	*Passerina caerulea*	terr	migrant	IV	1
Blue Grosbeak	*Passerina caerulea*	terr	resident	IV	1
Green-tailed Towhee	*Pipilo chlorurus*	terr	migrant	IV	1
Brewer's Sparrow	*Spizella breweri*	terr	resident	IV	3
Chipping Sparrow	*Spizella passerina*	terr	resident	GN,IV	4
Black-throated Sparrow	*Amphispiza bilineata*	terr	resident	DS,IV	4
Savannah Sparrow	*Passerculus sandwichensis*	terr	migrant	DS,IV	3
White-crowned Sparrow	*Zonotrichia leucophrys*	terr	migrant	IV	6
Pine Siskin	*Spinus pinus*	terr	migrant	IV	1
House Finch	*Carpodacus mexicanus*	terr	resident	IV	13
Great-tailed Grackle	*Quiscalus mexicanus*	terr	resident	DS,IV	5
Brown-headed Cowbird	*Molothrus ater*	terr	resident	DS,GN,IV	8
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	terr	migrant	DS	1
Bullock's Oriole	*Icterus bullockii*	terr	resident	GN	2

Species recovered from one site: 47
two sites: 18
three sites: 5

Appendix 2. Species with solar flux burns

Common Name	Scientific name	
Yellow-rumped warbler	*Setophaga coronata*	12
House finch	*Carpodacus mexicanus*	10
Chipping sparrow	*Spizella passerina*	2
Unidentified warbler	*Parulidae*	2
Verdin	*Auriparus flaviceps*	2
Great-tailed grackle	*Quiscalus mexicanus*	2
Lucy's warbler	*Oreothlypis luciae*	1
Wilson's warbler	*Cardellina pusilla*	1
MacGillivray's warbler	*Oporornis tolmei*	1
Black-throated gray warbler	*Setophaga nigrescens*	1
Townsend's warbler	*Setophaga townsendi*	1
Orange-crowned warbler	*Oreothlypis celata*	1
Blue-gray gnatcatcher	*Polioptila caerulea*	1
Unidentified swallow	*Hirundinidae*	1
Northern rough-winged swallow	*Stelgidopteryx serripennis*	1
Warbling vireo	*Vireo gilvus*	1
Unidentified hummingbird	*Selasphorus sp.*	1
Unidentified passerine	Passeriformes	1
Unidentified finch	*Carpodacus sp.*	1
Lazuli bunting	*Passerina caerulea*	1
Unidentified sparrow	*Spizella species*	1
Unidentified blackbird	*Icteridae*	1
Peregrine falcon	*Falco peregrinus*	1

From: McDonald Jane <janemcd1@mac.com>
Sent: Friday, June 27, 2014 6:15 PM
To: Cathreen Richards
Subject: Re: Inyo County Renewable Energy General Plan Amendment - Notice of Preparation

Why not take the OV SEDA out of the Western Cap? That would make it much clearer.

On Jun 27, 2014, at 5:45 PM, McDonald Jane wrote:

Dear Cathreen,

While I was not able to attend any of the Scoping meetings I did receive a copy and want to appreciate that I found many parts of it responsive to community concerns. Thank you again for your diligent work on this.

I am still concerned about the use of the word mitigate relative to cultural, biological, and economic (tourism) concerns, and feel that avoidance is the only appropriate mandate which can be applied to these criteria.

I am also hearing people are still concerned about the OV SEDA and the vagueness of the potential locations for any project, even with the additional stronger criteria…is there something you can do to clarify that?

Jane McDonald
Independence

On Jun 10, 2014, at 2:59 PM, Cathreen Richards wrote:

All,

It was brought to my attention that my earlier email, sent from Inyo Planning, did not work correctly – no attachment. So, I am sending it again from this email.<image001.png>

Cathreen Richards, Senior Planner
Inyo County Planning Department
PO Drawer L, Independence, CA 93526
Phone: 760-878-0447
Email: crichards@inyocounty.us

Jane McDonald
janemcd1@mac.com
510-468-7113

Cathreen Richards

From: Amy Noel <amynoel@mac.com>
Sent: Monday, June 30, 2014 10:45 AM
To: Matt Kingsley; Cathreen Richards
Subject: Fwd: Mojave Desert Blog

Hi Matt and Cathreen,

Thanks for coming to visit us last week. It was good to see you. I thought you might be interested in this latest report on the Bright Source Ivanpah Project if you don't already subscribe to Chris Clark's Blog.

Sincerely,
Amy

Begin forwarded message:

From: Mojave Desert Blog <noreply@blogger.com>
Subject: Mojave Desert Blog
Date: June 30, 2014 at 10:04:48 AM PDT
To: amynoel@mac.com

Mojave Desert Blog

BrightSource Underperforming; Adds Fossil Fuels

Posted: 29 Jun 2014 07:11 PM PDT

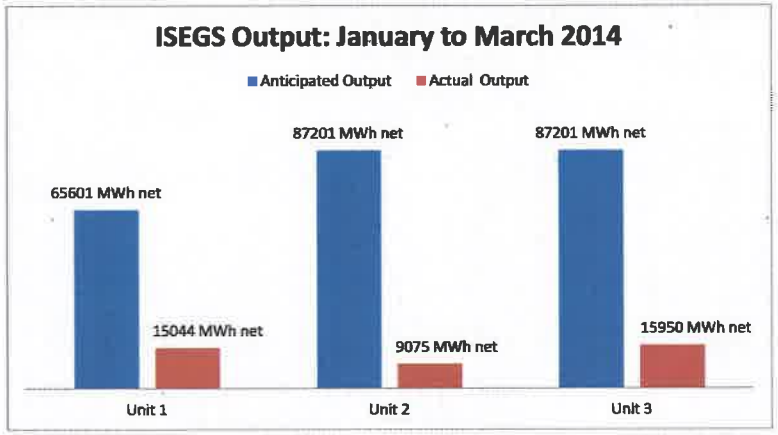
The California Energy Commission (CEC) last week **signaled** support for BrightSource Energy's request to increase natural gas use at the Ivanpah Solar project to nearly 525 million standard cubic feet each year to help heat steam when the sun is not shining. BrightSource's request to burn more natural gas underscores the difficulty the company has had with its experimental power tower project, even as the company proposes building the even larger **Palen Solar**project east of Joshua Tree National Park. The difficulties at Ivanpah - increased fossil fuel use, impacts on **birds and bats**, and poor operational performance - undermine the company's argument that the CEC should approve Palen because of the project's proposed renewable energy and storage

benefits.

Photo 2. *Photo of the ISEGS site taken from the north. From left to right: Tower 3; Tower 2, not in operation; and Tower 1. The photographer's position in relation to heliostat position and orientation results in no DSRH from Tower 3, but strong DSRH from Tower 1 which causes disability glare.*

The photo and text above were submitted by CEC staff as part of a **supplemental staff assessment** in the Palen Solar project proceeding regarding glare. The Caltrans Aeronautics Division Chief was also part of the flight, and the flight crew noted that the glare was "excessive," "painful" and compromised vision. Note that Unit 2 does not to appear be operational during this flight in early May.

According to **supplemental analysis** submitted by CEC staff for the Palen Solar project, the Ivanpah multifuel project was only online for a fraction of the anticipated capacity (see chart below) from January to March 2014. Although these statistics were meant to provide context for the project's impacts on wildlife, they could also suggest that the overall ratio of natural gas and solar energy inputs could be skewed toward the fossil fuels if natural gas was used to keep steam warm while the company struggled to synchronize its mirrors. According to the CEC's **Renewable Portfolio Standard Eligibility Guidebook,** Ivanpah's energy generation must include no more than 2% of heat inputs from fossil fuels in order to count toward California's RPS goals. With so many of the Ivanpah project's thousands of "heliostat" mirrors in stand-by mode for so many hours and days out of the year, it's possible that the project could surpass that 2% limit.



The Anticipated Output based on the Final Decision Efficiency Table 1 (TN 58716). Source: Quarterly Fuel and Energy Report CEC-1304 Power Plant Data Reporting; submitted by the Ivanpah Solar Electric Generating System project owner.

The chart speaks for itself. The Ivanpah multifuel project has had a tough start and may need to burn more natural gas, despite BrightSource Energy's confidence that its technology is necessary to meet California's Renewable Portfolio Standard.

Even with only partial operational success in early 2014, incidental and preliminary biological surveys found hundreds of dead **birds and bats** at the Ivanpah multifuel project, killed either in the solar flux (superheated air above the field of mirrors) or collision with facility structures. As a biologist noted in **testimony** submitted on behalf of the Center for Biological Diversity, it is likely that many more birds were killed but their carcasses were not found during the partial searches, or scavengers removed the dead birds and bats before they could be discovered in searches. Biologists are still working to determine the full extent of the power towers' impacts on wildlife.

Once again we have to ask ourselves what we get in return for this sacrifice of intact desert wildlands. In the case of Ivanpah, we have a multi-billion dollar hybrid solar/natural gas plant that has destroyed 5.6 square miles of prime tortoise habitat, and now burns and batters hundreds - and perhaps thousands - of birds and bats each year. It would be much wiser to double down on renewable energy and storage technologies that do not use our treasured landscapes as testing grounds and instead promote a more sustainable grid, such as **Solar City**'s batteries paired with rooftop solar, or **UC Riverside's** solar parking lots and battery storage.

United States Department of the Interior

NATIONAL PARK SERVICE
Pacific West Region
333 Bush Street, Suite 500
San Francisco, California 94104-2828

July 3, 2014

Planning Commission
Inyo County Planning Department
P.O. Drawer L
Independence, CA 93526

Dear Mr. Hart:

We are writing to provide scoping comments on Inyo County's Renewable Energy General Plan Amendment (REGPA) and Environmental Impact Report (EIR). The National Park Service (NPS) supports the efforts of Inyo County to define where and how renewable energy would be permitted in the County. We appreciate being invited to participate in the planning process as a stakeholder. We are also appreciative of the responsiveness of the County to NPS and other comments in the earlier public meetings and comment periods.

The NPS fully supports renewable energy projects so long as such projects 1) do not adversely affect National Park units, 2) can be constructed and operated in an environmentally responsible manner, 3) protect natural and cultural resources and 4) protect our treasured landscapes. It is the role of the NPS to contribute to the planning process and to help ensure that renewable energy projects are "Smart from the Start." Our goal is to provide expertise and practical and specific feedback in order to avoid significant adverse impacts to the resources and visitor experiences of Death Valley National Park, the Old Spanish National Historic Trail, and Manzanar National Historic Site. Comments are organized as general comments and NPS unit-specific comments below. Please contact Lara Rozzell at (415) 623-2205 for further clarification or information.

Sincerely,

Jay Goldsmith

Jay Goldsmith, ACTING
Acting Chief, Natural Resources
Pacific West Region, National Park Service

General Comments

We look forward to commenting in more detail throughout the stakeholder involvement process and the Programmatic Environmental Impact Report (PEIR) process. The NPS team is continuing analysis of the proposed policies and designations, and welcomes opportunities to work with staff and decision makers throughout the process.

The NPS thanks the County for its responsiveness to public concern over the earlier proposed versions of the REGPA. In particular, we commend the county for proposing new visual resource policies that reflect the importance of tourism and recreation in continuing economic development of the County, and for recognizing the national and international significance of the Death Valley National Park night skies.

Planning and Land Use

The currently proposed Plan Amendment contains a Land Use Implementation Measure as follows:

'The County shall coordinate with the Department of Defense, the United States Navy China Lake, and Edwards Air Force Base personnel on the siting of renewable energy facilities in a manner that does not significantly impact military readiness. Issues to be addressed in the coordination include: activities that produce electromagnetic and frequency spectrum interference, light and glare, dust and smoke, heat generation and the effects on military equipment testing and operations, including proposed development heights, personnel training, and flight activities."

The NPS requests that a similar paragraph be included for National Park Service coordination. The NPS would like to work with the County planning staff on language. Suggested language for discussion would be:

"The County shall coordinate with the National Park Service, Death Valley National Park, Manzanar National Historic Site, and Old Spanish National Historic Trail personnel on the siting of renewable energy facilities in a manner that does not significantly impact congressionally designated National Park Service resources. Issues to be addressed in the coordination include but are not limited to: wildlife habitat and corridor impacts, invasive species, light and glare, air quality, night sky resources, and visual resource impacts including proposed development heights, traffic impacts, and renewable energy construction personnel training regarding preservation of cultural resources."

Earlier guidance for the REGPA included only wilderness lands within NPS units as "Areas to be Considered for Exclusion". Please add NPS units, in their entirety, as "Areas to be Considered for Exclusion" from Solar Energy Development Areas (SEDA's).

The NPS supports the planning objective by the County to guide development to disturbed lands. The NPS suggests the County put forth for public discussion in the DEIR a clear definition of "disturbed lands", including addressing the planning objectives for agricultural lands and of lands used historically for agricultural production, but no longer in production.

The NPS commends the County for recognition and protection of the unique visual resources of the landscapes under study. The NPS recommends recognition in the PEIR of the differing visual effects specific to choice of

solar technology, and identification of appropriate technologies within individual SEDA's or portions of SEDA's. For instance, currently proposed power towers for concentrated solar power projects range up to 750 feet in height. Areas within the proposed SEDA's may be appropriate for photovoltaic development with its lower profile and visual impact, but could be inappropriate for power tower construction due to visual impacts. The NPS can provide viewshed analysis for areas of particular visual sensitivity that are under NPS protection, and encourages the County to use viewshed analysis for other visual resources within the County.

The NPS suggests clarification and discussion of the methods used to determine caps on the total megawatts applied to the proposed SEDA's, as well as the Owens Valley area.

Water Use

The currently proposed Plan Amendment contains a new Water Resource Policy as follows:

"Policy WR-3.5 (Sustainable Renewable Energy Solar Development) – The County shall require Renewable Energy Solar Facility development to incorporate measures to minimize water consumption and use of potable water and encourage the use of reclaimed water and/or practices that do not require water during construction, the life of the facility, and during reclamation."

The NPS commends the County for establishing policy to protect increasingly constrained water resources and for continuing to refine and expand on the language for water protection. The NPS suggests further information will be useful on the specifics of how water consumption will be minimized, and recommends the adoption of best practices from the BLM Solar PEIS in the PEIR.

Solar PEIS Variance Areas

The current draft REPGA includes a commitment from the County to encourage renewable energy development on BLM Solar PEIS variance areas, which were characterized in an earlier staff report as "fully studied and vetted as optimal for renewable energy." In contrast, the BLM Solar PEIS Record of Decision (ROD) states that "A variance process was established to allow development outside of SEZs on an exceptional basis" and also states that:

"*The BLM will consider ROW applications for utility-scale solar energy development in variance areas on a case-by-case basis based on environmental considerations; coordination with appropriate Federal, state, and local agencies and tribes; and public outreach. The responsibility for demonstrating to the BLM and other coordinating parties that a proposal in a variance area will avoid, minimize, and/or mitigate, as necessary, sensitive resources will rest with the applicant. The modification of variance areas would involve planning-level decisions and require the BLM to amend applicable land use plans."*

The NPS recommends that Inyo County maintain the distinctions applied by BLM between lands recommended for renewable energy development (disturbed lands, DRECP development focus areas, etc.) and the variance lands. The variance lands, as stated in the Solar PEIS ROD, require considerable study, interagency cooperation, tribal consultation, and BLM land use planning amendment before an application can be approved.

The NPS suggests discussion in the Draft PEIR of the specific measures to be used in the permitting process to encourage development within SEDA's. In particular, please identify how development would be encouraged

within the SEDA's in contrast to the incentives for development that may be applied to Solar PEIS variance areas.

Cultural and Ethnographic Studies

The sites and landscapes under consideration in Inyo County for solar development may contain a variety of natural and cultural resources that American Indian peoples define as heritage or traditional resources, as well as cultural resources important to recent American history. The NPS encourages a robust cultural analysis of the area and recommends ethnographic study, particularly for the Owens Valley area. Ethnographic study should include participation by the tribes affiliated with areas under study.

Cumulative Effects

The BLM Las Vegas/Pahrump Draft Resource Management Plan and Environmental Impact Statement proposes intensive renewable energy development areas in Nevada directly adjacent to the Inyo County Planning area. Cumulative effects from the proposed Nevada developments will need to be considered in the Inyo County PEIR. Cumulative effects of groundwater withdrawals are of particular concern to the NPS. The NPS recommends early analysis of cumulative effects to inform the designation of SEDA's along the Nevada state line.

Death Valley National Park

The formerly proposed Death Valley Junction SEDA was located within the Amargosa Desert, the location of the detached Devils Hole unit of Death Valley National Park that provides the sole habitat for the federally listed Devils Hole pupfish. Courts have ruled that NPS has a federally reserved water right in Devils Hole. The 1976 Supreme Court ruling in Cappaert v. United States led to a curtailment of ground water pumping near Devils Hole. This resulted in some recovery of the Devils Hole water level, but the water level remains well below the "pre-Cappaert" level. Water in the Amargosa Desert Hydrographic Basin is over-appropriated and over-pumped, which continues to prevent the recovery of water levels and the Devils Hole pupfish population. Many concerns were raised over similar groundwater issues in the 2011 scoping report for the California BLM Desert Renewable Energy Conservation Plan (DRECP). For these reasons, we gratefully support the County's decision to remove Death Valley Junction from the list of SEDAs.

The formerly proposed Panamint Valley SEDA is located in an area that is highly visible from Surprise Canyon, Telescope Peak, and other very popular visitor use destinations in Death Valley National Park. Utility-scale renewable energy development would vastly alter the viewshed, the scenic resources, and the experience of visitors to that part of Park. The NPS supports the decision of the County to apply its criteria for exclusions from renewable energy development, in particular criterion I identified in stakeholder worksheets: "Scenic Resources." Moreover, the preferred alternative in the most recent draft of the DRECP proposes designating the Panamint Valley SEDA as an ACEC and a National Conservation Land. We support these protective designations and appreciate the County's acknowledgement of the visual resource impacts that would accompany commercial development.

The formerly proposed Centennial Flat/Darwin SEDA, particularly in the larger designation of the more intense development alternative, raised concerns about the potential depletion of Death Valley National Park's groundwater resources. Groundwater withdrawal in this area would potentially reduce the discharge of the springs which support Darwin Falls, a highly popular visitor destination and a unique perennial waterfall occurrence in this arid setting. The NPS commends the County for removing the proposed Centennial Flat/Darwin SEDA.

The Staff Report contains suggested language for the Plan Amendment as follows:

"Policy VIS-1.8 (Utility –Scale Renewable Energy Development, Light and Glare, Night Skies) – The County shall encourage siting and screening to avoid or minimize significant changes to the visual environment from renewable energy facility development, including avoiding or minimizing light and glare, and impacts to Death Valley National Park's International Night Skies designation."

The NPS appreciates the inclusion of visual resource concerns throughout the plan, and particularly this recognition and protection for Death Valley National Park's internationally significant night sky resource. We suggest the addition of the words "during construction and operations of the facility" at the end of the paragraph. The NPS requests the opportunity to continue working with the County and applicants to ensure that future development has minimal impacts to the night skies.

Manzanar National Historic Site

The formerly proposed Owens Valley REDA and Sierra Wind: Owens Valley REDA were of particular concern for potential impacts to the Manzanar National Historic Site (Manzanar). The NPS commends the County for removing these proposed development areas from REGPA consideration, and requests further clarity on likely treatment of these areas for future development. The development of a utility-scale solar facility within the viewshed of Manzanar will have irreversible negative impacts to the authentic cultural experience for visitors and the cultural landscape associated with Manzanar. The uncertainty in the current REGPA process around potential wind and solar development raises questions about CEQA analysis of cumulative effects. Future projects in the Owens Valley and in the Sierra Winds area would have cumulative effects relevant to the REGPA. The NPS requests that the County establish the process for renewable energy permitting in these areas concurrent with the REGPA development, so that cumulative effects can be fully analyzed by the County and commented upon by the public and other agency stakeholders.

Manzanar is a California Registered Historic Landmark (1972), Los Angeles Historic-Cultural Monument (1976), listed on the National Register of Historic Places (1979), and a National Historic Landmark (1985). It was designated a National Historic Site by Congress in 1992. In 2004 the National Park Service opened a visitor center in the adaptively restored historic high school auditorium. Annual visitation averages 82,000 per year.

Manzanar was established to preserve the stories of the internment of nearly 120,000 Japanese Americans during World War II and to serve as a reminder to this and future generations of the fragility of American civil liberties. As the Japanese American internees discovered, Manzanar feels like the middle of nowhere. Although Manzanar is only 814 acres, Manzanar is surrounded by some of the largest tracts of public lands in the country.

This allows for the preservation of an important and invaluable cultural landscape appearing largely as it did when 11,070 Japanese Americans were confined here between 1942–1945.

Natural systems were historically important characteristics in the initial selection and development of the Manzanar War Relocation Center in 1942. At the largest scale, the natural landforms defining the valley—the Sierra Nevada, White, and Inyo Mountains—were the dominant structuring features that physically and perceptually contained the valley. They provide a strong visual context for the camp and all of the views and vistas from the camp. The topography of the valley and the low-growing vegetation allowed for expansive views of the mountain ranges on either side of the camp—reasons that the U. S. Army selected this site in 1942.

Sue Kunitomi Embrey (1923-2006), Former Internee, Founder of the Manzanar Committee and Chair of the Congressionally established Manzanar Advisory Commission, reflecting about the power of this place stated:

"As the rock gardens, the pleasure parks and the ponds brought solace to the internees beneath the high majestic Sierras, so can the Manzanar National Historic Site be a healing source for the devastation of the human spirit which we all experienced, not only for the Japanese American community, but for America as well."

Since 1969 the Manzanar Committee, a non-profit educational organization, has sponsored an annual pilgrimage to Manzanar. Former internees, their families, friends, and a growing number of young people gather at the Manzanar cemetery to remember, to honor, and to carry the lessons of this experience into the future. The event takes place on the last Saturday of April each year. This past April 27th —the 44th Annual Manzanar Pilgrimage—an estimated 1,500 participants made the Pilgrimage. Many of the pilgrims remarked that the 2013 Pilgrimage was the most inspirational that they could recall.

If utility-scale energy generation projects were built in the Owens Valley REDA and/or Sierra Winds: Owens Valley REDA, there would be significant adverse impacts to the scenic vistas and the culturally significant views from Manzanar. The setting, feel, and association of the area are of remote isolation. The construction of a utility-scale solar facility that will employ the use of large photovoltaic (PV) panels will add industrial intrusions to the natural landscape, impacting the cultural landscape and visual resources. In addition, facility lighting and the potential for glint and glare from the panels have a high potential for significant adverse impacts to Manzanar's visual resources, visitor experience and night sky resources.

Air quality in the Owens Valley is very good except in the category of inhalable particulates, where there are major deficiencies because of dust generated in the Owens Lake area. Owens Valley is subject to frequent high winds and inclement weather conditions that are dependent on the season. Fugitive dust as a result of construction activities and grading is a significant concern for human health and visual resource impacts. Utility-scale solar projects that utilize large-scale land clearing activities for the installation of PV panels severely damage existing vegetation cover and the fragile biological crust that stabilizes surface soils, creating problematic fugitive dust conditions.

The junction of U.S. Highway 395 and Manzanar Reward Road is not a signalized intersection. The addition of significant construction traffic volume to the existing traffic volume at that intersection is likely to increase the hazards for all motorists and bicyclists passing through that intersection. Signalizing the intersection would drastically affect the historic landscape, changing its character from rural to urban. Even if no adjacent focused

development areas are identified in this REGPA, the NPS recommends consultation with the California Department of Transportation District 9 staff to analyze and to suggest mitigations for potential highway traffic hazards associated with future utility-scale development in the Owens Valley.

Old Spanish National Historic Trail

The NPS is concerned about the potential designation of the Charleston View SEDA – and to a lesser extent, the Chicago Valley and Sandy Valley SEDA's – in close proximity to the cultural corridor that constitutes the Old Spanish National Historic Trail (NHT). In particular, there are High Potential Segments of the trail at Stump Springs and Emigrant Pass that could be affected by solar developments in the Charleston View SEDA. "High Potential Segments" are defined in the National Trails System Act of 1968 (as amended) as "those segments of a trail which would afford high quality recreation experience in a portion of the route having higher than average scenic values or affording an opportunity to vicariously share the experience of the original users of a historic route." The quality and integrity of trail segments, associated sites, and the trail setting provide the visitor with the opportunity "to vicariously share the experience of the original users of a historic route" (National Trails System Act of 1968) make this one of the premier trail experiences anywhere along the Old Spanish NHT. The potential scope of renewable energy development in this area would adversely affect the trail viewshed and significantly degrade the visitor experience. The Chicago Valley and Sandy Valley SEDAs would likely only affect trail resources if tall structures such as power tower technology were employed, or if transmission lines associated with those areas were constructed near the Old Spanish National Historic Trail.

Designation of a National Historic Trail is a rigorous process. The NPS conducted exhaustive research—both documentary and in the field—to document the significance, integrity, and location of the Old Spanish NHT as part of the feasibility study for its designation. The language of the National Trails System Act of 1968 (as amended) states: (To be designated as a National Historic Trail…) "It must be a trail or route established by historic use and must be historically significant as a result of that use. The route need not currently exist as a discernible trail to qualify, but its location must be sufficiently known to permit evaluation of public recreation and historical interest potential." The trail was determined to be nationally significant (NPS 2001:23) in terms of National Historic Trail criteria. Congress agreed, designating the Old Spanish NHT in 2002. The California Desert Renewable Energy Conservation Plan (DRECP), which will factor into future permitting decisions for renewable energy development on lands in Inyo County, also will address National Historic Trail protection. Lands with proximity and potential effects on NHT resources may be designated as National Conservation Lands, depending on the eventual chosen Plan alternative. The NPS encourages Inyo County to approach trail resource protection in alignment with the DRECP process.

In response to the County request for relevant references to inform the PEIR, the NPS has included a list of references which pertain to Old Spanish NHT trail use and remnants in Inyo County. The NPS is available to continue discussions with Inyo County regarding the potential impacts to the visitor experience on this nationally significant Historic Trail, and to find the best ways to avoid, minimize, or offset impacts to the visitor experience.

Old Spanish National Historic Trail references

Crampton, C. Gregory and Madsen, Steven K. 2007. In Search of The Old Spanish Trail: Santa Fe to Los Angeles 1829-1848. Layton, UT: Peregrine Smith Books.

Eggenhofer, Nick, n.d. Wagons, Mules and Men: How the Frontier Moved West. New York, NY: Hastings House Publishers.

Fremont, John C. 1845. Report of the exploring expedition to the Rocky Mountains in the year 1842 and to Oregon and North California in 1843-44. Washington, D.C.: Blair and Rives (printed for the House of Representatives).

Hafen, Leroy and Hafen, Ann 1993 The Old Spanish Trail. Lincoln, NE, and London: University of Nebraska Press. [originally published 1954]

Lawrence, Eleanor, 1932. Mexican Trade between Santa Fe and Los Angeles, 1830-1848. California Historical Society Quarterly 10: 27-39.

Lyman, E., 2004. The overland journey from Utah to California: Wagon travel from the City of Saints to the City of Angels. Reno & Las Vegas: University of Nevada Press.

Myhrer, Keith, White, William G., and Rolf, Stanton D. 1990. Archaeology of the Old Spanish Trail/Mormon Road from Las Vegas, Nevada to the California border. U.S. Department of the Interior, Bureau of Land Management Contributions to the Study of Cultural Resources: Technical Report 17.

Steiner, Harold 1999. The Old Spanish Trail across the Mojave Desert. Las Vegas, NV: the Haldor Co.

Warren, Elizabeth von Till, 1974. Armijo's trace revisited. A new interpretaton of the impact of the Antonio Armijo route of 1829-1830 on the development of the Old Spanish Trail. Unpublished M.A. thesis, University of Nevada, Las Vegas.

James Stroh
PO Box 173
Independence, CA 93526

Ms. Cathreen Richards
Inyo County Planning Department
July 8, 2014

I am writing in regard to the Renewable Energy General Plan Amendment (REGPA) Notice of Preparation. I strongly support all of the goals stated in documents related to the REGPA, including renewable energy zones, transmission corridors, and the PEIR process.

Follow up in the CEQA process is very important. Many of the claims made about potential impacts struck me as un-factual, even outright distortions and lies. It will be good to see some clear-eyed analysis of all the remaining planning areas. I look forward to seeing the analysis.

It is unfortunate that wind energy was eliminated from the PEIR analysis. In general wind has a better capacity factor than solar and complements it. If there is any chance wind energy can be part of the analysis I am for it.

The separate Owens Valley PEIR will be extremely important. I hope it goes forward with a variety of sites and analysis of transmission corridors.

Inyo County has a huge renewable energy resource. Private and public entities will be after this resource, just like prospectors and mining companies seek out earth resources. Planning for how when where this resource will be used, at all scales should be a county planning priority. Good luck.

Sincerely yours,

James Stroh

Manzanar Committee

1566 Curran Street • Los Angeles, California • 90026-2036 • (323) 662-5102
E-Mail: info@manzanarcommittee.org • Web: http://www.manzanarcommittee.org
Blog: http://blog.manzanarcommittee.org
http://www.facebook.com/ManzanarCommittee @manzanarcomm

July 8, 2014

Planning Department
County of Inyo
P.O. Drawer L
Independence, CA 92526-0611

RE: Notice of Preparation (NOP) - Program Environmental Impact Report (PEIR) – General Plan Amendment 2013-02/Inyo County Renewable Energy

The Manzanar Committee, which sponsors the annual Manzanar Pilgrimage and Manzanar At Dusk programs, and has played a key role in the preservation, protection and creation of the Manzanar National Historic Site, is vehemently opposed to any development that would interfere with the operation, goals and purpose of the Manzanar NHS, including forever marring its viewshed. As such, we are pleased that the Owens Valley is not included as a Solar Energy Development Area (SEDA) in the June 2014 draft of the 2013 Renewable Energy General Plan Amendment (REGPA) and we strongly urge the County of Inyo to forever protect this area from any large-scale renewable energy development.

In addition to protecting the cultural resources in the Owens Valley and the viewshed of the Manzanar NHS, such development in the Owens Valley, would make no sense, given that your economy is based primarily on tourism. After all, visitors are attracted to the Owens Valley because of its mostly pristine, open lands, along with forest areas, and other outdoor wonders. Tourism would suffer greatly if massive renewable energy facilities are built in the area.

We have also noted that some in Inyo County believe that large-scale solar energy projects would bring increased economic development. But if the Los Angeles Department of Water and Power's (LADWP) proposed Southern Owens Valley Solar Ranch (SOVSR) is any indication of how wrong such beliefs are, Inyo County must not buy into this fallacy. After all, according to LADWP's Draft Environmental Impact Report, the project would employ approximately 350 *temporary* workers, and *up to* ten *permanent* employees.

As such, in terms of providing employment opportunities for Inyo County residents, the SOVSR would generate some temporary jobs during construction of the project (LADWP stated it would take approximately five years to finish construction), but no more than ten permanent jobs to operate and maintain the facility. Does that sound like it is worth destroying a huge swath of the Owens Valley, given that, as I stated above, your economy is based on tourists, who are attracted to the Owens Valley because of the beauty of its open spaces and pristine lands?

Before anyone gets the wrong idea, let me state for the record that the Manzanar Committee is not opposed to solar energy, or other renewable energy sources. In fact, we applaud Inyo County's support of projects that would help us move away from fossil fuels. However, this brings up another reason why the Owens Valley must be protected from large-scale solar energy development. To be sure, placing massive solar facilities in the Owens Valley is the wrong choice while other options exist. In fact, centralized, industrial solar facilities are not a wise use of resources at this time, as centralized solar farms are less efficient and more expensive than distributed, rooftop solar systems.

Distributed solar produces energy directly in the market where it is consumed. There is no need for expensive, massive transmission lines and distribution infrastructure. For example, Los Angeles can easily generate incredible amounts of energy to power its homes and businesses from rooftop solar projects (source: report by Los Angeles Business Council/UCLA Luskin Center for Innovation). Furthermore, by its own admission, the LADWP will pay homeowners in the Owens Valley substantially less than homeowners here in Los Angeles per kilowatt hour (source: LADWP).

Not only would permitting large-scale solar energy development open the door for such ill-conceived, large-scale development in the Owens Valley, but it would also put a major crimp in the ability of the Manzanar NHS to accurately tell the story of the 11,070 Americans of Japanese ancestry, and their immigrant parents who were prevented from naturalizing due to racist laws, who were unjustly incarcerated there during World War II.

The natural environment surrounding Manzanar is an indispensable element in understanding what those incarcerated in America's concentration camps experienced. The fact that our government chose to incarcerate over 110,000 persons of Japanese ancestry—2/3rds of whom were native-born American citizens—and to place them in remote, desolate, largely uninhabitable locations is key to understanding what our families and our community were subjected to. In fact, one of the key reasons Manzanar has been such a successful National Park is that the site, and the surrounding area, was not marred by development, and has remained largely untouched since World War II.

In fact, the very idea that any land in or around the Manzanar NHS could be used for a massive solar energy generating facility would not harm the ongoing efforts to preserve and understand the tragedy of justice that occurred there is simply beyond insensitive, and it's not just insensitive to the Japanese American community, the survivors of America's concentration camps and their families. That gross insensitivity extends to the efforts of the National Park Service, and others who have worked so hard to bring this brief, but essential, part of American History to light.

Indeed, not only has the Manzanar NHS been a huge success, but it is also a significant contributor to Inyo County's economy, with annual visitation topping 82,000 people. But their experience will be greatly diminished if large-scale renewable energy development is permitted within Manzanar's viewshed. Such development would severely hamper the efforts of National Park staff at Manzanar

to accurately tell the story of those who were incarcerated there—as stated above, they would no longer be able to accurately show the desolation aspect of the story, which is essential to understanding it. Moreover, to allow such development would also greatly disrespect and dishonor those who were incarcerated there, people who were, in fact, Inyo County residents who expect and deserve much better from their former home.

2014 marks the tenth anniversary of the opening of the visitor's center at the Manzanar National Historic Site. Over one million people have visited the site since 2000. This year also marks the 50th anniversary of the Civil Rights Act. Our country has come a long way since 1964, and we hope that as we celebrate the advances we've made in the area of civil rights, the concerns of those Americans who were denied those rights simply because of their ancestry are not swept aside and ignored.

Once again, we strongly urge Inyo County to do its part by doing everything in its power to protect the Owens Valley from large-scale renewable energy development in perpetuity.

Sincerely,

Bruce Embrey
Co-Chair
Manzanar Committee

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Lahontan Regional Water Quality Control Board

July 8, 2014

File: Environmental Doc Review
Inyo County

Cathreen Richards, Senior Planner
Inyo County
P.O. Box Drawer L
Independence, CA 93526
Email: crichards@inyocounty.us

COMMENTS ON NOTICE OF PREPARATION OF A DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT FOR THE RENEWABLE ENERGY GENERAL PLAN AMENDMENT, INYO COUNTY, STATE CLEARINGHOUSE NO. 2014061039

The California Regional Water Quality Control Board, Lahontan Region (Water Board) staff received the Notice of Preparation (NOP) of a Draft Programmatic Environmental Impact Report (DPEIR) for the above-referenced plan amendment (Plan) on June 13, 2014. The NOP was prepared by Inyo County (County) and submitted in compliance with provisions of the California Environmental Quality Act (CEQA). Water Board staff, acting as a responsible agency, is providing these comments to specify the scope and content of the environmental information germane to our statutory responsibilities pursuant to CEQA Guidelines, California Code of Regulations (CCR), title 14, section 15096. We encourage the County to take this opportunity to integrate elements into the Plan that (1) promote watershed management, (2) support "Low Impact Development" (LID), (3) reduce the effects of hydromodification, (4) encourage solar development on previously disturbed lands, and (5) encourage recycled water uses. Our comments on the NOP are outlined below.

PURPOSE OF THE PLAN

The Renewable Energy General Plan will focus on the County's goals, policies, and implementation measures as related to solar energy development, and will identify and evaluate eight specific solar energy development areas (SEDAs) located throughout the County. The SEDAs were selected based on a number of criteria, with degraded or otherwise previously disturbed lands given special consideration; areas excluded from consideration as a SEDA include known areas of critical environmental concern and designated wilderness areas. The Owens Valley is excluded from this PEIR, with the exception of one SEDA in Laws, and will be evaluated separately under a subsequent planning document.

WATER BOARD'S AUTHORITY

All groundwater and surface waters are considered waters of the State. Surface waters include streams, lakes, ponds, and wetlands, and may be ephemeral, intermittent, or perennial. All waters of the State are protected under California law. State law assigns responsibility for protection of water quality in the Lahontan Region to the Lahontan Water Board. Some waters of the State are also waters of the U.S. The Federal Clean Water Act (CWA) provides additional protection for those waters of the State that are also waters of the U.S.

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) contains policies that the Water Board uses with other laws and regulations to protect the quality of waters of the State within the Lahontan Region. The Basin Plan sets forth water quality standards for surface water and groundwater of the Region, which include designated beneficial uses as well as narrative and numerical objectives which must be maintained or attained to protect those uses. The Basin Plan can be accessed via the Water Board's web site at http://www.waterboards.ca.gov/lahontan/water_issues/programs/basin_plan/references.shtml.

RECOMMENDED ELEMENTS TO INCLUDE IN THE PLAN

The majority of Inyo County includes areas with a high solar energy generation potential, which is an integral component driving renewable energy development. We encourage the County to take this opportunity and incorporate into the Plan elements that promote watershed management, support LID, reduce the effects of hydromodification, encourage solar development on previously disturbed lands, and encourage recycled water uses.

A Watershed Approach

Healthy watersheds are sustainable. Watersheds supply drinking water, provide for recreational uses, and support ecosystems. Watershed processes include the movement of water (i.e. infiltration and surface runoff), the transport of sediment, and the delivery of organic material to surface waters. These processes create and sustain the streams, lakes, wetlands, and other receiving waters of our region. Inyo County encompasses a number of watersheds and contains the highest elevation (Mount Whitney) and lowest elevation (Badwater) in the contiguous United States. All of these watersheds are internally draining with no outlet to the Pacific Ocean.

The watershed approach for managing water resource quality and quantity is a collaborative process that focuses public and private efforts on the highest priority problems within a drainage basin. The Inyo-Mono Integrated Regional Water Management Group has assembled a collaborative group of stakeholders, both public and private, to address both water quantity and water quality within the Inyo and Mono basins. A number of water management plans are being developed through that stakeholder collaboration process, and strategies continue to be developed and refined to sustain water quantity and to manage salts and nutrients to maintain the quality of groundwater resources. The County is encouraged to play an active stakeholder role in

the development of these plans and to incorporate the applicable implementation strategies into their Plan.

Low Impact Development Strategies

The foremost method of reducing impacts to watersheds from urban development is LID, the goals of which are maintaining a landscape functionally equivalent to predevelopment hydrologic conditions and minimal generation of non-point source pollutants. LID results in less surface runoff and potentially less impacts to receiving waters, the principles of which include:

- Maintaining natural drainage paths and landscape features to slow and filter runoff and maximize groundwater recharge;
- Reducing compacted and impervious cover created by development and the associated road network; and
- Managing runoff as close to the source as possible.

LID development practices that maintain aquatic values also reduce local infrastructure requirements and maintenance costs and benefit air quality, open space, and habitat. Vegetated areas for storm water management and infiltration onsite are valuable in LID. We encourage the County to establish LID implementation strategies for renewable energy development and incorporate these strategies into the Plan.

Storm Water Management

Because increased runoff from developed areas is a key variable driving a number of other adverse effects, attention to maintaining the pre-development hydrograph will prevent or minimize many problems and will limit the need for other analyses and mitigation. However, traditional methods for managing urban storm water do not adequately protect the environment and tend to treat symptoms instead of causes. Such practices have led to channelization and stream armoring that permanently alter stream habitat, hydrology, and aesthetics, resulting in overall degradation of a watershed.

Storm water control measures that are compatible with LID are preferred over more traditional methods. Examples include the use of bioretention swales, pervious pavement, and vegetated infiltration basins, all of which can effectively treat post-construction storm water runoff, help sustain watershed processes, protect receiving waters, and maintain healthy watersheds. Any particular one of these control measures may not be suitable, effective, or even feasible on every site, but the right combination, in the right places, can successfully achieve these goals.

We encourage the County to establish guidelines for implementing specific storm water control measures into the Plan. Additional information regarding sustainable storm water management can be accessed online at http://www.waterboards.ca.gov/water_issues/programs/low_impact_development/.

Hydromodification

Hydromodification is the alteration of the natural flow of water through a landscape (i.e. lining channels, flow diversions, culvert installations, armoring, etc.). Disturbing and compacting soils, changing or removing the vegetation cover, increasing impervious surfaces, and altering drainage patterns limit the natural hydrologic cycle processes of absorption, infiltration, and evapotranspiration, and increases the volume and frequency of runoff and sediment transport. Hydromodification results in stream channel instability, degraded water quality, changes in groundwater recharge processes, and aquatic habitat impacts. Hydromodification also can result in disconnecting a stream channel from its floodplain. Floodplain areas provide natural recharge, attenuate flood flows, provide habitat, and filter pollutants from urban runoff. Floodplain areas also store and release sediment, one of the essential processes to maintain the health of the watershed. Information regarding hydromodification can be accessed online at http://www.swrcb.ca.gov/water_issues/programs/stormwater/hydromodification.shtml.

We encourage the County to establish guidelines and develop mitigation measures that will help to avoid hydromodification from future projects. The guidelines should include maintaining natural drainage paths of streams and creeks and establishing buffers and setback requirements to protect channels and floodplain areas from encroaching development.

Focus Development on Previous Disturbed Lands

We recommend that the County continue to promote and to provide incentive for renewable energy development on previous disturbed lands as part of the renewable energy Plan. Desert ecosystems are fragile. Biological soil crusts are common and provide a variety of functions including soil stabilization and nutrient cycling. When these ecosystems are disturbed, as is the case from clearing, grubbing, and grading, recovery is slow, on the order of decades. To minimize impacts to undisturbed desert lands, we encourage the County to support and promote development and reuse of previously disturbed lands, such as former agricultural lands. Such reuse can benefit environmental resources, including hydrology and water quality, by maintaining relatively undisturbed natural areas and avoiding direct impacts to established habitats and surface waters. Where feasible, we encourage the County to support and promote small-scale rooftop solar development. Such development avoids impacts to water quality and hydrology, reduces the project footprint by siting the solar generating equipment closer to the end user, and reduces the need for secondary projects such as new transmission lines or utility upgrades.

Recycled Water Uses

The State Water Resources Control Board adopted the Recycled Water Policy in February 2009 (effective May 14, 2009, and amended January 22, 2013). The purpose of the policy is to increase the use of recycled water from municipal wastewater sources, in a manner that implements state and federal water quality laws, as a means towards achieving sustainable local water supplies. The Recycled Water Policy establishes goals and mandates for recycled water use. The mandates are to increase the use of recycled water from the amount used in 2009 by 200,000 acre-feet per year

by 2020 and by 500,000 acre-feet per year by 2030. Incentives for implementing recycled water projects include grant opportunities and priority funding.

The County is encouraged to consider the use of recycled water as an implementation strategy in their Plan to reduce demand on groundwater resources. SEDAs strategically located near population centers serviced by wastewater treatment plants would be ideal candidates to receive and use recycled water either during construction, operation, or both.

Other Issues to be Considered

- The DPEIR should establish general baseline conditions for water quantity in the groundwater basins beneath the SEDAs. This information could then be used to establish thresholds of significance for subsequent project-level environmental review. Projects proposed in SEDAs where the groundwater basin is in overdraft or threatened to be in overdraft should consider alternative water sources other than groundwater for construction and long-term operational needs.

- The DPEIR should establish general baseline conditions for water quality in the surface waters and groundwater basins of the SEDAs. This information could then be used to establish thresholds of significance for subsequent project-level environmental review.

- We urge the County to take a critical look at cumulative impacts on water quality and hydrology that may result over time from implementing the various components of the Plan. The analysis should consider the impacts of all potential projects planned and constructed within the various SEDAs and evaluate, at minimum, the potential impacts to groundwater recharge due to increased impervious surface and/or compacted soils, changes in the hydrology of the respective watershed(s) and potential flooding implications, and habitat connectivity. The cumulative impacts analysis should identify regional, broad-scale mitigation measures that, when implemented, will reduce potential impacts to a less than significant level.

PERMITTING REQUIREMENTS FOR INDIVIDUAL PROJECTS

A number of activities that will be implemented by individual projects under the Plan have the potential to impact waters of the State and, therefore, may require permits issued by either the State Water Resources Control Board (State Water Board) or Lahontan Water Board. The required permits may include:

- Land disturbance of more than 1 acre may require a CWA, section 402(p) storm water permit, including a National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit, Water Quality Order (WQO) 2009-0009-DWQ, obtained from the State Water Board, or an individual storm water permit obtained from the Lahontan Water Board;

- Land disposal of waste may require compliance with CCR title 27 and regulation under individual Waste Discharge Requirements (WDRs) issued by the Lahontan Water Board;

- Recycled water use may require General WDRs under WQO 2009-0006-DWQ (specifically for landscape irrigation uses), or under WQO-2014-0090-DWQ (for all other authorized uses), both issued by the Lahontan Water Board; and

- Streambed alteration and/or discharge of dredge and/or fill material to a surface water, including water diversions, may require a CWA, section 401 water quality certification for impacts to federal waters (waters of the U.S.), or dredge and fill WDRs for impacts to non-federal waters, both issued by the Lahontan Water Board.

We request that the DPEIR recognize the potential permits that may be required for individual projects, as outlined above. Information regarding these permits, including application forms, can be downloaded from our web site at http://www.waterboards.ca.gov/lahontan/.

Thank you for the opportunity to comment on the NOP. We are encouraged that the County is taking the initiative to establish long-term planning strategies for renewable energy development. If you have any questions regarding this letter, please contact me at (760) 241-7376 (jzimmerman@waterboards.ca.gov) or Patrice Copeland, Senior Engineering Geologist, at (760) 241-7404 (pcopeland@waterboards.ca.gov).

Jan M. Zimmerman, PG
Engineering Geologist

cc: State Clearinghouse (SCH No. 2014061039)
(state.clearinghouse@opr.ca.gov)
California Department of Fish and Wildlife
(AskRegion6@wildlife.ca.gov)

R:\RB6\RB6Victorville\Shared\Units\PATRICE'S UNIT\Jan\CEQA Review\RenewEnergyPlanAmend-InyoCo_NOP.docx

The Nature Conservancy
Protecting nature. Preserving life.®

To: Cathreen Richards, Senior Planner
Inyo County Planning Department
168 North Edwards Street
Post Office Drawer L
Independence, CA 93526

Submitted by mail and electronically at inyoplanning@Inyocounty.us

Date: July 9, 2014

Subject: Comments of The Nature Conservancy on the Notice of Preparation (NOP) for the Program Environmental Impact Report (PEIR) of the Inyo County Renewable Energy General Plan Amendment (REGPA) 2013-02

The Nature Conservancy submits the following comments on the Notice of Preparation of the PEIR for the County's proposed general plan amendment for solar energy development.

Introduction

The Nature Conservancy (the Conservancy or TNC) is a world-wide conservation organization, devoted to preservation of the lands and waters upon which all life depends. The Conservancy has long focused on conservation planning and actions to protect the entire spectrum of biodiversity resources. We have actively participated in the federal Solar Programmatic Environmental Impact Statement (SPEIS) proceedings, are a formal stakeholder in the Desert Renewable Energy Conservation Plan (DRECP) process, and have commented extensively on individual renewable development project proposals. The Conservancy has engaged in land and water resource conservation in the Amargosa region of Inyo County for several decades, acquiring critical riparian habitat, supporting studies of the groundwater-dependent Amargosa River system (Figure 1), and assisting in the formation and activities of the Amargosa Conservancy, a local conservation organization. We appreciate this opportunity to comment on the content and scope of the County's pending Program Environmental Impact Report (PEIR).

The Nature Conservancy's Ecological Assessments

The Conservancy's principal focus in its desert energy work has been to provide science-based analysis to help ensure that renewable energy facilities are sited and conditioned in ways that preserve the remarkably intact yet fragile natural communities of California's Mojave and Sonoran Deserts. We have encouraged agencies and developers to avoid good

quality habitat and instead locate renewable facilities on already disturbed lands. The Conservancy conducted extensive studies to map habitat quality and other ecological values in both the Mojave and Sonoran Deserts, and published the results of these efforts as ecoregional assessments[1]. The Nature Conservancy's Mojave Desert Ecoregional Assessment (MDEA) evaluated habitat and other ecological values across the entire Mojave Desert, and included much of Inyo County in that assessment. The study ranked each square mile-sized hexagon into one of four categories: Ecologically Core habitat, Ecologically Intact habitat, Moderately Degraded habitat, and Highly Converted areas. By siting renewable facilities in either the Moderately Degraded or Highly Converted categories, these facilities have much less impact on nature.

We prepared Figure 2, which overlays the three original county-selected options (intensive, preferred, and less intensive) for proposed Renewable Energy Development Areas (REDAs[2]) on the Conservancy's MDEA habitat valuation mapping of the same areas. Most of Inyo County is in fact quite good quality habitat, and the county also has adequate disturbed land to meet most or all of its solar energy goals. The county can do this by limiting Solar Energy Development Areas (SEDAs) to the over 50,000 acres of Inyo County's Moderately Degraded and Highly Converted lands shown in the MDEA. (Table 1 contains tables listing the originally proposed solar development areas and their conservation value category in the MDEA).

In the Amargosa region, the Chicago Valley and Charleston View SEDAs each have, at most, a small area categorized as moderately degraded or converted in the MDEA. The majority of these SEDAs contain ecologically core or ecologically intact habitats. We applaud the County's revisions to its proposed open areas to eliminate several of the originally proposed areas, including Death Valley Junction, but strongly urge the County to reconsider its designation of Chicago Valley and Charleston View as development areas. Each of these areas occupy mostly MDEA core or intact habitat, provide linkages to wilderness areas, and overlie groundwater aquifers that sustain the Amargosa Wild and Scenic River and its tributaries.

Figure 3 depicts the DRECP-released landscape intactness scale overlain with the original (REDA) alternatives. While several of the SEDA areas in the currently proposed option contain areas that are lower on the intactness scale, most of those areas are adjacent to, or surrounded by, areas that are highly intact. The benefit of preserving these intact habitats is that they will serve as corridors for movement of both plants and animals now and

[1] http://scienceforconservation.org/downloads/mojave_desert_ecoregional_assessment

[2] The County recently changed its nomenclature for solar open zones from renewable energy development areas (REDAs) to solar energy development areas (SEDAs), reflecting the elimination of wind from the plan. Since the County's EIR will include an analysis of alternatives, we have included all of the previously proposed development areas in our overlay maps.

especially in the future, given the likelihood that long-term climate change will necessitate even more movement. This is particularly important when habitat connects different elevations. The existing REGPA documents could be improved by specifically addressing intactness and connectivity issues.

Groundwater

A second issue of focus for our desert energy work is groundwater. Striving to maintain fresh water flows for nature and people in the face of drought and climate change is an increasingly critical aspect of our work in California, across the US southwest, and globally. The protection of groundwater and related surface water flows—the streams, springs, seeps, and wetlands on which the survival of so much desert life depends—has been a principal concern of the Conservancy in the siting of solar plants in the Mojave, since desert renewables almost invariably depend on consumptive use of groundwater. The development of renewable energy represents a new consumptive use of water in our arid landscape, often requiring withdrawal of groundwater from already overdrafted basins. Careful regulation of water use, including compensatory mitigation for withdrawals, is both warranted and increasingly important for people and nature dependent on that water in the face of drought and likely climate change-driven long-term water shortages.

The county has long been protective of its groundwater resources, largely driven by its protracted disputes with the Los Angeles Department of Water and Power over water exports to the City of Los Angeles from the Owens River region. Groundwater resources are also at risk in the far southeast corner of the county, where the Conservancy has been working to protect water dependent species and habitats in the bi-state Amargosa River region since the early 1970s. The currently proposed version of the Inyo County Renewable Energy General Plan Amendment would open up significant expanses of land in the Amargosa watershed to large-scale solar generation, which would have to rely on pumped groundwater from overdrafted basins, risking harm to protected and sensitive groundwater dependent resources.

For planning purposes, the Conservancy recommends using the "Death Valley Regional Ground Water Flow Model Boundary" (USGS) to delineate the Amargosa Watershed (Figure 1, below). The Nature Conservancy believes that development zones within the California section of the Amargosa Watershed should be precluded. Specifically, our strong recommendation would be for Inyo County to exclude from consideration any SEDAs in the Amargosa Watershed in the REGPA due to the serious threat that development poses to protected groundwater-dependent species, for the reasons we outline below.

Desert groundwater is an exceedingly scarce, declining, and crucially important resource, often little understood – especially the subsurface hydrologic dynamics. Renewable energy pumping of groundwater is a new and likely permanent use of water; and the adverse

effects of pumping on surface water-dependent resources are often distant from the source and delayed in time so that by the time such adverse effects are detected, it is too late to stop pumping in order to save these resources.

The groundwater-dependent Amargosa River system harbors a world-class collection of listed, endemic, rare and sensitive species in both California and Nevada. With partners, The Nature Conservancy has been engaged in the conservation of this ecologically fragile system for 40 years, spending more than $8 million to plan, acquire and manage over 18,000 acres of lands, protect groundwater, and restore habitat in the Amargosa Basin. The Conservancy has done extensive conservation analysis and planning for the Amargosa that reveals the unique importance of the aquatic and riparian resources of this area. Recent federal action has confirmed our analyses: in 2009, reaches of the Amargosa River in California were added to the national Wild and Scenic River system.

The sources and paths of the groundwater that supplies the springs and river across the 3.4 million acre Amargosa River watershed have been little studied until recently. However, groundwater levels have been steadily dropping in many areas of the region, due in part to existing groundwater pumping from over appropriated aquifers in Nevada. Maintaining and protecting the perennial flow of springs – and the groundwater aquifers that supply them with water – is the single most important action that must be taken to keep this desert system, and the special status species that inhabit it, viable for the long term.

The Conservancy is concerned by the cumulative effects of groundwater pumping by proposed renewable energy facilities within both the California and Nevada region of the Amargosa Watershed. Renewable facilities located in the Amargosa basin in Nevada will pump groundwater from an already over-drafted and over-appropriated bi-state aquifer system that is linked to the Wild and Scenic Amargosa River and its vital springs, seeps and wetlands in Inyo County, California.

Understandably, the Inyo County REGPA will not include specific Nevada facilities. However, given the ecological fragility of the Amargosa watershed as a whole, and well-documented hydrological connection between the Nevada and California portions of the watershed, cumulative effects of pumping on both sides of the border should not be overlooked.

A previous development proposal in the Amargosa watershed proved to be controversial because of groundwater issues. Specifically, the California Energy Commission (CEC) proceeding to approve the Bright Source Hidden Hills power tower facility in Charleston View was suspended after hearings were concluded, with groundwater pumping by the project from the overdrafted Pahrump Valley basin a significant, unresolved issue in the proceedings. In that proceeding, Inyo County expressing deep concern about pumping proposed by the project in the absence of accurate information about regional groundwater

flows and potential effects on the Amargosa Wild and Scenic River, comments that were similar to those of the Bureau of Land Management (BLM), the Amargosa Conservancy, the Nature Conservancy and local residents.

In addition, the County took a very strong position on groundwater monitoring and mitigation and also noted that the hydrology of many groundwater basins in the southeast corner of the county was inadequately described, leading the county to apply for state Proposition 84 grant funding to determine groundwater levels and collect other information about basin hydrology in this region. That grant request was not funded, and information about the complex hydrogeology of basins in the Amargosa watershed region (including Charleston View and Chicago Valley) is still incomplete. The Nature Conservancy strongly supports the comments made by Inyo County in the Hidden Hills proceeding and believes that the same approach should be used to exclude the zoning of renewable energy facilities in these locations. Indeed, very recent groundwater geochemistry studies have identified the Pahrump Valley as a likely source of groundwater to the Amargosa Wild and Scenic River. [3]

Transmission

The Nature Conservancy respectively requests that the REGPA analyses further consider transmission issues as they relate to the proposed SEDAs. For example, for the Charleston View SEDA, the assumption is made that this area would supply up to 400 megawatts of solar power from 2400 acres or less. However, this energy would have to be conveyed through newly constructed transmission lines into Nevada. The analysis would benefit from a discussion of the likelihood that these lines would be built, and the timing of their construction[4].

Coordination with the Desert Renewable Energy Conservation Plan (DRECP)

We applaud the county's willingness to consider where solar generation might best be sited to avoid adverse ecological effects in its broad geographic realm, and to link this work with the impending DRECP. However, the county's schedule to complete its obligations under the California Energy Commission planning grant and to produce its REGPA do not appear to be well synchronized with the DRECP process. In light of the fact that the CEC strongly

[3] Any Zdon & Associates, Inc., 2014 State of the Basin Report, Amargosa River Basin, June 28, 2014. The report included better identification, through new geochemical analyses, of sources of groundwater to springs that sustain the Wild and Scenic Amargosa River, including flows from the Pahrump Valley and Ash Meadows areas, some likely traversing through Chicago Valley. The report is unpublished, but electronic versions of the report will be furnished to the County water department and additional copies are available from the Conservancy upon request.

[4] The Hidden Hills plant would have required transmission across BLM lands to connect with lines in Nevada, requiring a federal Environmental Impact Statement (EIS). The BLM has not completed that EIS, nor indicated that it will be restarted.

supports integrating county plans with the DRECP process, we recommend that the county seek a delay from the CEC in completing the County's grant obligations. This would provide sufficient time for the Board of Supervisors to complete action on this PEIR, with a full consideration of alternatives proposed by DRECP process.

Thank you for the opportunity to comment. We look forward to working with the county as the REGPA process moves into later stages.

Sincerely,

Laura Crane
Director, California Renewable Energy Initiative
The Nature Conservancy
lcrane@tnc.org
(415) 418-6513

Figure 1 – Amargosa watershed (Death Valley Regional Flow System)

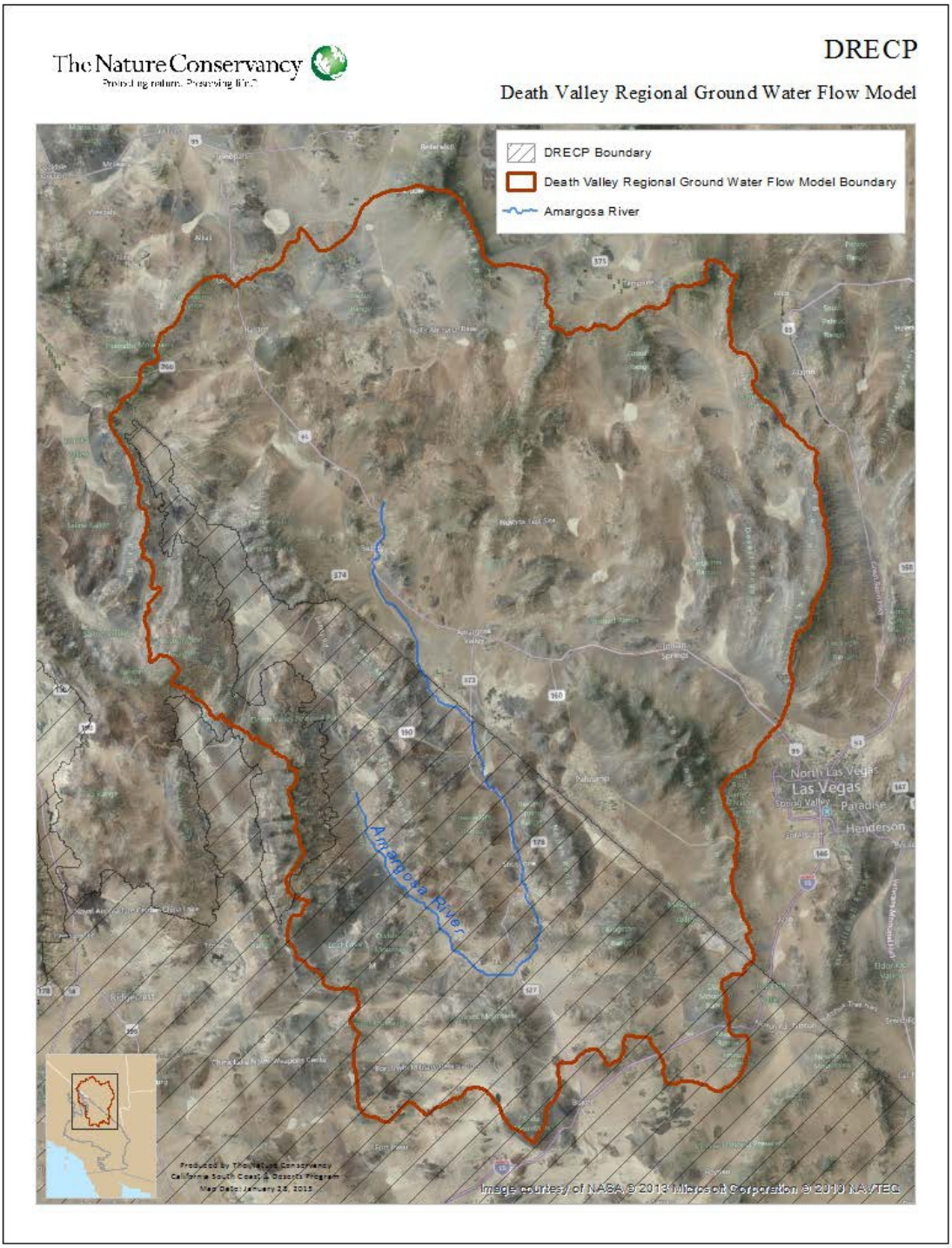
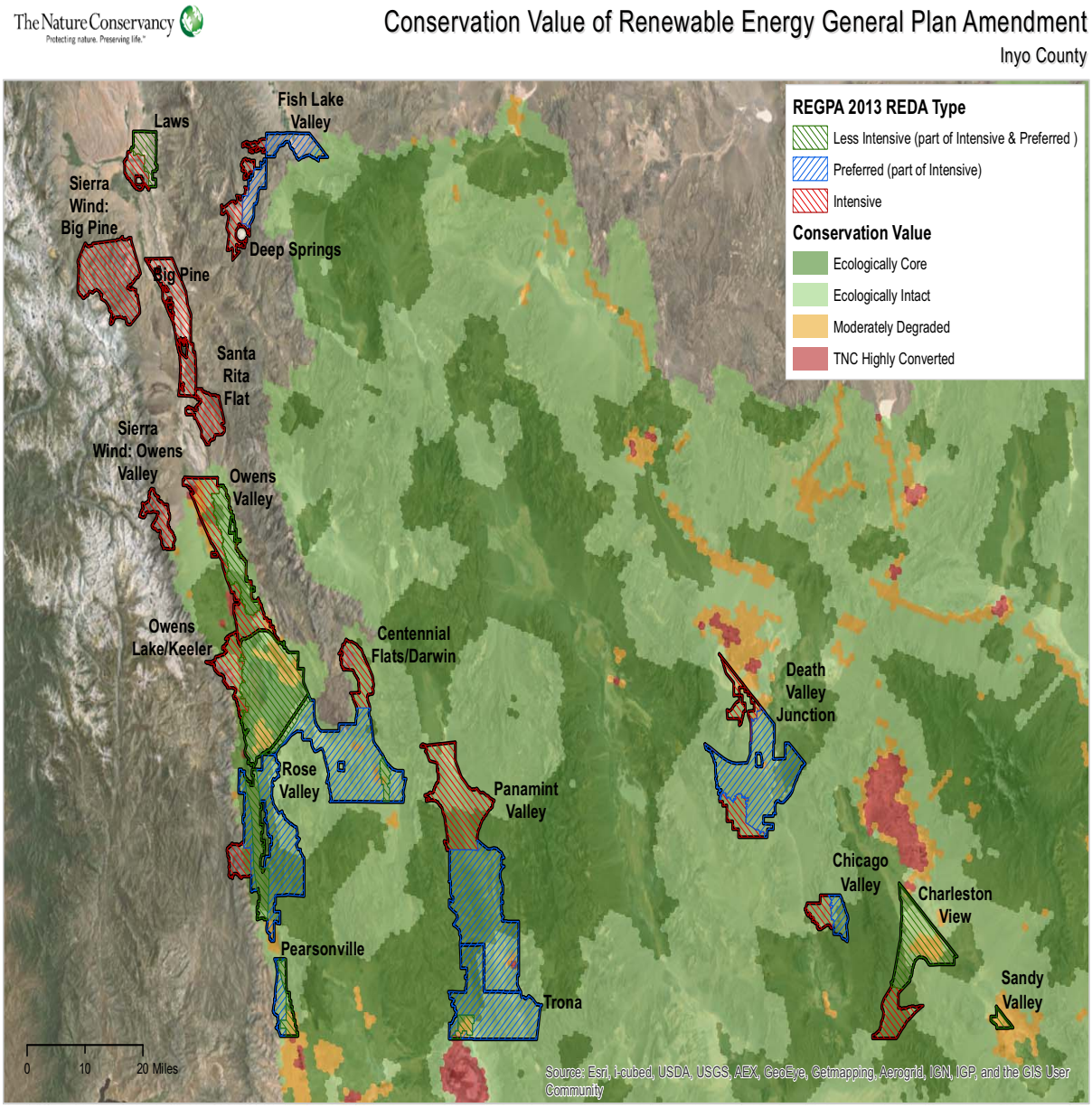
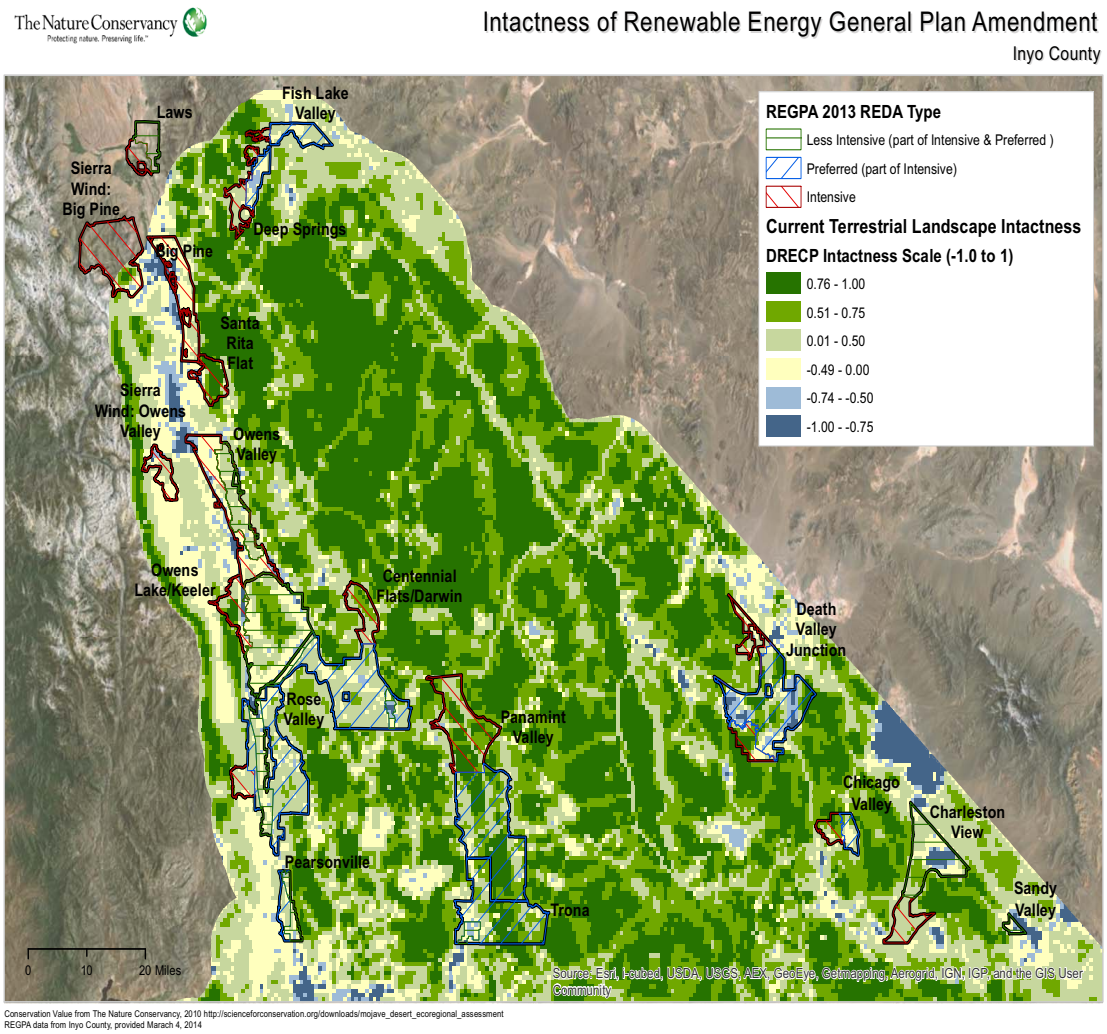


Figure 2 - Overlay of original REDA (SEDA) areas with TNC conservation values



Conservation Value from The Nature Conservancy, 2010 http://scienceforconservation.org/downloads/mojave_desert_ecoregional_assessment
REGPA data from Inyo County, provided Marach 4, 2014

Figure 3 - Overlay of original REDA areas with DRECP intactness values



Conservation Value from The Nature Conservancy, 2010 http://scienceforconservation.org/downloads/mojave_desert_ecoregional_assessment
REGPA data from Inyo County, provided Marach 4, 2014

Table 1 – Table of TNC conservation values as compared to Inyo County REDAs

	TNC Ecologically Core				TNC Ecologically Intact				TNC Moderately Degraded				TNC Highly Converted				Area Totals
Area Name	Intensive	Preferred	Less Intensive	Total	Intensive	Preferred	Less Intensive	Total	Intensive	Preferred	Less Intensive	Total	Intensive	Preferred	Less Intensive	Total	
Centennial Flats/Darwin	70.5	1,005.2	1,636.2	2,711.9	12,745.7	73,352.9	6,851.6	92,950.2		2,691.0	503.8	3,194.7					98,856.8
Charleston View	14,042.4		13,960.8	28,003.1	1,675.1		16,094.6	17,769.7			9,642.0	9,642.0					55,414.8
Chicago Valley	414.7	5,627.2		6,041.8	8,171.3	2,332.3		10,503.6									16,545.5
Death Valley Junction		14,480.9		14,480.9	19,952.4	55,491.7		75,444.1	1,664.6	1,064.4		2,729.0					92,653.9
Fish Lake Valley						1,298.9		1,298.9		463.4		463.4					1,762.4
Owens Lake/Keeler	7,409.3		56,995.2	64,404.5	5,613.1		6,914.6	12,527.7			19,570.9	19,570.9			239.6	239.6	96,742.7
Owens Valley	13,777.8		10,246.4	24,024.2	12,858.5		14,879.0	27,737.5	6,328.9			6,328.9	1,745.9			1,745.9	59,836.6
Panamint Valley	20,670.0	67,905.3		88,575.3	31,739.4	25,010.4		56,749.8		1,278.0		1,278.0		639.0		639.0	147,242.1
Pearsonville		178.5	460.5	639.0		6,821.8	3,919.1	10,740.8		147.4	2,832.5	2,980.0			141.0	141.0	14,500.8
Rose Valley	2,874.1	48,147.5	19,705.9	70,727.5	182.8	12,837.4	1,556.8	14,576.9		1,931.6	68.0	1,999.6					87,304.0
Sandy Valley							187.2	187.2			2,910.5	2,910.5					3,097.7
Sierra Wind: Owens Valley					728.3			728.3									728.3
Trona		22,544.9	986.9	23,531.8		41,682.3	467.8	42,150.1		590.7	2,604.6	3,195.3		283.5	516.6	800.1	69,677.2
(blank)	66.8		7.7	74.5	0.3		1,617.0	1,617.3									1,691.8

Lone Pine Paiute-Shoshone Reservation
P.O. Box 747 • 1103 South Main Street
Lone Pine, CA 93545
(760) 876-1034 Fax (760) 876-8302
Web Site: www.lppsr.org

July 9, 2014

Mr. Josh Hart, Planning Director
Inyo County Planning Department

Re: Comments to the draft Renewable Energy General Plan Amendment

Mr. Hart:

Thank you for the opportunity to comment on the REGPA Program Environmental Impact Report (PEIR) preparation. We are pleased with the refinement of areas included in this document as well as the maximum cap to the available ~250 MW capacity to the Inyo-Rinaldi transmission line in any development within the greater Owens Valley and Rose Valley corridors.

The Lone Pine Tribe has participated and commented throughout this General Plan amendment process. Here, we reiterate some of the concerns for the potential development of utility-scale solar energy generation:

- Cultural landscape includes the entire region. Our people have been here for many thousands of years, living within the ecosystem without negative impact. Only since European 'contact' a mere 150 years ago have major alterations created unmitigable impacts. We strongly appeal to Inyo County to help preserve what remains of the unique character of this area.

- Southern Owens Valley continues the EPA's designation of 'serious non-attainment' for PM10 dust pollution. Utility-scale development will inevitably create additional dust pollution during development. Lessons from similar environments close to Inyo County show dust pollution to be a continuous and unmitigated problem following construction, as well. This potential should be addressed in the PEIR. Use of palliatives and water both have negative impacts for this area. Without alternatives, any new dust source control is problematic.

- Owens River restoration was a hard fought battle with the City of Los Angeles. Any energy development within this perimeter will have negative impact on the intention and health of the LORP. LADWP (water division) confirms the importance of the project and the water shed protection. The following quote is taken directly from LADWP.com website:

  The Lower Owens River Project (LORP) settles more than 24 years of litigation between the LADWP and Inyo County over groundwater pumping and water exports. This project is intended to mitigate for a host of lost environmental values in the reach of the Owens River from the Los Angeles Aqueduct Intake to Owens Lake as well as associated springs, seeps, off-river lakes, and ponds. The project is the largest restoration effort undertaken by the LADWP. It has an extensive scope and includes a geographic area 65 miles long and across the Owens Valley from the White Mountains to the Sierra Nevada Mountains. This area has been designated the Lower Owens River Conservation area and consists entirely of LADWP property. This project includes not only restoration of the river, but developing habitat connectivity with off-river habitats (numerous ponds and lakes) and thousands of acres of wetlands, riparian pasture and upland grazing management, sanctuaries for T&E bird, fish, and plant species, recreation plans, and a pumpback facility.

  Designation of "Lower Owens River Conservation area" conforms to the Owens Valley Land Management Plan (OVLMP) required by the LORP agreement and approved by the

LADWP commissioners on June 1, 2010. The power division of LADWP appeared ignorant of the legal designation of this area when proposing their "solar ranch" project. We urge Inyo County, as partner in the LORP MOU, to defend the agreement and restrictions under the OVLMP.

- DRECP draft documents identify many areas surrounding the Lone Pine and Keeler communities for energy development. The Development Focus Areas (DFA) surround LPPSR on three sides. We are in discussions concerning increased land base contiguous to the current reservation boundaries. Inyo County's support for the DFAs as designed is contrary to the needs and desires of our community.

- The table presented in the General Plan amendment establishes limits on acreage and energy for each SEDA in the western region. We are on record asking that the Owens Lake SEDA have the MW capacity cap raised to include the entire 250MW available. New construction techniques in test on the lake bed provide the potential for development on this site without the environmental impacts that would occur on relatively undisturbed ground.

We appreciate the efforts of your staff and the Inyo Board of Supervisors in incorporating the values of Inyo County residents and visitors in the General Plan.

Sincerely,

Mary Wuester

Mary Wuester, Tribal Chairperson
Lone Pine Paiute-Shoshone Reservation

401 E. Yaney St., Bishop CA 93514
(760) 873-3790/ smanning@telis.org
July 9, 2014

Planning Department
168 North Edwards Street
Post Office Drawer L
Independence, California 93526

Dear Planning Department:

Subject: Notice of Preparation (NOP) - Program Environmental Impact Report (PEIR) – General Plan Amendment 2013-02/Inyo County Renewable Energy

The notice of preparation (NOP) for the Program Environmental Impact Report (PEIR) allows the public to provide input on issues to be addressed in the PEIR. I think there are several issues to address regarding the proposed project to amend the county's General Plan to "facilitate" the building of utility-scale solar projects in Inyo County.

If the county feels the need to revise its General Plan to address the potential of solar renewable energy projects, then the new renewable energy general plan amendment (REGPA) language should emphatically state that utility-scale projects are unwelcome. If such language is not enough to discourage developers, then the revised General Plan should insist that the developer of any proposed solar project must prepare a comprehensive EIR.

If the county wishes to waste money and people's time on a PEIR, the PEIR should point out that Inyo County already contributes a huge portion of California's renewable energy in the forms of hydro and geothermal power. Abrupt changes in elevation coupled with year-round runoff water provide hydro power, and geothermal areas are not found just anywhere, but everywhere on earth has sunshine.

Inyo County is exactly the wrong place to build projects with large footprints. The obvious reason is topography. Even the County of Inyo website brags that it's home to both the highest and lowest points in the continental United States. Our mountains, valleys, and "wide open spaces" attract people from all over the world. From any particular spot, one can see a lot of places. From these vantage points, human disturbances are particularly obvious and unwelcome. Someone may write the words presented on page 7 of the proposed REGPA language, "*The County shall balance Renewable Energy Solar Facility development opportunities with the potential loss of tourist based economic opportunities from impacts to visual resources,"* but it is simply **not possible** to pay for loss of a natural view. And, pay who?? Everything should be done to protect Inyo County's viewsheds and keep them free of metal, glass, concrete, rectilinear features, towers, and other human constructs that distract the eye, mar the view, exclude people, animals, and plants, upset the soul, and deter tourists.

The proposed REGPA is based on Solar Energy Development Areas (SEDAs). Eight of these are outlined in red (on the map accompanying the NOP), and a ninth is the nebulous "Owens

Valley" shown in hatch marks. The latter has no actual outer boundary and apparently extends all the way south to the county line at Pearsonville even though not drawn that way. It is poorly defined and should be removed. None of these 9 areas should be designated as anything but Open Space and should not be considered as eligible for industrial development due to scenic/aesthetic, biological, archaeological/cultural, air quality, current land management, and other reasons.

How will a minimal effort at disclosure of potential impacts result in a useful environmental review? It is my understanding that the preparers of the PEIR do not intend to perform any field work. It has also been stated (for example at the June 25, 2014, public meeting held in Bishop), that the purpose of the PEIR is to streamline any later environmental review that would be needed for specific projects. If the PEIR is based on lack of information, it will have little or nothing to disclose to the public. I think this is intended for the purpose of sugar-coating the REGPA and making it easier for county officials to adopt and implement. However, future project proponents will use the lack of findings to assume all that stands between them and development is a minimal CEQA document, such as a Mitigated Negative Declaration or an amendment to the PEIR. The same tactic was used with the EIR on the Inyo/LA Water Agreement. The 1991 EIR is a program level EIR, and now projects agreed to by the county and Los Angeles Department of Water and Power, such as the resolution to the Blackrock 94 dispute, require such minimal CEQA analysis that there is not even a formal public comment period. The way the county is pursuing the REGPA is similarly flawed and destined to lead to many problems in the future, especially for the undisclosed resources occupying the 9 SEDAs.

The project description (in the NOP Attachment 1) is flawed and does not reflect extensive public comment to date. Why would Inyo County offer onto the chopping block -- and risk losing -- its own incredible and non renewable resources simply to export so-called renewable energy out of the area? Inyo County need not accept any further adverse environmental impacts due to exploitation of its natural resources (typically by others in distant places). The goal of any new planning policy that allows development should always be to **avoid** significant adverse impacts. Potential impacts of utility-scale solar facilities would need to be considered cumulatively, fully taking into consideration the ecological destruction already inflicted on Owens Valley due to water diversions by the City of Los Angeles Department of Water and Power. These impacts include desiccation of a huge and ecologically significant lake. Ongoing diversions and groundwater pumping have destroyed springs, seeps, other wetlands, and unique groundwater-dependent plant communities such as alkali meadow. These impacts were imposed by non residents who regard their needs as more important than ours, and who will go to extreme measures to take resources. A PEIR should point out what I hope Inyo County has learned: parts of our county have already been decimated by exploitation in the name of resource extraction and exportation. Inyo County must stop being taken advantage of.

The PEIR needs to present and evaluate meaningful project alternatives for the future of solar energy generation in Inyo County. The county has the ability, funding, and (I hope) desire to formulate a policy on renewable energy that truly protects our own regional resources, which we need for our own, as well as the world's, future. There are alternatives to the proposed project as presented in the NOP, and there are people who are willing to work with county staff and leaders to craft a meaningful and visionary plan for any additional renewable energy in Inyo County. In

the view of many, a General Plan Amendment should focus on thoughtful placement of energy generation within our own small but potentially powerful **built** environments (towns). As alternatives to the proposed project, please consider incentives for roof top or parking lot solar panels and seek ways to make this affordable and meaningful to people who live, work, and visit in Inyo County. Please keep or fortify (if necessary) the Open Space designation so it discourages industrial development.

Keep in mind that "renewable" is actually a relative term. Water is a renewable resource at the scale of Earth, but in Owens Valley, where it is exported faster than it's replenished, for those of us who live here (including the plants and animals), it is not renewable in our lifetime. The PEIR needs recognize scale, and "renewable" needs to be defined at the local and regional scale, not the world scale. With regard to electrical energy, the impacts due to development of remotely produced renewable energy are not noticed by those at the receiving end of the electrical wire, but if we – Inyo County -- pursue this course, we and all generations after us pay the ugly price. Our landscapes, clean air, agricultural economy, cultural history, and other resources that draw visitors will be damaged by industrialization, and so will our economy.

Proposed new language for the General Plan (in the document called DRAFT REGPA Update) has some language that is contradictory but which threatens the citizens and taxpayers of, and all others who care about, Inyo County. On page 2, under New Land Use Implementation Measures, item 2 says, "*The County shall consider seeking compensation for the loss of revenues from potential Renewable Energy Solar Facilities that are not developed due to possible impacts on military readiness, special status species, and aesthetics, and/or other barriers to development of appropriate Renewable Energy Solar Facilities. Methods of compensation include but are not limited to Payment-in-lieu of Taxes (PILT) or similar programs.*" This language is seemingly contradicted by the statement on page 7 where the county intends to actually seek compensation from those who do attempt development that results in adverse impacts to scenic resources: "*The County shall balance Renewable Energy Solar Facility development opportunities with the potential loss of tourist based economic opportunities from impacts to visual resources.''* What do these mean? To me the REGPA says the county will seek financial compensation if you don't develop solar facilities **and** if you do develop them. Going after land owners for NOT developing (and not developing for legitimate reasons) is nonsensical, arrogant and I hope illegal. Please omit this verbiage.

Here is another reason the SEDA approach is flawed and unworkable: The SEDA Table on page 5 of the proposed new language for the General Plan is misleading. If the "megawatt cap" is adhered to, this would only apply for a point in time. However, all of the acreage in a SEDA is at risk of being developed at some point in time, just not all at once if the megawatt cap is enforced. Under this policy, solar facilities may be placed on 1,500 acres of Owens Valley to achieve the 250 MW cap. But, when the first generation technology becomes obsolete and the project goes offline, a new project may be built on other acreage in Owens Valley and replace the energy generation lost by an earlier project. In fact, this approach encourages developers to creep into new space within the SEDA. (This is sort of like "replacement wells" we have learned about with the Inyo/LA Water Agreement! They keep coming, and they extract more than their predecessors.)

The (fuzzy) Owens Valley SEDA includes lands that are by mitigation agreements between Inyo County and Los Angeles Department of Water and Power supposed to be managed

sustainably for habitat, agriculture, and recreation. They are not supposed to be developed for single purposes.

Here is yet another problem with allowing utility-scale projects and the proposed language of the REGPA: On page 6, the bar set for rehabilitation of developed lands is set extremely low ("*The County shall work with Renewable Energy Solar Facility developers to provide and implement a reclamation plan including financial assurances, such as bonding, for the termination of any Renewable Energy Solar Facility including all equipment and accessory structures related to the facility, including but not limited to solar collector arrays, mounting posts, substations, electrical infrastructure, transmission lines, operations and maintenance buildings, and other accessory structures.")* To me and to the developers, this says the developers must simply pick up their stuff. Meanwhile, the land surface and plant communities will not be restored. Dusty, barren, scarred land will remain for perhaps hundreds of years in our arid region.

With any luck, my comments have convinced Inyo County Planning to amend the General Plan to ban utility-scale solar facilities. If not, the PEIR will be difficult to prepare and present to the public in an acceptable manner. Please keep me informed about the REGPA and CEQA process.

Sincerely,

Sara J. Manning, Ph.D.

BISHOP TRIBAL COUNCIL

July 10, 2014

Planning Department
168 North Edwards Street
Post Office Drawer L
Independence, California 93526
Att: Cathreen Richards, Senior Planner

RE: Notice of Preparation (NOP) – Program Environmental Impact Report – General Plan Amendment 2013-02/Inyo County Renewable Energy

1) As a federally recognized tribal government located in Inyo County that includes much of aboriginal homeland we appreciate the opportunity to comment on this proposed general plan amendment regarding renewable energy development.

2) As hydroelectric and wind energy are not included in the amendment the renewable energy title of the amendment should be changed to solar energy.

3) Similar to addressing surficial disturbance from a mining project, the PEIR should fully address the environmental impact of projects that may exist after decommissioning. In particular it should specify specific mitigation goals that need to be achieved to reclaim disturbed land after completion of a project. This analysis should include a detailed inventory of soil and vegetation conditions before project disturbance. The environmental review should take into account the effect of long lasting soil erosion, air pollution, invasive weed issues that could potentially exist long after the project is completed should reclamation plans not be strictly enforced by the county.

4) The environmental analysis should include an analysis of cumulative effects

5) The definition of Community Scale projects state that they shall only generate electricity for the use of specified communities and only import energy as a part of a net metering plan. However it does not give a limit or proportion of the total power generated that can be exported. As the

PAIUTE PROFESSIONAL BUILDING • 50 TU SU LANE • BISHOP, CA 93514
PHONE (760) 873-3584 • FAX (760) 873-4143

amendment allows community scale projects to be constructed outside of a RGPA there would exist a potential incentive for developers to submit proposals to site these projects in environmentally sensitive areas outside RGPAs for generation for reasons other than community scale projects.

6) New economic development policy. The cumulative economic and social impacts should be thoroughly evaluated for this proposed new policy.

7) Based on unique habitat, visual and cultural resources all Utility scale solar development should be excluded from all areas within the Owens Valley and Deep Rose areas as these impacts cannot be reduced or mitigated.

If you have any questions please contact our Environmental Management Office at 760-873-3584 x 237.

Sincerely,

Dale Delgado Jr.
Tribal Chairman, Bishop Paiute Tribe

Attachment:
Comments draft DEIR Solar Ranch Project

PAIUTE PROFESSIONAL BUILDING • 50 TU SU LANE • BISHOP, CA 93514
PHONE (760) 873-3584 • FAX (760) 873-4143

BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY
Big Pine Paiute Indian Reservation
P.O. BOX 700 · 825 SOUTH MAIN STREET · BIG PINE, CA 93513
(760) 938-2003 · FAX (760) 938-2942
www.bigpinepaiute.org

July 10, 2014

Inyo County Planning Department
PO Drawer L
168 N. Edwards Street
Independence, CA 93526

RE: Scoping Comments for the Program Environmental Impact Report for the Inyo County Renewable Energy General Plan Amendment

Dear Planning Department:

The Big Pine Paiute Tribe of the Owens Valley (Tribe), a federally recognized Tribe, submits the following comments regarding the *Program Environmental Impact Report (PEIR) for the General Plan Amendment 2013-02/Inyo County Renewable Energy.*

SB 18 Consultation

The Tribe would like to thank Supervisor Tillemans and Josh Hart and Cathreen Richards of the Planning Department for participating in two SB 18 government to government consultation meetings at the Big Pine Tribal Council Chambers on February 13, 2014, and June 9, 2014. Consultation is on-going as the review process for the proposed Renewable Energy General Plan Amendment (REGPA) continues. The Tribe desires additional consultation on this issue and requests that the Board of Supervisors schedule another meeting.

Previous Comments to be Incorporated into Scoping Comments for the PEIR

Attached are two previous letters sent to the Inyo County Planning Commission (2/19/14) and the Inyo County Board of Supervisors (3/20/14) regarding the proposed REGPA. These letters should be incorporated as part of the Tribe's comments during the California Environmental Quality Act's Notice of Preparation comment period.

PEIR Must Adequately Analyze Potential Significant Impacts and Cumulative Impacts

The PEIR needs to disclose and analyze the potential environmental impacts that may occur due to amending the county General Plan to address solar energy development in enough detail so that impacts can be reasonably known. The PEIR cannot be used as a "first tier" environmental document if a superficial analysis is used. For example, on page 9 of the NOP Attachment 1 under *Cultural and Historic Resources* it is stated: "The SEDAs included in the REGPA will be evaluated at a programmatic level for impacts to cultural resources." A "programmatic level" of evaluation should include standard record checks for past archeological surveys and reports, relevant pedestrian archaeological surveys and an ethnographic report with contemporary interviews with Native Americans relating to ethnographic landscapes. The massive scale of this project involving thousands of acres in Inyo County requires this level of detail for the PEIR.

Small-scale Renewable Energy Solar Facility Alternative

The *Small-scale Renewable Energy Solar Facility Alternative* needs to be included in the PEIR, defined as "A facility that uses renewable solar resources to generate energy for on-site use such as roof-top or ground mounted photovoltaic panels." This alternative would greatly increase awareness and implementation of Distributed Generation solar energy production for individual, public, and commercial use.

SEDAs Do Not Meet Inyo County's Own Criteria for Utility-Scale Solar Development

No utility-scale solar energy power plants are feasible in Inyo County because industrial developments would violate the screening criteria *developed by Inyo County*. The NOP Attachment 1 page 3 suggests the county desires to avoid designating SEDAs where "potentially, critical habitats, military concerns, cultural and historic resources, and scenic resources" occur. On page 6 of the NOP Attachment 1, it's stated that "the presence of biological and cultural attributes" and "visual resources" were criteria used to restrict designation of SEDAs, while "Areas given special consideration as SEDAs include degraded lands such as brownfields, mines, landfills...".

The Tribe has studied the areas proposed for SEDAs, and they are not consistent with the county's own exclusion criteria, and they *are not* on degraded lands. Utility scale solar developments on any of the SEDAs or the Owens Valley study area would create significant impacts which could not be mitigated to a less than significant level. Utility scale solar projects will have significant adverse impacts on the ethnographic landscapes and scenic resources in Inyo County which can't be mitigated.

Comments on proposed SEDAs

The *Laws* and *Owens Lake* SEDAs are part of the Owens Valley Paiute Ethnographic Landscape and any utility scale solar development in these areas will desecrate this cultural resource. The Laws area also contains irrigated agriculture, active monitoring for effects of groundwater pumping, groundwater-dependent and riparian vegetation, and mitigation projects that are required as part of the Inyo-Los Angeles Water Agreement.

Utility scale solar development in the *Rose Valley* SEDA would desecrate a significant Shoshone/Paiute cultural landscape which is part of a regional complex of cultural resources such as Coso Hot Springs and the Coso Rock Art National Historic Landmark.

Utility scale solar development in the *Charleston View* SEDA would significantly impact the Pahrump Paiute Ethnographic Landscape and the Old Spanish Trail, a National Historic Trail, to a level which can't be mitigated. This was clearly stated in the Staff Reports of the California Energy Commission for the Hidden Hills Solar Project located within the proposed Charleston View SEDA.

The Pearsonville, Trona, Sandy Valley, and Chicago Valley SEDAs are not on disturbed lands and/or would impact visual resources.

Owens Valley Study Area Needs to Be Eliminated

Any utility scale industrial solar development in the Owens Valley would desecrate the Owens Valley Ethnographic Landscape and impact visual resources to a degree which can't be mitigated. For a multitude of reasons, there was almost unanimous opposition to any utility scale solar development during public meetings in Inyo County regarding the proposed REGPA; thus no study is needed, and no utility scale solar development should occur there. This unique and powerful landscape needs to be preserved for present and future generations.

Issues with DRAFT REGPA Update Document

In the New Land Use Implementation Measures it states that the "County shall consider seeking compensation for the loss of revenues from potential Renewable Energy Solar Facilities that are not developed due to possible impacts on military readiness, special status species, and/or other barriers to development of appropriate Renewable Energy Solar Facilities." This measure shall force private land owners to either develop their lands for solar projects or pay Inyo County for the right to not develop their lands for solar projects. This measure is not consistent with other elements of the General Plan and should be eliminated from consideration. In addition to not being consistent with other elements of the General Plan, this measure is not consistent with the thresholds for significant impacts to Biological Resources proposed for the PEIR on page 8 of the NOP Attachment 1, which states that it will evaluate the SEDAs and "minimize or exclude" resource areas which "may accommodate rare, endangered, and sensitive plant and animal species."

Renewable Energy is defined in the DRAFT REGPA Update Document, but since the REGPA is limited to solar energy development, the use of the term renewable energy is misleading. This General Plan Amendment has been limited in scope by the Board of Supervisors to look solely on solar energy development so terminology needs to be modified reflecting the desires of the Board of Supervisors. In addition, the solar energy development potential of Inyo County needs to focus on Distributed Generation and Community-Scale Solar Facilities since those are the two appropriate approaches to solar energy development facilities.

Conclusion

The Tribe has consistently shared that utility scale renewable energy development is not the best approach to meeting the energy needs of the world. Our people recognize that the decisions we make have the ability to impact generations which come after us so we are taught to plan how our actions today influence the quality of life seven generations to come. Sacrificing large areas of land today for utility scale energy development projects with an operational life of 20 years will meet short term goals but defer the long term consequences to future generations. The Tribe would like to see Inyo County develop and implement policies that are sustainable over the long term.

Please contact Tribal Historic Preservation Officer Bill Helmer if you have questions about these scoping comments. The Tribe looks forward to future consultation regarding the REGPA and the PEIR.

Sincerely,

Genevieve A. Jones

Genevieve Jones
Tribal Chairwoman

Attachments

BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY
Big Pine Paiute Indian Reservation

February 19, 2014

Planning Commission
168 N. Edwards St.
Post Office Drawer L
Independence, CA 93526

RE: Request for continued Government to Government Consultation (per SB 18) on the draft Renewable Energy General Plan Amendment (REGPA) (GPA 2013-02) and comments on the draft REGPA.

Dear Planning Commission:

The Big Pine Paiute Tribe of the Owens Valley (Tribe) held its first SB 18 consultation meeting regarding the latest proposed Renewable Energy General Plan Amendment (REGPA) with Supervisor Tillemans and Inyo County (County) planning staff Josh Hart and Cathreen Richards on February 13, 2014. As a part of the SB 18 consultation, Inyo County hired Shelly Davis-King to facilitate appropriate consultation between the Tribe and County. With public comment due for the Planning Commission packet in a few days, Ms. Davis-King has not completed recommendations for appropriate measures in moving forward with consultation. It is premature for the Planning Commission to proceed with a recommendation on the draft REGPA at its February 26, 2014, meeting because consultation obligations have not been fulfilled. The county set an unrealistically short timeline for receiving comments on the staff recommendations for the REGPA before the scheduled Planning Commission meeting.

Although the Tribe has had only a limited amount of time to review the information, the Tribe notes that all three REGPA alternatives in the staff report adversely impact Cultural and Historic Resources as well as Scenic Resources. Native American traditional cultural landscapes will be desecrated by industrial solar and wind projects if any of the proposed alternatives are adopted or pursued.

The Tribe recommends the Distributed Generation Alternative *(Distributed Generation - facilities that generate less than 20 megawatts)* be explored further as a possible preferred alternative in ongoing consultation between the County and Tribe. The Distributed Energy Alternative was not recommended by planning staff (Alternative 13 [page 47 in the Staff Report for the REGPA]) despite the strong support this approach received from stakeholders and Inyo County citizens. Typically, distributed generation solar facilities would be built for local use and benefit, and they have the potential to provide many more job opportunities for local residents than industrial solar projects.

The Tribe respectfully requests the Planning Commission postpone action on the latest proposed REGPA and continue to engage in meaningful government to government consultation with the Tribe until it is agreed that the consultation obligation has been fulfilled.

Sincerely,

Jacqueline Gutierrez
Tribal Vice Chairperson

cc: Inyo County Board of Supervisors

Big Pine Tribal Office
P.O. Box 700 • 825 South Main Street • Big Pine, CA 93513
Phone: 760-938-2003 • Fax: 760-938-2942

BIG PINE PAIUTE TRIBE OF THE OWENS VALLEY
Big Pine Paiute Indian Reservation
P.O. Box 700 • 825 South Main Street • Big Pine, Ca 93513
Office No. (760) 938-2003 • Fax No. (760) 938-2942

March 20, 2014

Inyo County Board of Supervisors
Board of Supervisors Room
P.O. Box N
224 North Edwards St.
Independence, CA 03526

RE: Request for continued Government to Government Consultation (per SB 18) on the draft Renewable Energy General Plan Amendment (REGPA) (GPA 2013-02) and comments on the draft REGPA.

Board of Supervisors:

The Big Pine Paiute Tribe of the Owens Valley (Tribe) would like to schedule an SB 18 consultation meeting with representatives of Inyo County regarding the proposed Renewable Energy General Plan Amendment (REGPA). This is a follow-up SB 18 consultation meeting which occurred on February 13, 2014, in the Big Pine Paiute Tribal Council Chambers. This productive first meeting on February 13, 2014, was attended by Supervisor Tillemans and Inyo County Planning staff, and Big Pine Tribal Council members Genevieve Jones (Chairwoman), Danelle Gutierrez (Vice-Chair), Roberta Hunter (Secretary), as well as Big Pine Tribal Council staff.

The Tribe would like to invite Supervisor Tillemans and Inyo County Planning Staff to meet on Friday, March 28, 2014, 5:30 p.m., at the Big Pine Paiute Tribal Council chambers. Although SB 18 Guidelines state that " [SB 18] *Consultation must be concluded prior to the formal adoption or amendment of a general plan or specific plan"(*11/14/2005, p.18), the SB 18 Statute states: "SECTION 1. (a) The Legislature finds and declares all of the following: …Establish *meaningful* consultations between California Native American tribal governments and California local governments *at the earliest possible point in the local government land use planning* process so that these places [see 6. Below] can be identified and considered" (SB 18, Section 1(b)(2), italics added for emphasis). It follows that the "land use planning process," which in this case is the Programmatic Environmental Impact Report (PEIR) for the REGPA, required by the California Environmental Quality Act (CEQA), be implemented in coordination with tribal SB 18 consultation. In respect of this, the Tribe recommends that the Inyo County Board of Supervisors (BOS) refrain from approving the contents of a draft REGPA at its April 1, 2014 meeting until more consultation with the Tribe has been conducted.

The following items need further discussion between the Tribe and Inyo County:

1. The need for including a Distributed Generation Alternative in the draft REGPA for local projects and job creation. The Planning Commission ignored this request for inclusion in the range of alternatives for the draft REGPA.

2. In the letter from the Tribe to the Inyo County Planning Commission (dated February 19, 2014 and copied to the BOS, see attached), it is stated: "Native American traditional cultural landscapes will be desecrated by industrial solar and wind projects if any of the proposed alternatives are adopted or pursued." This statement will be further validated by using the County's own criteria for excluding Traditional Cultural Landscapes, cultural resources, and areas with scenic values from the proposed REDAs.

A mutual goal should be to implement what is in the SB 18 statute, including:

> *(3) Establish government-to-government consultations regarding potential means to preserve those places, determine the level of necessary confidentiality of their specific location, and develop proper treatment and management plans.*
>
> *(4) Ensure that local and tribal governments have information available early in the land use planning process to avoid potential conflicts over the preservation of California Native American prehistoric, archaeological, cultural, spiritual, and ceremonial places.*
>
> *(5) Enable California Native American tribes to manage and act as caretakers of California Native American prehistoric, archaeological, cultural, spiritual, and ceremonial places.*
>
> *(6) Encourage local governments to consider preservation of California Native American prehistoric, archaeological, cultural, spiritual, and ceremonial places in their land use planning processes by placing them in open space.*
>
> *(7) Encourage local governments to consider the cultural aspects of California Native American prehistoric, archaeological, cultural, spiritual, and ceremonial places early in land use planning processes* [SB 18 (Section 1(b)].

The Big Pine Paiute Tribe of the Owens Valley agrees on the importance of renewable energy and its development according to sustainable and environmentally-sound strategies. It is hoped that further consultation can help us achieve this mutual goal.

Sincerely,

Genevieve Jones

Genevieve Jones
Tribal Chairwoman

cc: Inyo County Planning Commission

Board of Supervisors
Inyo County
PO Box N
Independence, CA 93526

July 10, 2014

Submitted via email: jhart@inyocounty.us, crichards@inyocounty.us larcularius@inyocounty.us, jgriffiths@inyocounty.us, supervisor.pucci@gmail.com, mtillemans@inyocounty.us, mkingsley@inyocounty.us

Re: Inyo County Renewable Energy General Plan Amendment

Dear Inyo County Board of Supervisors,

Thank you for the opportunity to comment on the Renewable Energy General Plan Amendment (REGPA). For 28 years Friends of the Inyo (FOI) has been the local leader for public lands conservation and stewardship in the Eastern Sierra. We have grown from a group of concerned citizens into a strategic non-profit with an active membership of over 600, a diverse and engaged Board of Directors, and a strong partnership network. Friends of the Inyo has also engaged the public effectively in understanding the processes of land management and decisions influencing recreational, social and ecological resources of the Eastern Sierra. Our comments represent a broad based constituency.

FOI is actively involved in renewable energy issues in the Eastern Sierra. We advocate for the protection of public lands from large-scale energy development (>20MW), which includes the impact to public land viewscapes, natural resources and recreation opportunities. We support a small-scale renewable energy plan and greatly appreciate the changes the county made in April, based upon public comment, to the REGPA.

However, it is still unclear whether the renewable energy plan for Inyo County will negatively impact our rural economy, which is fueled primarily by tourism dollars. Additionally, several proposed locations may significantly impact native species of plants and wildlife, as well as other natural resources. Other proposed locations have cultural and historical implications, as have been noted in past public comment letters. There are many potential locations, such as the previously disturbed lands around Laws, where solar infrastructure may be a good fit. Locations with demonstrated impacts to ecological and cultural resources need to be removed from consideration.

The REGPA will require a careful planning process in order to adequately assess the viability and potential impacts to each identified locale. All resources that make the

Eastern Sierra the special and unique place it is need attention throughout the planning process. It is of the utmost importance that renewable energy planning contain directives outlining the process of biological and cultural inventories at each proposed location, as well as details a process for not only identifying, but also implementing, meaningful mitigations to address any impacts to recreational, cultural, ecological or social resources. Impacted resources include not just those within the direct project location, but also those resources on adjacent public lands. Friends of the Inyo will be submitting more detailed comments during the DEIS phase of the REGPA. We look forward to working with Inyo County staff and members of the public to help the county make well informed choices when siting projects. This includes, but is not limited to, siting projects near existing transmission lines and on previously disturbed land.

Sincerely,

Jora Fogg
Preservation Coordinator
jora@friendsoftheinyo.org

Daniel Pritchett
401 East Yaney St.
Bishop, CA 93515
July 10, 2014

Inyo County Planning Depart
P.O. Drawer L
168 N. Edwards St.
Independence, CA 93526

Dear Planning Department:

Please find below scoping comments for the Programmatic EIR for the Renewable Energy General Plan Amendment.

1) The underlying premise for the proposed REGPA, as explained repeatedly by county leaders in early 2014, is that industrial-scale solar may be forced upon Inyo County, and the best way to deal with this is to sacrifice certain areas i.e. circumscribe REDAs/SEDAs, in order to protect other areas. This premise is debatable, to say the least.

The current business model used by electric utilities is one of industrial-scale generation facilities sited in rural areas generating power that is transmitted long distances to consumers in large urban areas. There is abundant evidence that this business model is failing. According to Barrons (http://blogs.barrons.com/incomeinvesting/2014/05/23/barclays-downgrades-electric-utility-bonds-sees-viable-solar-competition/) Barclays recently downgraded the entire electric sector of the U.S. high-grade corporate bond market because electric utilities' business model is being undercut by the declining cost of residential scale solar photovoltaic power combined with residential power storage. The Barrons analysis found the cost of residential-solar-with-storage is already competitive with the cost of grid power in Hawaii, and found the cost in California may become competitive as soon as 2017. According to Barrons, there has never before been an alternative to grid power which is truly cost-competitive, and the advent of this competition could "reconfigure" the organization and regulation of the electric power business.

Given this failing business model, combined with overwhelming public opposition to sacrificing any part of Owens Valley for industrial-scale solar, the last thing the PEIR should do is facilitate the establishment of industrial-scale solar generation plants in Owens Valley or, for that matter, anywhere in Inyo County. Instead, the PEIR should should focus on facilitating residential-scale solar and helping make the county self-sufficient in electricity. According to Bill Powers (http://solardoneright.org/index.php/site/about/) this goal would be easily attainable using existing rooftops and parking lots, and would probably lower residential energy bills.

To protect the county from industrial-scale solar, the PEIR should rigorously apply the same exclusionary criteria the public identified -- but the planning department ignored -- in the REDA/SEDA planning process i.e. "Sensitive Species areas", "Cultural and Historic Resources", "Scenic Resources", "Manzanar historic landscape viewshed", and "Tie in with economy that is based on non-industrial landscape". A final exclusionary criteria (repeatedly raised by the public but ignored by the planning department) should also be applied: "non-urban DWP lands subject to the land management plans required in the MOU to the 1997 MOU to the Inyo-LA Long Term Water Agreement EIR." The PEIR should not allow development of industrial-scale solar in any area meeting any of these exclusionary criteria. This is the simplest way to develop a REGPA which the public will support.

2)Eliminate the Owens Valley "non-SEDA," with its fuzzy "non-boundaries" shown with hatch marks in the Figure 1 "Location Map" (http://www.inyoplanning.org/projects/documents/InyoCounty_NOP_project_locator_052814_landscape_edit.pdf). Public opposition to including even a portion of Owens Valley in a REDA was overwhelming. The Owens

Valley “non-SEDA” shown in Figure 1 would allow 250 MW of industrial-scale solar not only in the originally-proposed REDA but also in a much larger area. This is a terrible idea and should be abandoned.

3) If the terrible idea of Owens Valley being opened to 250 MW of industrial-scale solar is not abandoned, there must be an accurate map showing exactly what areas are being proposed for being open to industrial-scale solar development. At the Bishop scoping meeting it was explained that the hatch marks in Figure 1 are meaningless. Presenting a map with meaningless content reflects poorly on the professionalism of the Planning Department and is insulting to the public. If the Planning Department has already determined that there are appropriate sites to support 250 MW of industrial-scale solar in Owens Valley it has an obligation to disclose precisely where the appropriate sites are. Without this disclosure meaningful public comment is impossible.

On the other hand, if the Planning Department has not already identified appropriate sites for up to 250 MW of industrial-scale solar in Owens Valley it has no business including Owens Valley in a 250 MW solar cap, because the cap pre-supposes the existence of suitable sites for industrial-scale solar in Owens Valley, and there is abundant evidence no such sites exist.

My concern is that a political decision has already been made to allow 250 MW of industrial-scale solar in Owens Valley notwithstanding overwhelming public opposition and notwithstanding the lack of suitable sites. This is not planning, it is coercion and an abuse of public trust. The Planning Department is supposed to work *for* the public, not against it.

4) The PEIR should prohibit any development of industrial-scale solar on DWP non-urban land subject to land management plans required in the 1997 MOU to the Inyo-LA Long Term Water Agreement EIR. When this comment was made in the REDA process, the Planning Department responded that some of this land is disturbed and the public supported development of solar in disturbed areas. This argument misses the point. The land management plans are partial mitigation for impacts of the second barrel of the Aqueduct. Whether or not the land is disturbed does not affect their status as mitigation, nor does the fact that some members of the public said disturbed land may potentially be acceptable for solar.

The issue is good faith. As a signatory to the MOU, Inyo County has a good faith obligation to insure that the MOU's mitigation goals are realized. Opening the land for industrial-scale solar is antithetical to realizing that goal. The fact that the Planning Department may be unhappy with the county's obligation to honor the MOU goals does not relieve the county of its obligation to honor the MOU goals. If the Planning Department wishes to include any of this land in planning for industrial-scale solar, the county should first reach agreement with the other MOU parties and then modify the MOU accordingly.

Thank you for considering these comments.

Sincerely,
Daniel Pritchett

VIA ELECTRONIC MAIL AND U.S. MAIL

July 10, 2014

Inyo County Planning Department
P. O. Drawer "L"
Independence, CA 93526
Email: inyoplanning@inyocounty.us

Re: Scoping Comments on Inyo County's Renewable Energy General Plan Amendment

Dear Planning Department:

These comments are submitted on behalf of the Center for Biological Diversity (Center) and the Sierra Club regarding Inyo County's proposed General Plan Amendment for Renewable Energy process. Via this process, the County proposes to adopt a General Plan Land Use Designation Overlay ("Overlay") that would steer renewable energy development into the adopted zones. We support the County's efforts to begin a rational process of planning for renewable energy development on private and public lands within the County. Continued work is needed, including site-specific biological and cultural surveys, to ensure that this planning process will have the desired results and that the development of renewable energy in Inyo County is properly sited to avoid significant impacts to environmental resources to the greatest extent feasible.

At the Center for Biological Diversity, we believe that welfare of human beings is deeply linked to nature – to the existence in our world of vast diversity of wild animals and plants. Because diversity has intrinsic value, and because its loss impoverishes society, we work to secure a future for all species, great and small, hovering on the brink of extinction. We do so through science, law and creative media, with a focus on protecting lands, waters and climate that species need to survive. We want those that come after us to inherit a world where the wild is still alive. Many of our 775,000 staff, members and on-line activists in California and throughout the United States, know and enjoy the biological diversity and world class landscape of Inyo County.

The Sierra Club, which is a national nonprofit organization of approximately 2.5 million members and supporters (over 380,000 who live in California) dedicated to exploring, enjoying,

and protecting the wild places of the earth. Our concerns encompass protecting our lands, wildlife, air and water while at the same time rapidly increasing use of renewable energy to reduce global warming. While we work vigorously to create a clean energy future, including championing tax incentives and renewable portfolio standards for utility-scale renewable energy projects, we also believe this transition must be sustainable. To that end we devote considerable resources to engage in landscape-level energy planning efforts in California to designate some areas for large-scale renewable energy projects while protecting areas with high biological value from development. We support the County's efforts to develop a comprehensive renewable energy planning process in Inyo County which respects the County's unique and irreplaceable conservation resources, and will continue to participate in developing a strong plan to safeguard those resources.

.Because renewable energy is an incredible tool for reducing carbon emissions and other damages done to the environment by the excavation, transport, and burning of fossil fuels, we strongly support the development of renewable energy as a critical component of efforts to reduce greenhouse gas emissions, avoid the worst consequences of global warming, and to assist California in meeting carbon emission reductions. We particularly support planning efforts to ensure that projects are sited appropriately and include policies to support energy efficiency and conservation, residential and commercial rooftop and parking lot solar, and other distributed renewable energy projects that avoid impacts to intact habitats and wild lands. If any large-scale renewable energy projects are contemplated in the County then, like any industrial projects, those large-scale renewable energy projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitats, and should be sited in proximity to the areas of electricity end-use and existing transmission in order to reduce the need for and impacts from extensive new transmission corridors or lines and the efficiency loss associated with extended energy transmission. We promote principles to protect wildlife and wildlands, including siting projects away from areas that are important for protected plant and animal species and using the best available science to anticipate and minimize the impacts on local ecosystems. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

While the development of renewable energy on already heavily disturbed or type converted lands can is preferable to avoid and reduce impacts, recent data from the recently-constructed large-scale solar and wind projects raises additional concerns. For example, the recent USFWS report[1] on the potential attraction of avian species to solar projects – photovoltaic, power tower and trough technologies—raises particular concerns for Inyo County which provides world-class migratory bird habitat. The County will need to address this issue in its EIR in light of the fact that many of the north-south trending valleys in the County act as funnels for migratory birds and Owens lake is a major stop over on the Pacific flyway. We offer the following comments on additional issues to be covered in the Environmental Impact Report and General Plan Amendment (GPA) language below:

1 Kagan et al 2014.

I. Direct, Indirect, and Cumulative Impacts Are Significant and Need to be Adequately Identified and Analyzed in an EIR.

Because the proposed GPA may have significant direct and indirect impacts on many environmental resources including surface waters and ground water resources, air quality, open space, rare and imperiled wildlife and plant species, and cultural and visual resources, the EIR must evaluate the potential impacts from any renewable energy and other development in the Solar Energy Development Areas (SEDAs). Impacts to habitat for rare flora and fauna are significant under section 15065 and require full evaluation under CEQA. *See Mira Monte Homeowners Association v. Ventura County*, 165 Cal.App.3d 357, 363-364.

A. Impacts to Rare Species and Communities

Numerous rare, threatened and endangered species currently inhabit the proposed SEDAs or could be impacted by activities within the SEDAs that would compromise adjacent habitat upon which the species rely, including but not limited to:

Common Name	*Scientific Name*	*State/Federal/Other Status*
Desert Tortoise	*Gopherus agassizii*	*ST/FT*
Owens Tui Chub	*Siphateles bicolor snyderi*	*SE, FP/FE*
Owens sucker	*Catostomus fumeiventris*	*S3*
Owens speckled dace	*Rhinichthys osculus ssp. 2*	*SQT/*
Owens pupfish	*Cyprinodon radiosus*	*SE/FE*
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	*SE/FE*
Swainson's Hawk	*Buteo swainsoni*	*ST/MB*
Western Snowy Plover	*Charadrius alexandrinus* (Interior Population)	*SSC/MB*
Mountain Plover	*Charadrius montanus*	*SSC/PT(withdrawn)*
Le Conte's thrasher	*Toxostoma lecontei*	*SSC*
Yellow breasted chat	*Icteria virens*	*SSC*
Golden eagle	*Aquilo chrysaetos*	*FP/BGEPA*
Least Bell's Vireo	*Vireo belli pusillus*	*SE/FE*
Least bittern	*Ixobrychus exilis*	*SSC*
Mojave ground squirrel	*XeroSphermophilus mohavensis*	*ST*
Owens Valley vole	*Microtus californicus vallicola*	*SSC/BLM S*
Pallid bat	*Antrozous pallidus*	*SSC/BLM S*
Spotted bat	*Euderma maculatumf*	*SSC/BLM S*
Yuma myotis	*Myotis yumanensis*	*BLM S*
Wong's springsnal	*Pyrgulopsis wongii*	*USFS S*
Owens Checkerbloom	*Sidalcea covillei*	*SE/Cal List 1B./BLM S*
Ash Meadows buckwheat	*Eriogonum contiguum*	*Cal List 2B.3*
Preuss' milkvetch	*Astragalus preussii var. preussii*	*Cal List 1B.2/BLM S*
Charlotte's phacelia	*Phacelia nashiana*	*Cal List 1B.2/BLM S*
Creamy blazing star	*Mentzelia tridentata*	*Cal List1B.3/BLM S*
Forked buckwheat	*Eriogonum bifurcatum*	*Cal List 1B.2/BLM S*
Coyote gilia	*Aliciella triodon*	*Cal List 2B.2*

Torrey's Mormon-tea	*Ephedra torreyana*	*Cal List 2B.1*
Small flowered androstephium	*Androstephium breviflorum*	*Cal List 2B.2*
Gravel milkvetch	*Astragalus sabulonum*	*Cal List 2B.2*
Wheeler's dune broom	*Chaetadelpha wheeleri*	*Cal List 2B.2*
Wind-seed blazing star	*Mentzelia pterosperma*	*Cal List 2B.2*
Desert wing fruit	*Acleisanthes nevadensis*	*Cal List 2B.1*
Booth's evening primrose	*Eremothera boothii ssp. boothii*	*Cal List 2B.3*
Goodding's phacelia	*Phacelia pulchella var.gooddingi*	*Cal List 2B.2*
Nye milk-vetch	*Astragalus nyensis*	*Cal List 1B.1/BLM S*
Inyo County star-tulip	*Calochortus excavatus*	*Cal List 1B.1/BLM S*
Parish's popcorn-flower	*Plagiobothrys parishii*	*Cal List 1B.1/BLM S*
Crucifixion thorn	*Castela emoryi*	*Cal List 2B.2*
Tidestrom's milkvetch	*Astragalus tidestromii*	*Cal List 1B.1/BLM S*

State Designation

SE – State listed as endangered.
ST - State listed as threatened. Species that although not presently threatened in California with extinction are likely to become endangered in the foreseeable future.
FP – Fully protected
SQT – State qualifies as threatened (https://www.dfg.ca.gov/wildlife/nongame/ssc/fish.html)
S3 – State watch list (https://www.dfg.ca.gov/wildlife/nongame/ssc/fish.html)
SSC - California Department of Fish and Game "Species of Special Concern." Species with declining populations in California.

Federal Designation

FE - Federally listed as endangered.
FT - Federally listed as threatened.
BGEPA – Bald and Golden Eagle Protection Act
MB - Migratory Bird Treaty Act. of 1918. Protects native birds, eggs, and their nests.
BLM S - BLM Sensitive Species.
USFS S – US Forest Service Sensitive Species

Other

Cal List – California Rare Plant Rank
1B – Plant rare, threatened or endangered in California and elsewhere
2B – Plant rare, threatened or endangered in California but more common elsewhere

Threat Code:
. .1 - very threatened.
.2 - fairly threatened in CA.
.3 - not very threatened in CA.

The California Rare Plant Rank of 1B indicates that these species qualify for Endangered Species Act protection, but they have not yet been petitioned for protection.

In addition, migratory birds may be significantly impacted and these impacts must be fully addressed and an alternative evaluated to avoid impacts. As noted above, the recent USFWS report[2] on the potential attraction of avian species to many types of large-scale solar projects – photovoltaic, power tower and trough technologies—raises particular concerns for Inyo County which provides world-class migratory bird habitat. The County will need to address this issue in its EIR in light of the fact that many of the north-south trending valleys in the County act as funnels for migratory birds and Owens lake is a major stop over on the Pacific flyway. Indeed, the Owens Lake SEDA is coincident with Audubon's Important Bird Area (IBA)[3] and may be a particularly inappropriate site for industrial development. The impact to

2 Kagan et al 2014.
3 http://ca.audubon.org/iba/ibamaps.php

migratory bird populations and the Owens Lake IBA needs to be addressed in the EIR including evaluation of at least one alternative that avoids this critical area for migratory birds.

We know from the Hidden Hills project level surveys that desert tortoise are present in the Charleston View SEDA. The USGS modeled habitat for desert tortoise includes not only the Charleston View SEDA, but also the Sandy Valley and Chicago Valley SEDAs. The EIR must discuss impacts to this state and federally threatened and declining species and alternatives to avoid significant impacts.

The EIR will also need to address potential impacts to golden eagles, a state fully protected species and a federal species of concern protected both under the Migratory Bird Treaty Act and the Bald and Golden Eagle Act. Because of significantly declining populations of golden eagles, the U.S. Fish and Wildlife Service issued guidance March of 2010 with regards to surveying and impact analysis to golden eagles.[4] SEDAs should be designed to avoid and minimize impacts to eagles. The USFWS also released a Draft Eagle Conservation Plan[5] and, at minimum, that guidance should be required for projects in the SEDAs along with a suite of other BMPs.

The Chicago Valley SEDA overlaps dramatically with a rare plant community that is tracked by the State, known as mesquite bosque. Impacts to this rare plant community must be analyzed and an alternative should be avoided.

B. Groundwater and Hydrology Impacts

While other rare and endangered species are not directly in the footprint of the overlay zones, they may be significantly impacted by the activities in the overlay zones. Groundwater use by renewable energy projects in any of the proposed SEDAs may affect down-gradient springs, seeps and riparian areas that are critical for rare, threatened and endangered species. Impacts to down-gradient ground water resources must be clearly addressed and alternatives provided (such as limiting technologies to those that use the least water).

Current science has established that groundwater in the Pahrump Valley is hydrologically linked to the Amargosa River as well as springs in the Resting Springs and other nearby ranges. While these data are not yet published, we will submit the reports to the County as soon as they are published. The EIR will need to evaluate the impacts of any additional groundwater pumping for renewable energy in this system (Charleston View and Chicago Valley) that would affect the Amargosa River and adjacent springs and seeps.

In addition, impacts to from groundwater pumping in the other proposed SEDAs should also be analyzed in the EIR, along with alternatives and minimization and mitigation measures such as strict limits on groundwater pumping identified to protect from overdraft.

---

4 www.fws.gov/.../USFWS_Interim_GOEA_**Monitoring_Protocol**_10March2010.pdf
5 http://www.fws.gov/windenergy/eagle_guidance.html

C. Impacts to Existing Conservation Areas – Mohave Ground Squirrel

The EIR will need to evaluate the potential impacts of these zones on the Mojave Ground Squirrel Conservation Area which was designated in the Bureau of Land Management's West Mojave Plan in 2006[6] and consider alternatives to avoid this area. In fact, the Owens Lake, Rose Valley, Pearsonville and Trona proposed SEDAs all include the BLM designated Mohave Ground Squirrel Conservation Area. The Conservation Area has a one-percent allowable development cap but the County must also consider impacts from existing fragmentation and other uses. An analysis of the feasibility of the proposed SEDAs to comply with the development cap needs to be included as well as alternatives to avoid the MGS conservation area entirely.

D. Impacts to Wildlife Connectivity Corridors

The EIR will need to address crucial plant and animal connectivity issues. The Pearsonville, Rose Valley and Trona proposed SEDAs all have identified crucial connectivity corridors[7]. Sandy Valley, Charleston View and Chicago Valley proposed SEDAs all have identified crucial connectivity corridors identified by the USFWS for desert tortoise connectivity.[8] While we are unaware of any wildlife linkage studies done in the Owens Valley/Laws areas, the proposed SEDAs from Owens Lake in the north to Pearsonville in the south create the opportunity for a relatively solid band of potential development to occur - effectively impacting not only occupied habitat for threatened and endangered species, but also potentially blocking movement between the Argus, Coso and Inyo Mountains and the Sierra Nevada Range. Cutting off crucial connectivity especially in light of global climate change would be a significant impact. These impacts must be fully evaluated and alternatives developed to avoid impacts to movement corridors and support habitat connectivity.

All of these potentially significant impacts, and others, show that there is a fair argument that the proposed general plan amendment may have one or more significant effects on the environment and, therefore, an EIR must be prepared.

The EIR must provide the public with essential information with which to determine the impacts of development in the SEDAs on the environment. Identification of the resources of these areas and the likely impacts on them is needed. Full disclosure of environmental impacts of these projects must include direct, indirect and cumulative impacts from the foreseeable development including impacts to biological resources, water resources, and air quality.

II. The EIR Must Analyze a Full Range of Alternatives to Avoid Significant Impacts.

Alternatives that should be considered and fully analyzed in the EIR include, but are not limited to, alternatives that would: prioritize approval for distributed renewable energy projects that will supply local energy needs first; limit renewable energy zones to previously disturbed and/or type

6 http://www.blm.gov/ca/st/en/fo/cdd/wemo.html
7 SC Wildlands 2012 http://scwildlands.org/reports/ALinkageNetworkForTheCaliforniaDeserts.pdf
8 http://solareis.anl.gov/documents/fpeis/maps/FWS_Desert_Tortoise_Connectivity.pdf

converted private lands that do not provide habitat for sensitive species; have fewer or smaller zones to avoid sensitive resources; limit renewable energy zones to areas with existing transmission lines; strictly limit the use of surface and groundwater for renewable energy projects within the County by requiring one to one off-sets in each basin and sub-basin; and distributed generation of renewable energy in the Los Angeles basin and other areas where the power is expected to be exported. This last alternative would not only avoid impacts to the resources within Inyo County from site specific renewable energy generation but would also avoid impacts from additional transmission and other infrastructure that would be needed for these proposed zones and be more efficient by avoiding power losses from long-distance transmission. The Center requests that alternatives be included that eliminate the Owens Lake proposed SEDA and eliminate the Chicago Valley proposed SEDA and one or more other proposed SEDAs.

As the County is aware, the EIR cannot dismiss a feasible alternative without analysis and must provided sufficient information about feasible alternatives to comply with CEQA. Pursuant to CEQA and the guidelines, "public agencies shall not undertake actions concerning the proposed public project that would have a significant adverse effect or limit the choice of alternatives or mitigation measures, before completion of CEQA compliance." CEQA Guidelines § 15004(b)(2). In particular, an agency shall not "take any action which gives impetus to a planned or foreseeable project in a manner that forecloses alternatives or mitigation measures that would ordinarily be part of CEQA review of that public project." CEQA Guidelines § 15004(b)(2)(B).

As noted above, the time for complete CEQA review is now, when environmental considerations still can inform the County's planning decision for the proposed GPA, and before the County takes any step that could foreclose any potential alternatives or mitigation measures. *Laurel Heights I*, 47 Cal.3d at 394-95; CEQA Guidelines § 15004(b)(2)(B). It does not matter for purposes of CEQA that the County, the BLM, or any other public agency may need to render some later decision with regard to any site specific projects. *See Fullerton Joint Union High Sch. Dist. v. State Bd. of Educ*., 32 Cal. 3d 779, 795 (1982). The County cannot defer evaluation of environmental impacts of this planning decision until after the proposed GPA is approved or skirt the required procedure for public review and agency scrutiny of potential impacts. *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 307-09.

Site specific surveys should be conducted for the EIR so that alternatives to avoid the likely impacts can be properly developed and analyzed and minimization and mitigation measures formulated. Leaving surveys, alternatives analysis, and formulation of mitigation measures to a future time undermines the purpose of CEQA including public participation and review by other agencies before project approval. The EIR must identify and analyze the many impacts to resources until site specific projects are proposed. Because for many of the SEDAs little data exists on the biological resources, surveys should be done at the planning stage, prior to consideration of the proposed GPA in order to comply with CEQA because those surveys could find sensitive resources that, were their presence known before project approval, would lead the County to adopt a different alternative, change the size or lay out of some of the area, or otherwise change the decision.

CEQA requires that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. *See* Public Resources Code § 21002.

III. Specific Comment on Draft REGPA Language

The scoping information also included proposed language for the REGPA. Our specific comments on the proposed language is as follows:

Under "New Land Use Implementation Measures"

> "2. The County shall consider seeking compensation for the loss of revenues from potential Renewable Energy Solar Facilities that are not developed due to possible impacts on military readiness, special status species, and aesthetics, and/or other barriers to development of appropriate Renewable Energy Solar Facilities. Methods of compensation include but are not limited to Payment-in-lieu of Taxes (PILT) or similar programs." **This language seems infeasible because not all areas may be developed for multiple reasons and it appears to encourage designating areas that are not appropriate in hopes of receiving PILT later. We recommend that it be dropped from the REGPA.**

> "4. The County shall encourage Renewable Energy Solar Facility development projects on disturbed lands such as solid waste and wastewater treatment facilities, brown fields, including abandoned mine sites; within Desert Renewable Energy Conservation Plan Development Focus Areas; within Variance Areas identified by the Solar Programmatic Environmental Impact Statement, and distributed generation projects." **While the we support encouraging renewable energy projects on already disturbed lands (and believe that a "disturbed lands only" alternative should be considered in the EIR), because they tend to have lower conservation value, the BLM designated variance lands in many instances would not be considered as either disturbed or of low conservation value. Indeed, many of the variance lands have been identified by wildlife and land management agencies as having a high value to threatened and endangered species. Therefore, we do not recommend prioritizing development on variance lands**. **Additionally, the Center generally opposes development within the BLM variance areas until the BLM designated Solar Energy Zones are fully built out, at which time new Solar Energy Zones should be identified.**

With regards to the New Mineral and Energy Resources policies,

> "3. Policy MER – 2.3 SEDA Land Inventory – The County shall maintain an inventory of the land in the SEDA that will include caps on the total megawatts and the corresponding acreage of Renewable Energy Solar Facility generation and development in a SEDA Table." **In capping the total megawatts in a SEDA, it leaves the County little opportunity to upgrade to future more efficient types of solar projects that may**

produce many more megawatts from an acre of land in the future than is currently produced. The Center suggests capping the development acreage instead as it is more clearly tied to impacts.

IV. Conclusion

We are supportive of Inyo County's renewable energy planning process and look forward to continued participation in it. Please feel free to contact us with any questions.

Sincerely,

Ileene Anderson
Senior Scientist
Center for Biological Diversity
8033 Sunset Blvd., #447
Los Angeles, CA 90046
ianderson@biologicaldiversity.org
323-654-5943

Sarah K. Friedman
Senior Campaign Representative
Sierra Club
Los Angeles, CA
sarah.friedman@sierraclub.org
(215) 300-8572

Attachment:
Kagan, R.A., T.C. Viner, P.W. Trail, E.O. Espinoza. 2014. Avian mortality at solar energy facilities in southern California: a preliminary analysis. National Fish and Wildlife Forensics Laboratory. Pgs. 28.

PLEASE REFER TO STUDY ENTITLED *AVIAN MORTALITY AT SOLAR FACILITIES IN SOUTHERN CALIFORNIA: A PRELIMINARY ANALYSIS* ATTACHED TO PREVIOUS LETTER FROM EARL WILSON

CALIFORNIA
NATIVE PLANT SOCIETY

July 10, 2014

Ms. Cathreen Richards, Senior Planner
Inyo County Planning Department
PO Drawer L, Independence, CA
93526

Delivered via email to: crichards@Inyocounty.us, and inyoplanning@Inyocounty.us

Dear Ms. Richards:
The California Native Plant Society (CNPS) provides the following comments regarding botanical issues to be addressed in the Program Environmental Impact Report (PEIR) for the Inyo County Renewable Energy Gneneral Plan Amendment (REGPA).

The California Native Plant Society is a non-profit organization working to protect California's native plant heritage and preserve it for future generations. Our nearly 10,000 members professional and volunteers who work to promote native plant conservation through 34 chapters across California and Baja California, MX. Our local CNPS Bristlecone Chapter has members from Inyo and Mono counties, as well as throughout California and from countries across the globe. The attraction of these hundreds of members is the vast and beautiful landscapes – montane and desert – where uniquely intriguing, diverse and sensitive vegetation occur. Local residents and visitors appreciate the lack of human disturbance that offers the increasingly rare opportunity for spacious solitude and provide safe harbor for our native plant and animal life.

While CNPS supports renewable energy production and utilization, we do not consider the construction of large-scale projects, and especially solar energy projects proposed on relatively undisturbed lands, to be the only or even the best way, to achieve our renewable energy goals. Ideally such large scale solar and wind projects should be located on degraded or disturbed land such as degraded and abandoned agricultural fields, industrial sites, and near existing structures rather than on lands containing intact natural biological communities, particularly those that include threatened, endangered or other at-risk species.

As we transition toward a clean energy future, it is imperative that we strike a balance between addressing the near term impacts of large scale renewable energy development with the long-term impacts of climate change on our biological diversity, wildlife habitats, and natural landscapes. To ensure that the proper balance is achieved, we need smart planning for renewable power that avoids and minimizes adverse impacts on wildlife, their habitat, and the ecological processes necessary to sustain them. These projects should be placed in the least harmful locations near existing transmission lines and on already disturbed lands with low value to special-status plant and animal species.

I. The PEIR must assess impacts to rare plants
The California Environmental Quality Act of 1970 requires public agencies to evaluate the environmental implications of their actions, and to prevent environmental effects by avoiding or

reducing significant impacts of their decisions, where feasible. CEQA was intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects. In enacting CEQA, the Legislature expressed a policy that public agencies should not approve projects as proposed if there are such feasible alternatives or mitigation measures. Among its goals, CEQA was intended "to preserve for future generations representations of all plant and animal communities" (Cal. Pub. Res. Code §21001c).

The California Native Plant Society has developed and maintains an inventory of rare, threatened, and endangered plants of California. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. The inventory presents a ranking system for rare plants within the state known as California Rare Plant Ranks (CRPR). The definitions of the California Rare Plant Ranks are as follows:

- CRPR 1A: Plants presumed extirpated in California and either rare or extinct elsewhere;
- CRPR 1B: Plants that are rare, threatened, or endangered in California and elsewhere;
- CRPR 2A: Plants presumed extirpated in California, but more common elsewhere;
- CRPR 2B: Plants that are rare, threatened, or endangered in California, but more common elsewhere;
- CRPR 3: Plants about which more information is needed (a review list); and
- CRPR 4: Plants of limited distribution (a watch list).

During CEQA review, public agencies must evaluate and disclose impacts to plant species protected under CESA, and in most cases must mitigate all significant impacts to these species to a level of less than significance. During the CEQA process, public agencies must also address plant species that may not be listed under CESA, but that may nevertheless meet the definition of rare, threatened, or endangered provided in CEQA. In addition to plants listed under CESA, CEQA requires that impacts to "resources that are rare or unique to that region" be evaluated [CEQA Guidelines 15125(c)].

All CRPR 1 and 2 plants meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act (CEQA) Guidelines. As part of the CEQA process, such species should be fully considered, as they meet the definition of rare or endangered under the Native Plant Protection Act (NPPA) and Sections 2062 and 2067 of the California Endangered Species Act. CRPR 4 species are considered to be uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS recommends that these species be evaluated for consideration during the preparation of CEQA documents as some of these species may meet NPPA and CESA criteria as Rare, Threatened or Endangered.

<u>California Rare Plant Rank 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere</u>
Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant Rank 1B plants constitute the majority of taxa in the CNPS *Inventory*, with more than 1,000 plants assigned to this category of rarity.

All of the plants constituting California Rare Plant Rank 1B meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Except for being common beyond the boundaries of California, plants with a California Rare Plant Rank of 2B would have been ranked 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the Federal Endangered Species Act. With California Rare Plant Rank 2B, we recognize the importance of protecting the geographic range of widespread species. In this way we protect the diversity of our own state's flora and help maintain evolutionary processes and genetic diversity within species.

All of the plants constituting California Rare Plant Rank 2B meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

II. The PEIR must assess impacts to plant communities

The California Department of Fish and Wildlife (CDFW) Vegetation Classification and Mapping Program (VegCAMP) maintains an inventory of plant communities in California that have been classified and mapped according to the National Vegetation Classification System[1]. One purpose of the vegetation classification is to assist in determining the level of rarity and imperilment of vegetation types. Ranking of plant alliances according to their degree of imperilment (as measured by rarity, trends, and threats) follows NatureServe's Heritage Methodology, in which all plant alliances are listed with a G (global) and S (state) rank. For alliances with State ranks of S1-S3, all associations within them are also considered to be highly imperiled.

Special status natural communities are plant alliances that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of the Department's List of California Terrestrial Natural Communities indicates which natural communities are of special status given the current state of the California classification. For most if not all the proposed SEDAs, vegetation mapping that can identify natural communities to the plant alliance level do not yet exist. Therefore, in order to assess whether rare natural communities occur within SEDAs, vegetation mapping will need to be completed for most areas.

[1] https://www.dfg.ca.gov/biogeodata/vegcamp/

III. Known botanical resources by SEDA

Our comments below list known botanical resources located within and near (<2km) the boundaries of the eight draft Solar Energy Development Areas (SEDAs). Rare plant information comes from a search of rare plant occurrences in the California Natural Diversity Database (CNDDB, June 2104). Other plant community information comes from the Central Mojave Vegetation Database, available online via the CDFW VegCAMP website. At a minimum, the County must include these botanical resources in the PEIR's environmental assessment of proposed development areas.

As noted below, it will not be possible to disclose potential impacts to botanical resources for much of the proposed SEDA lands since no rare plant surveys or fine-scale vegetation mapping has been completed for these areas. Both CNPS and CDFW have developed rare plant survey and vegetation mapping guidelines (attached as Appendix 1) to help determine when a botanical survey is needed, who should be considered qualified to conduct such surveys, how surveys should be conducted, and what information should be contained in the survey report.

Charleston View SEDA

Some of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Charleston View SEDA.

Rare Plants

Scientific name	Common name	FED List	CA List	G Rank	S Rank	CRPR
Acleisanthes nevadensis	desert wing-fruit	None	None	G5	S1	2B.3
Allium nevadense	Nevada onion	None	None	G4	S2	2B.3
Androstephium breviflorum	small-flowered androstephium	None	None	G5	S2S3	2B.2
Astragalus nyensis	Nye milk-vetch	None	None	G3	S1	1B.1
Astragalus preussii var. preussii	Preuss' milk-vetch	None	None	G4T4	S1	2B.3
Astragalus sabulonum	gravel milk-vetch	None	None	G5	S2	2B.2
Astragalus tidestromii	Tidestrom's milk-vetch	None	None	G4G5	S2	2B.2
Chaetadelpha wheeleri	Wheeler's dune-broom	None	None	G4	S2	2B.2
Cymopterus multinervatus	purple-nerve cymopterus	None	None	G5?	S2	2B.2
Ephedra torreyana	Torrey's Mormon-tea	None	None	G5?	S1	2B.1
Eriogonum bifurcatum	forked buckwheat	None	None	G3	S3	1B.2
Eriogonum contiguum	Ash Meadows buckwheat	None	None	G2	S2	2B.3
Mentzelia pterosperma	wing-seed blazing star	None	None	G4	S2	2B.2
Peteria thompsoniae	spine-noded milk vetch	None	None	G4	S1	2B.3
Phacelia pulchella var. gooddingii	Goodding's phacelia	None	None	G5T2T3	S2	2B.3
Sclerocactus johnsonii	Johnson's bee-hive cactus	None	None	G3G4	S2.2	2B.2

Rare natural plant communities

- Mosquite bosques

Other mapped important biological features

- Low-elevation wash systems (Central Mojave Vegetation Database)

Owens Lake SEDA

Some of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Owens Lake SEDA.

Rare plant species (E = Endangered, T = Threatened)

Scientific name	**Common name**	**FED List**	**CA List**	**G Rank**	**S Rank**	**CRPR**
Erigeron calvus	bald daisy	None	None	G1Q	S1	1B.1
Plagiobothrys parishii	Parish's popcornflower	None	None	G1	S1	1B.1
Sidalcea covillei	Owens Valley checkerbloom	None	E	G2	S2	1B.1

Rare natural plant communities

- Distichlis spicata alliance (Central Mojave Vegetation Database) - not a rare community, however loss of this community can indicate negative impacts from groundwater pumping
- Olancha Greasewood Unusual Plant Assemblage (UPA)[2]
- Olancha sand dunes - survey and manage for protection of rare dune plant communities

Other mapped important biological features

- Low-elevation wash systems (Central Mojave Vegetation Database)
- Keeler Dunefield - survey and manage for protection of rare dune plant communities
- Alkali meadows and sinks
- Limestone geology represents extremely high probability of endemic rare plants. Comprehensive botanical surveys must be performed by qualified botanists, during appropriate seasons and climate conditions, before any renewable energy development occurs in this area in order to assess, avoid, and minimize potential impacts to rare plants.
- Mid-elevation wash systems (Central Mojave Vegetation Database)
- Springs - mapped in Central Mojave Vegetation Database

Rose Valley SEDA

Most of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Rose Valley SEDA.

Rare plant species (E = Endangered, T = Threatened)

Scientific name	**Common name**	**FED List**	**CA List**	**G Rank**	**S Rank**	**CRPR**

[2] UPAs were esablished by the U.S. Bureau of Land Management (BLM) through the 1980 California Desert Conservation Plan as areas administratively managed for conservation of important plant resources.

Cymopterus ripleyi var. saniculoides	sanicle cymopterus	None	None	G3G4T3Q	S1	1B.2
Eremothera boothii ssp. boothii	Booth's evening-primrose	None	None	G5T4	S2	2B.3
Mentzelia tridentata	creamy blazing star	None	None	G2	S2.3	1B.3
Sidalcea covillei	Owens Valley checkerbloom	None	E	G2	S2	1B.1

Rare natural plant communities

• Olancha Greasewood UPA

Other mapped important biological features

• Olancha sand dunes - survey and manage for protection of rare dune plant communities

Trona SEDA

Most of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Trona SEDA.

Rare plant species

Scientific name	**Common name**	**FED List**	**CA List**	**G RANK**	**S RANK**	**CRPR**
Castela emoryi	Emory's crucifixion-thorn	None	None	G4	S2S3	2B.2

Other mapped important biological features

• Low-elevation wash systems (Central Mojave Vegetation Database)

Chicago Valley SEDA

Most of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Chicago Valley SEDA.

Rare plant species

Scientific name	**Common name**	**FED List**	**CA List**	**G RANK**	**S RANK**	**CRPR**
Atriplex argentea var. longitrichoma	Pahrump orache	None	None	G5T2	S2	1B.1
Eriogonum bifurcatum	forked buckwheat	None	None	G3	S3	1B.2
Eriogonum contiguum	Ash Meadows buckwheat	None	None	G2	S2	2B.3
Phacelia parishii	Parish's phacelia	None	None	G2G3	S1	1B.1

Other mapped important biological features

• Low-elevation wash systems (Central Mojave Vegetation Database)

Pearsonville SEDA

Most of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Pearsonville SEDA.

Rare plant species

Scientific name	**Common name**	**FED List**	**CA List**	**G RANK**	**S RANK**	**CRPR**
Phacelia nashiana	Charlotte's phacelia	None	None	G3	S3	1B.2

Rare natural plant communities

• Lepidospartum squamatum Alliance

Sandy Valley SEDA

Most of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Sandy Valley SEDA.

Rare plant species

Scientific name	**Common name**	**FEDList**	**CA List**	**G RANK**	**S RANK**	**CRPR**
Astragalus preussii var. preussii	Preuss' milk-vetch	None	None	G4T4	S1	2B.3
Eriogonum bifurcatum	forked buckwheat	None	None	G3	S3	1B.2
Phacelia pulchella var. gooddingii	Goodding's phacelia	None	None	G5T2T3	S2	2B.3

Other mapped important biological features

• Sand dunes - survey and manage for protection of rare dune plant communities

Laws SEDA

Most of the lands within this proposed SEDA have not been surveyed for rare plants. Comprehensive rare plant surveys and vegetation mapping will need to be completed on lands proposed for development in order to assess potential impacts to, and avoidance / mitigation measures for rare plant species and communities. The botanical resources below are known to occur within and/or near the Laws SEDA.

Rare plant species (E = Endangered, T = Threatened)

Scientific name	**Common name**	**FED List**	**CA List**	**G Rank**	**S Rank**	**CRPR**
Aliciella triodon	coyote gilia	None	None	G5	S2	2B.2
Astragalus argophyllus var.	silver-leaved milk-vetch	None	None	G5T4	S1	2B.2

argophyllus						
Astragalus lentiginosus var. piscinensis	Fish Slough milk-vetch	T	None	G5T1	S1	1B.1
Calochortus excavatus	Inyo County star-tulip	None	None	G2	S2	1B.1
Crepis runcinata ssp. hallii	Hall's meadow hawksbeard	None	None	G5T3?	S1S2	2B.1
Dedeckera eurekensis	July gold	None	Rare	G3	S3	1B.3
Elymus salina	Salina Pass wild-rye	None	None	G5	S2	2B.3
Eremothera boothii ssp. intermedia	Booth's hairy evening-primrose	None	None	G5T3 T4	S3	2B.3
Fimbristylis thermalis	hot springs fimbristylis	None	None	G4	S2	2B.2
Grusonia pulchella	beautiful cholla	None	None	G4	S2S3	2B.2
Ivesia kingii var. kingii	alkali ivesia	None	None	G4T3 Q	S2	2B.2
Mentzelia torreyi	Torrey's blazing star	None	None	G4	S2.2	2B.2
Oryctes nevadensis	Nevada oryctes	None	None	G2G3	S2	2B.1
Phacelia inyoensis	Inyo phacelia	None	None	G2	S2	1B.2
Plagiobothrys parishii	Parish's popcornflower	None	None	G1	S1	1B.1
Sidalcea covillei	Owens Valley checkerbloom	None	E	G2	S2	1B.1
Sphenopholis obtusata	prairie wedge grass	None	None	G5	S2.2	2B.2
Thelypodium integrifolium ssp. complanatum	foxtail thelypodium	None	None	G5T5	S2.2	2B.2

CNPS continues to dedicate resources to engaging in renewable energy planning process across California. We appreciate the opportunity to submit this information to the Inyo County Planning Department, and would be glad to provide botanically-related GIS layers to which we have access. Please contact us directly with any questions about the information we have referenced.

By avoiding many areas proposed for development in response to public comments during the REGPA's pre-CEQA public meetings, Inyo County has shown a genuine intention to find a balance between developing renewable energy and maintaining the natural beauty of Inyo County. We urge you to carry this attentiveness to public input forward into the CEQA process.

Sincerely,

Greg Suba

Greg Suba
Conservation Program Director

Julie Anne Hopkins
Conservation Chair
CNPS Bristlecone Chapter

CNPS Botanical Survey Guidelines

CALIFORNIA NATIVE PLANT SOCIETY
December 9, 1983
Revised June 2, 2001

The following recommendations are intended to help those who prepare and review environmental documents determine when a botanical survey is needed, who should be considered qualified to conduct such surveys, how surveys should be conducted, and what information should be contained in the survey report. The California Native Plant Society recommends that lead agencies not accept the results of surveys unless they are conducted and reported according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all botanical resources, including special status plants (rare, threatened, and endangered plants) and plant (vegetation) communities. Special status plants are not limited to those that have been listed by state and federal agencies but include any plants that, based on all available data, can be shown to be rare, threatened, or endangered under the following definitions:

   > A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.[1]

   Rare plant (vegetation) communities are those communities that are of highly limited distribution. These communities may or may not contain special status plants. The most current version of the California Natural Diversity Database's *List of California Terrestrial Natural Communities*[2] should be used as a guide to the names and status of communities.

   Consistent with the California Native Plant Society's goal of preserving plant biodiversity on a regional and local scale, and with California Environmental Quality Act environmental impact assessment criteria[3], surveys should also assess impacts to locally significant plants. Both plants and plant communities can be considered significant if their local occurrence is on the outer limits of known distribution, a range extension, a rediscovery, or rare or uncommon in a local context (such as within a county or region). Lead agencies should address impacts to these locally unique botanical resources regardless of their status elsewhere in the state.

2. Botanical surveys must be conducted to determine if, or to the extent that, special status or locally significant plants and plant communities will be affected by a proposed project when any natural vegetation occurs on the site and the project has the potential for direct or indirect effects on vegetation.

3. Those conducting botanical surveys must possess the following qualifications:
   a. Experience conducting floristic field surveys;
   b. Knowledge of plant taxonomy and plant community ecology and classification;
   c. Familiarity with the plants of the area, including special status and locally significant plants;

---

[1] California Environmental Quality Act Guidelines, §15065 and §15380.
[2] List of California Terrestrial Natural Communities. California Department of Fish and Game Natural Diversity Database. Sacramento, CA.
[3] California Environmental Quality Act Guidelines, Appendix G (Initial Study Environmental Checklist).

d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
e. Experience with analyzing impacts of a project on native plants and communities.

4. Botanical surveys should be conducted in a manner that will locate any special status or locally significant plants or plant communities that may be present. Specifically, botanical surveys should be:

   a. Conducted in the field at the proper times of year when special status and locally significant plants are both evident and identifiable. When special status plants are known to occur in the type(s) of habitat present in the project area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the plants are identifiable at the time of survey.

   b. Floristic in nature. A floristic survey requires that every plant observed be identified to species, subspecies, or variety as applicable. In order to properly characterize the site, a complete list of plants observed on the site shall be included in every botanical survey report. In addition, a sufficient number of visits spaced throughout the growing season is necessary to prepare an accurate inventory of all plants that exist on the site. The number of visits and the timing between visits must be determined by geographic location, the plant communities present, and the weather patterns of the year(s) in which the surveys are conducted.

   c. Conducted in a manner that is consistent with conservation ethics and accepted plant collection and documentation techniques[4,5]. Collections (voucher specimens) of special status and locally significant plants should be made, unless such actions would jeopardize the continued existence of the population. A single sheet should be collected and deposited at a recognized public herbarium for future reference. All collections shall be made in accordance with applicable state and federal permit requirements. Photography may be used to document plant identification only when the population cannot withstand collection of voucher specimens.

   d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas. All habitats within the project site must be surveyed thoroughly in order to properly inventory and document the plants present. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity.

   e. Well documented. When a special status plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5-minute topographic map with the occurrence mapped, shall be completed, included within the survey report, and separately submitted to the California Natural Diversity Database. Population boundaries should be mapped as accurately as possible. The number of individuals in each population should be counted or estimated, as appropriate.

5. Complete reports of botanical surveys shall be included with all environmental assessment documents, including Negative Declarations and Mitigated Negative Declarations, Timber Harvesting Plans, Environmental Impact Reports, and Environmental Impact Statements. Survey reports shall contain the following information:

   a. Project location and description**,** including:

[4] Collecting Guidelines and Documentation Techniques. California Native Plant Society Policy (adopted March 4, 1995).
[5] Ferren, W.R., Jr., D.L. Magney, and T.A. Sholars. 1995. The Future of California Floristics and Systematics: Collecting Guidelines and Documentation Techniques. *Madroño* 42(2):197-210.

1) A detailed map of the location and footprint of the proposed project.
2) A detailed description of the proposed project, including one-time activities and ongoing activities that may affect botanical resources.
3) A description of the general biological setting of the project area.

b. Methods, including:
   1) Survey methods for each of the habitats present, and rationale for the methods used.
   2) Description of reference site(s) visited and phenological development of the target special status plants, with an assessment of any conditions differing from the project site that may affect their identification.
   3) Dates of surveys and rationale for timing and intervals; names of personnel conducting the surveys; and total hours spent in the field for each surveyor on each date.
   4) Location of deposited voucher specimens and herbaria visited.

c. Results, including:
   1) A description and map of the vegetation communities on the project site. The current standard for vegetation classification, *A Manual of California Vegetation*[6], should be used as a basis for the habitat descriptions and the vegetation map. If another vegetation classification system is used, the report must reference the system and provide the reason for its use.
   2) A description of the phenology of each of the plant communities at the time of each survey date.
   3) A list of all plants observed on the project site using accepted scientific nomenclature, along with any special status designation. The reference(s) used for scientific nomenclature shall be cited.
   4) Written description and detailed map(s) showing the location of each special status or locally significant plant found, the size of each population, and method used to estimate or census the population.
   5) Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms and accompanying maps.

d. Discussion, including:
   1) Any factors that may have affected the results of the surveys (*e.g.*, drought, human disturbance, recent fire).
   2) Discussion of any special local or range-wide significance of any plant population or community on the site.
   3) An assessment of potential impacts. This shall include a map showing the distribution of special status and locally significant plants and communities on the site in relation to the proposed activities. Direct, indirect, and cumulative impacts to the plants and communities shall be discussed.
   4) Recommended measures to avoid and/or minimize direct, indirect, and cumulative impacts.

e. References cited and persons contacted.

f. Qualifications of field personnel including any special experience with the habitats and special status plants present on the site.

[6] Sawyer, J.O. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society. Sacramento, CA. 471 pp.

This page intentionally left blank

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities

State of California
CALIFORNIA NATURAL RESOURCES AGENCY
Department of Fish and Game
November 24, 2009[1]

INTRODUCTION AND PURPOSE

The conservation of special status native plants and their habitats, as well as natural communities, is integral to maintaining biological diversity. The purpose of these protocols is to facilitate a consistent and systematic approach to the survey and assessment of special status native plants and natural communities so that reliable information is produced and the potential of locating a special status plant species or natural community is maximized. They may also help those who prepare and review environmental documents determine when a botanical survey is needed, how field surveys may be conducted, what information to include in a survey report, and what qualifications to consider for surveyors. The protocols may help avoid delays caused when inadequate biological information is provided during the environmental review process; assist lead, trustee and responsible reviewing agencies to make an informed decision regarding the direct, indirect, and cumulative effects of a proposed development, activity, or action on special status native plants and natural communities; meet California Environmental Quality Act (CEQA)[2] requirements for adequate disclosure of potential impacts; and conserve public trust resources.

DEPARTMENT OF FISH AND GAME TRUSTEE AND RESPONSIBLE AGENCY MISSION

The mission of the Department of Fish and Game (DFG) is to manage California's diverse wildlife and native plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations (Fish and Game Code §1802). DFG, as trustee agency under CEQA §15386, provides expertise in reviewing and commenting on environmental documents and makes protocols regarding potential negative impacts to those resources held in trust for the people of California.

Certain species are in danger of extinction because their habitats have been severely reduced in acreage, are threatened with destruction or adverse modification, or because of a combination of these and other factors. The California Endangered Species Act (CESA) provides additional protections for such species, including take prohibitions (Fish and Game Code §2050 *et seq.*). As a responsible agency, DFG has the authority to issue permits for the take of species listed under CESA if the take is incidental to an otherwise lawful activity; DFG has determined that the impacts of the take have been minimized and fully mitigated; and, the take would not jeopardize the continued existence of the species (Fish and Game Code §2081). Surveys are one of the preliminary steps to detect a listed or special status plant species or natural community that may be impacted significantly by a project.

DEFINITIONS

Botanical surveys provide information used to determine the potential environmental effects of proposed projects on all special status plants and natural communities as required by law (i.e., CEQA, CESA, and Federal Endangered Species Act (ESA)). Some key terms in this document appear in **bold font** for assistance in use of the document.

For the purposes of this document, **special status plants** include all plant species that meet one or more of the following criteria[3]:

---

1 This document replaces the DFG document entitled "Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened and Endangered Plants and Natural Communities."

2 http://ceres.ca.gov/ceqa/

3 Adapted from the East Alameda County Conservation Strategy available at http://www.fws.gov/sacramento/EACCS/Documents/080228_Species_Evaluation_EACCS.pdf

- Listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12).

- Listed[4] or candidates for listing by the State of California as threatened or endangered under CESA (Fish and Game Code §2050 *et seq.*). A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors (Fish and Game Code §2062). A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures (Fish and Game Code §2067).

- Listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 *et seq.*). A plant is **rare** when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901).

- Meet the definition of rare or endangered under CEQA §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:

  - Species considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (Lists 1A, 1B and 2);

  - Species that may warrant consideration on the basis of local significance or recent biological information[5];

  - Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List* (California Department of Fish and Game 2008)[6].

- Considered a **locally significant species,** that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of the Department's *List of California Terrestrial Natural Communities*[7] indicates which natural communities are of special status given the current state of the California classification.

Most types of wetlands and riparian communities are considered special status natural communities due to their limited distribution in California. These natural communities often contain special status plants such as those described above. These protocols may be used in conjunction with protocols formulated by other agencies, for example, those developed by the U.S. Army Corps of Engineers to delineate jurisdictional wetlands[8] or by the U.S. Fish and Wildlife Service to survey for the presence of special status plants[9].

---

4 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

5 In general, CNPS List 3 plants (plants about which more information is needed) and List 4 plants (plants of limited distribution) may not warrant consideration under CEQA §15380. These plants may be included on special status plant lists such as those developed by counties where they would be addressed under CEQA §15380. List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. List 3 and 4 plants are also included in the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List.* [Refer to the current online published list available at: http://www.dfg.ca.gov/biogeodata.] Data on Lists 3 and 4 plants should be submitted to CNDDB. Such data aids in determining or revising priority ranking.

6 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

7 http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf. The rare natural communities are asterisked on this list.

8 http://www.wetlands.com/regs/tlpge02e.htm

9 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

BOTANICAL SURVEYS

Conduct botanical surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site.

SURVEY OBJECTIVES

Conduct field surveys in a manner which maximizes the likelihood of locating special status plant species or special status natural communities that may be present. Surveys should be **floristic in nature**, meaning that every plant taxon that occurs on site is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status species or are restricted to lists of likely potential species are not considered floristic in nature and are not adequate to identify all plant taxa on site to the level necessary to determine rarity and listing status. Include a list of plants and natural communities detected on the site for each botanical survey conducted. More than one field visit may be necessary to adequately capture the floristic diversity of a site. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the species and communities on the site is also useful to assess the significance of a particular population.

SURVEY PREPARATION

Before field surveys are conducted, compile relevant botanical information in the general project area to provide a regional context for the investigators. Consult the CNDDB[10] and BIOS[11] for known occurrences of special status plants and natural communities in the project area prior to field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties of the site and surrounding ecoregion[12], unless a larger assessment area is appropriate. Then, develop a list of special status plants with the potential to occur within these vegetation types. This list can serve as a tool for the investigators and facilitate the use of reference sites; however, special status plants on site might not be limited to those on the list. Field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on this list. Include in the survey report the list of potential special status species and natural communities, and the list of references used to compile the background botanical information for the site.

SURVEY EXTENT

Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects, such as those from fuel modification or herbicide application, could potentially extend offsite. Pre-project surveys restricted to known CNDDB rare plant locations may not identify all special status plants and communities present and do not provide a sufficient level of information to determine potential impacts.

FIELD SURVEY METHOD

Conduct surveys using **systematic field techniques** in all habitats of the site to ensure thorough coverage of potential impact areas. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct surveys by walking over the entire site to ensure thorough coverage, noting all plant taxa

---

[10] Available at http://www.dfg.ca.gov/biogeodata/cnddb

[11] http://www.bios.dfg.ca.gov/

[12] Ecological Subregions of California, available at http://www.fs.fed.us/r5/projects/ecoregions/toc.htm

observed. The level of effort should be sufficient to provide comprehensive reporting. For example, one person-hour per eight acres per survey date is needed for a comprehensive field survey in grassland with medium diversity and moderate terrain[13], with additional time allocated for species identification.

TIMING AND NUMBER OF VISITS

Conduct surveys in the field at the time of year when species are both evident and identifiable. Usually this is during flowering or fruiting. Space visits throughout the growing season to accurately determine what plants exist on site. Many times this may involve multiple visits to the same site (e.g. in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special status plants are present[14]. The timing and number of visits are determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which the surveys are conducted.

REFERENCE SITES

When special status plants are known to occur in the type(s) of habitat present in the project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those species are identifiable at the time of the survey and to obtain a visual image of the target species, associated habitat, and associated natural community.

USE OF EXISTING SURVEYS

For some sites, floristic inventories or special status plant surveys may already exist. Additional surveys may be necessary for the following reasons:

- Surveys are not current[15]; or
- Surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems); or
- Surveys are not comprehensive in nature; or fire history, land use, physical conditions of the site, or climatic conditions have changed since the last survey was conducted[16]; or
- Surveys were conducted in natural systems where special status plants may not be observed if an annual above ground phase is not visible (e.g. flowers from a bulb); or
- Changes in vegetation or species distribution may have occurred since the last survey was conducted, due to habitat alteration, fluctuations in species abundance and/or seed bank dynamics.

NEGATIVE SURVEYS

Adverse conditions may prevent investigators from determining the presence of, or accurately identifying, some species in potential habitat of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any given year. Discuss such conditions in the report.

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that this plant occurrence no longer exists at this location, particularly if adverse conditions are present. For example, surveys over a number of years may be necessary if the species is an annual plant having a persistent, long-lived seed bank and is known not to germinate every year. Visits to the site in more

---

[13] Adapted from U.S. Fish and Wildlife Service kit fox survey guidelines available at www.fws.gov/sacramento/es/documents/kitfox_no_protocol.pdf

[14] U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

[15] Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

[16] U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/botanicalinventories.pdf

than one year increase the likelihood of detection of a special status plant especially if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may ensure that the timing of the survey was appropriate.

REPORTING AND DATA COLLECTION

Adequate information about special status plants and natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants or natural communities[17] and will guide the development of minimization and mitigation measures. The next section describes necessary information to assess impacts. For comprehensive, systematic surveys where no special status species or natural communities were found, reporting and data collection responsibilities for investigators remain as described below, excluding specific occurrence information.

SPECIAL STATUS PLANT OR NATURAL COMMUNITY OBSERVATIONS

Record the following information for locations of each special status plant or natural community detected during a field survey of a project site.

- A detailed map (1:24,000 or larger) showing locations and boundaries of each special status species occurrence or natural community found as related to the proposed project. Mark occurrences and boundaries as accurately as possible. Locations documented by use of global positioning system (GPS) coordinates must include the datum[18] in which they were collected;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If the species is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of individuals in each life stage such as seedlings vs. reproductive individuals;
- The number of individuals of the species per unit area, identifying areas of relatively high, medium and low density of the species over the project site; and
- Digital images of the target species and representative habitats to support information and descriptions.

FIELD SURVEY FORMS

When a special status plant or natural community is located, complete and submit to the CNDDB a California Native Species (or Community) Field Survey Form[19] or equivalent written report, accompanied by a copy of the relevant portion of a 7.5 minute topographic map with the occurrence mapped. Present locations documented by use of GPS coordinates in map and digital form. Data submitted in digital form must include the datum[20] in which it was collected. If a potentially undescribed special status natural community is found on the site, document it with a Rapid Assessment or Relevé form[21] and submit it with the CNDDB form.

VOUCHER COLLECTION

Voucher specimens provide verifiable documentation of species presence and identification as well as a public record of conditions. This information is vital to all conservation efforts. Collection of voucher specimens should

---

17 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata. For Timber Harvest Plans (THPs) please refer to the "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

18 NAD83, NAD27 or WGS84

19 http://www.dfg.ca.gov/biogeodata

20 NAD83, NAD27 or WGS84

21 http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp

be conducted in a manner that is consistent with conservation ethics, and is in accordance with applicable state and federal permit requirements (e.g. incidental take permit, scientific collection permit). Voucher collections of special status species (or suspected special status species) should be made only when such actions would not jeopardize the continued existence of the population or species.

Deposit voucher specimens with an indexed regional herbarium[22] no later than 60 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant permittee names and permit numbers on specimen labels. A collecting permit is required prior to the collection of State-listed plant species[23].

BOTANICAL SURVEY REPORTS

Include reports of botanical field surveys containing the following information with project environmental documents:

- **Project and site description**
  - A description of the proposed project;
  - A detailed map of the project location and study area that identifies topographic and landscape features and includes a north arrow and bar scale; and,
  - A written description of the biological setting, including vegetation[24] and structure of the vegetation; geological and hydrological characteristics; and land use or management history.
- **Detailed description of survey methodology and results**
  - Dates of field surveys (indicating which areas were surveyed on which dates), name of field investigator(s), and total person-hours spent on field surveys;
  - A discussion of how the timing of the surveys affects the comprehensiveness of the survey;
  - A list of potential special status species or natural communities;
  - A description of the area surveyed relative to the project area;
  - References cited, persons contacted, and herbaria visited;
  - Description of reference site(s), if visited, and phenological development of special status plant(s);
  - A list of all taxa occurring on the project site. Identify plants to the taxonomic level necessary to determine whether or not they are a special status species;
  - Any use of existing surveys and a discussion of applicability to this project;
  - A discussion of the potential for a false negative survey;
  - Provide detailed data and maps for all special plants detected. Information specified above under the headings “Special Status Plant or Natural Community Observations,” and “Field Survey Forms,” should be provided for locations of each special status plant detected;
  - Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms should be sent to the CNDDB and included in the environmental document as an Appendix. It is not necessary to submit entire environmental documents to the CNDDB; and,
  - The location of voucher specimens, if collected.

---

22 For a complete list of indexed herbaria, see: Holmgren, P., N. Holmgren and L. Barnett. 1990. Index Herbariorum, Part 1: Herbaria of the World. New York Botanic Garden, Bronx, New York. 693 pp. Or: http://www.nybg.org/bsci/ih/ih.html

23 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

24 A vegetation map that uses the National Vegetation Classification System (http://biology.usgs.gov/npsveg/nvcs.html), for example *A Manual of California Vegetation*, and highlights any special status natural communities. If another vegetation classification system is used, the report should reference the system, provide the reason for its use, and provide a crosswalk to the National Vegetation Classification System.

- **Assessment of potential impacts**
  - A discussion of the significance of special status plant populations in the project area considering nearby populations and total species distribution;
  - A discussion of the significance of special status natural communities in the project area considering nearby occurrences and natural community distribution;
  - A discussion of direct, indirect, and cumulative impacts to the plants and natural communities;
  - A discussion of threats, including those from invasive species, to the plants and natural communities;
  - A discussion of the degree of impact, if any, of the proposed project on unoccupied, potential habitat of the species;
  - A discussion of the immediacy of potential impacts; and,
  - Recommended measures to avoid, minimize, or mitigate impacts.

QUALIFICATIONS

Botanical consultants should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with the plants of the area, including special status species;
- Familiarity with natural communities of the area, including special status natural communities;
- Experience conducting floristic field surveys or experience with floristic surveys conducted under the direction of an experienced surveyor;
- Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
- Experience with analyzing impacts of development on native plant species and natural communities.

SUGGESTED REFERENCES

Barbour, M., T. Keeler-Wolf, and A. A. Schoenherr (eds.). 2007. Terrestrial vegetation of California (3rd Edition). University of California Press.

Bonham, C.D. 1988. Measurements for terrestrial vegetation. John Wiley and Sons, Inc., New York, NY.

California Native Plant Society. Most recent version. Inventory of rare and endangered plants (online edition). California Native Plant Society, Sacramento, CA. Online URL http://www.cnps.org/inventory.

California Natural Diversity Database. Most recent version. Special vascular plants, bryophytes and lichens list. Updated quarterly. Available at www.dfg.ca.gov.

Elzinga, C.L., D.W. Salzer, and J. Willoughby. 1998. Measuring and monitoring plant populations. BLM Technical Reference 1730-1. U.S. Dept. of the Interior, Bureau of Land Management, Denver, Colorado.

Leppig, G. and J.W. White. 2006. Conservation of peripheral plant populations in California. Madroño 53:264-274.

Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, Inc., New York, NY.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed plants on the Santa Rosa Plain. Sacramento, CA.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants. Sacramento, CA.

Van der Maarel, E. 2005. Vegetation Ecology. Blackwell Science Ltd., Malden, MA.

Comments by the Amargosa Conservancy
On the Proposed Inyo County
Renewable Energy General Plan Amendment (REGPA) EIR

July 10, 2014

Dear Ms. Richards:

The Amargosa Conservancy is the local conservation organization dedicated to preserving the lands, water and beauty of the Amargosa region. Our headquarters are in Shoshone, California, in the far southeast corner of Inyo County.

We have been actively involved in renewable energy issues in our portion of the county, primarily to ensure that our ecological, cultural, and historic values are given appropriate weight in considering the location of solar and wind facilities in this region.

While we support renewable energy development, we are deeply concerned that siting utility scale solar plants in Chicago Valley and Charleston View would entail pumping significant quantities of groundwater from aquifers that support the Amargosa Wild and Scenic River and that provide water for our small human communities. Industrial scale solar plants would also adversely affect scenic and historic values that support tourism in the area, the only enterprise that this economically depressed region can rely on.

We appreciate the decision by the Supervisors to eliminate Death Valley Junction as a Solar Energy Development Area (SEDA). We believe, however, that eliminating Chicago Valley and Charleston View as solar development candidates is even more important. Recent hydrologic studies by Andy Zdon and Associates, Inc, have confirmed the existence of groundwater flowing from Ash Meadows and Pahrump Valley into springs that provide perennial flow in the Wild and Scenic Amargosa River in the Shoshone and Tecopa area. Likely flow paths are through Charleston View and Chicago Valley.

In the Bright Source Hidden Hills proceeding conducted by the California Energy Commission, currently stayed, our organization intervened to oppose siting the power tower solar facility in the Charleston View on a number of grounds, including concerns about proposed groundwater pumping. Other entities, including the Bureau of Land Management, The Nature Conservancy, and Inyo County itself expressed serious reservations about the proposed facility, none of which have been finally resolved. Submissions by the Amargosa Conservancy, Inyo County, and The Nature Conservancy can be found here:

Amargosa Conservancy comments:

http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/11-AFC-2%20Hidden%20Hills/2012/Jul/TN%2066330%2007-21-12%20Comment%20Letter%20from%20Amargosa%20Conservancy%20on%20the%20PSA.pdf

http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/11-AFC-2%20Hidden%20Hills/2011/December/TN%2063256%2012-28-11%20Amargosa%20Conservancy%20Comment%20Letter.pdf

Inyo County comments:

http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/11-AFC-2%20Hidden%20Hills/2012/Jul/TN%2066310%2007-17-12%20County%20of%20Inyo%27s%20Comments%20on%20PSA.pdf

http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/11-AFC-2%20Hidden%20Hills/2013/FEB/TN%2069402%2002-04-13%20County%20of%20Inyo%20Land%20Use%20Testimony.pdf

http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/11-AFC-2%20Hidden%20Hills/2013/FEB/TN%2069401%2002-04-13%20County%20of%20Inyo%20Water%20Supply%20Testimony.pdf

The Nature Conservancy comments:

http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/11-AFC-2%20Hidden%20Hills/2012/Jul/TN%2066322%2007-25-12%20Comments%20from%20The%20Nature%20Conservancy%20on%20the%20PSA.pdf

Concerns expressed in these submissions, in addition to the lack of transmission to serve a utility scale plant in the Charleston View area, warrant removing Charleston View from the County's proposed slate of SEDAs.

Chicago Valley should be removed as well from the list of open solar development areas, since it represents a probable flow path for groundwater into the Amargosa Wild and Scenic River, provides important habitat connectivity from the Nopah wilderness into the Tecopa basin, and provides an expansive scenic desert view, buffering California from development in Pahrump Valley in Nevada.

For these reasons, the Amargosa Conservancy respectfully proposes that Inyo County remove Charleston View and Chicago Valley from its list of Solar Energy Development Areas.

Thank you for the opportunity to comment. If you have questions, please get in touch with Jordan Kelley at 518-321-3101. We look forward to working with the County as the solar development area general plan amendments move forward.

Sincerely

Jordan Kelley
Executive Director
Amargosa Conservancy
P.O. Box 63
Shoshone, CA, 992384

July 10, 2014

Inyo County Planning Department
Attn: Cathreen Richards & Josh Hart
168 North Edwards Street
P.O. Drawer L
Independence, CA 93526
VIA EMAIL: inyoplanning@inyocounty.us

RE: Scoping Comments, Inyo County Renewable Energy General Plan Amendment and Draft Environmental Impact Report

Dear Cathreen & Josh,

These scoping comments on Inyo County's proposed Renewable Energy General Plan Amendment (REGPA) and Draft Environmental Impact Report (DEIR) are submitted by Defenders of Wildlife, Natural Resources Defense Council (NRDC) and The Wilderness Society. Our organizations have been engaged in renewable energy issues in Inyo County, since 2010, having provided scoping comments on the County's first proposed general plan amendment and mitigated negative declaration.

We have attached our two comment letters from December 9, 2010 and January 14, 2011, and our two comment letters from February 19, 2014 and March 24, 2014 so that they will be considered part of the California Environmental Quality Act (CEQA) record for the REGPA project during the current scoping period.

We commend the County for modifying the initial proposed REGPA to address the many concerns of local citizens and stakeholders in the public lands of Inyo County. The proposed REGPA removes five large areas of public land that were proposed as renewable energy development areas (REDAs): Centennial Flat, Panamint Valley, Death Valley Junction, Deep Springs Valley and Fish Lake Valley. The proposed REGPA also removes a proposed REDA in the Owens Valley, comprised largely of lands owned by the City of Los Angeles Department of Water and Power (LADWP). The proposed REGPA proposes limiting development to available transmission capacity of approximately 250 megawatts (MW) in the U.S. highway 395 corridor. The proposed REGPA eliminates wind development from consideration in Inyo County. We support these modifications.

We remain concerned about several issues, and ask for them to be carefully considered in the environmental impact report (EIR) that will be prepared.

Proposed Solar Energy Development Areas

Because wind has been removed from consideration in the REGPA by Inyo County, the REDAs are now called Solar Energy Development Areas (SEDAs). While we generally support the SEDAs that have been proposed by Inyo County, we have several concerns.

First, we believe the Chicago Valley SEDA should be removed from consideration for development. As noted in our previous comments, Chicago Valley has well developed mesquite woodland habitat and is suitable desert tortoise habitat. Golden eagles nest in numerous locations in surrounding mountain ranges and likely utilize Chicago Valley for foraging. Bighorn sheep occur in these ranges as well, and may cross Chicago Valley during inter-herd movements or utilize the bajadas in the valley adjacent to the mountains for winter and early spring forage. This area has been modeled as intermountain habitat for desert bighorn sheep by the California Department of Fish and Wildlife. Groundwater in the basin is also limited and there are no electrical transmission facilities other than local distribution lines serving scattered local residences.

Second, we previously recommended that Inyo County develop protocol avoiding avian impacts from solar facilities in the Owens Lake REDA with the state and federal wildlife agencies. Due to the importance of the entire area along the highway 395 corridor to resident and migratory birds, we recommend this protocol be applied to *all* proposed solar developments north and south of the Owens Lake, in addition to the Owens Lake region itself. We also recommend that the County work with the state and federal wildlife agencies to develop a protocol for monitoring the impacts of solar developments on avian species. Please see our comments dated March 24, 2014 for our detailed suggestions.

Owens Valley

We believe it's important for the DEIR to clarify how the Owens Valley will be treated with respect to potential renewable energy development. The NOP notes (p. 2) that "Alternative solar development scenarios in the Owens Valley will be considered separately." The Inyo Board of Supervisors recommended that the Owens Valley REDA be eliminated from consideration in the REGPA. However, it is our understanding that Inyo County recently was granted funding to engage in a collaborative planning process for the Owens Valle (with the realization Inyo County does not control the land on which much of the Valley lies). It will be important for the public to understand, therefore, how Owens Valley will be treated relative to the rest of the REGPA and also to understand how the Owens Valley process will treated with respect to CEQA.

Visual Impacts and Mitigation

Given the highly scenic nature of Inyo County and the importance of the County's scenic quality to regional tourism, we request that Inyo County consider mitigation for visual impacts in all the areas considered for development in Inyo County. We are attaching a report prepared by Argonne National Laboratory (***Utility-Scale Solar Energy Facility Visual Impact Characterization and Mitigation Study, Project Report***, December 20, 2013) that details the efficacy of various mitigation measures for different types of solar facilities.

Finally, we request a minimum 60 day comment period on the draft EIR when it is released, for the following reasons: First, the information about renewable energy is very technical in nature and the public needs sufficient time to digest and understand the material; second, the DRECP will likely be released this fall and the two comment periods may overlap; and third, we strongly recommend a series of field trips early in the comment period so the public can review the proposed REDAs and, with assistance from the

County's technical experts and consultants, assess the technical and other issues related to proposed REDAs and associated transmission.

Thank you for considering our comments. We look forward to working with Inyo County on the REGPA. Please address correspondence to each of the signers below at the email addresses provided.

Sincerely,

Stephanie Dashiell
California Representative
Defenders of Wildlife
Sdashiell@defenders.org

Helen O'Shea
Director, Western Renewable Energy Project
Natural Resources Defense Council
Hoshea@nrdc.org

Sally Miller
Senior Conservation Representative, CA
The Wilderness Society
Sally_miller@tws.org

Attachments:
1. Argonne National Laboratory Project Report: Utility-scale Solar Energy Facility Visual Impact Characterization and Mitigation Study
2. March 24, 2014 Comment letter to Board of Supervisors from Defenders, TWS, NRDC on REGPA
3. February 19, 2014 Comment letter to Cathreen Richards, Inyo County Planning Department from Defenders, TWS, NRDC on Proposed Action for REGPA
4. January 14, 2011 Comment letter to Joshua Hart, Inyo County Planning Department from Defenders, TWS, NRDC on Initial Study and Mitigated Negative Declaration of Environment Impact for General Plan Amendment No. 2010-03
5. December 9, 2010 Comment letter to Joshua Hart, Inyo County Planning Department from Defenders, TWS and NRDC on Preliminary Draft General Plan Amendment No. 2010-03

March 24, 2014

Board of Supervisors
Inyo County
PO Box N
Independence, California 93526
Delivered via email to: Jhart@inyocounty.us

RE: Inyo County Renewable Energy General Plan Amendment

Thank you for the opportunity to provide stakeholder comments for Inyo County's (County) Renewable Energy General Plan Amendment (REGPA) which is being prepared under a grant from the California Energy Commission (CEC). These comments are submitted on behalf of Defenders of Wildlife (Defenders), Natural Resources Defense Council (NRDC) and The Wilderness Society (TWS) and on behalf of our combined members and supporters, which number more than 350,000 in California alone.

Introduction

Inyo County is a land of superlatives. The combination of soaring snow-capped mountain ranges, sweeping valleys, desert riparian areas supported by springs and snowmelt rivers and diverse desert scenery creates a place of stunning beauty. Inyo County harbors a multitude of rare and threatened species, some of which are found nowhere else. And, Inyo County is a recreational paradise for residents and the millions of visitors who descend upon the region annually. Many of our members and supporters, from all over California and the U.S., regularly visit Inyo County and the Eastern Sierra to use its public lands for a variety of purposes including hiking, fishing and back-road touring, and they feel passionately about the County's landscapes.

Our organizations strongly support the emission reduction goals found in the Global Warming Solutions Act of 2006 (AB 32), including the development of renewable energy in California. We urge that in seeking to meet the state's renewable energy portfolio standard, and within Inyo County in particular, renewable energy development is designed and sited in the locations that will have the least potential impact on the values described above. Proper siting is essential to ensure that project approvals move

forward expeditiously and in a manner that does not sacrifice our fragile landscapes and wildlife, and our scenic vistas and recreational destinations, in the effort to meet our renewable energy goals.

As we transition toward a clean energy future, it is imperative for our future and the future of our wild places and wildlife that we strike the appropriate balance between addressing the near term impact of industrial-scale solar development with the long-term impacts of climate change on biological diversity, fish and wildlife habitat, and natural landscapes. To ensure that the proper balance is achieved, we need *smart planning* for renewable energy that *avoids and minimizes* adverse impacts on wildlife and lands with known high-resource values.

Our organizations support planning for renewable energy development and development of policies which incentivize "Smart from the Start" renewable energy projects.[1] Our preference is that projects be sited on disturbed private lands, brownfields and, lastly, on disturbed public lands. We also support the development of policies statewide that further incentivize rooftop solar and community-based solar projects. We recognize that a mix of technologies and approaches will be needed to meet California's renewable energy goals.

Inyo County Renewable Energy General Plan Amendment & Our Recommendations

We are pleased the County is working with the CEC to plan for renewable energy development within its jurisdiction, and we have supported the allocation of monies from the CEC to desert counties to develop renewable energy elements in their general plans. As organizations who have been involved in the Desert Renewable Energy Conservation Plan (DRECP) process, of which Inyo County is a part, it's critically important that knowledge and data on land use, species and habitat, development constraints and other factors flow both ways and be integrated between the counties, state and federal government. Our hope is that Inyo County and the DRECP agencies will ultimately develop a plan that helps the state and the County meet their respective renewable energy needs while preserving what is special about Inyo County, and provides more certainty for the County, the public and developers as to where renewable energy will and will not go.

However, *we do not support the "preferred alternative" (PA) as described by staff in its report to the Planning Commission (dated February 26, 2014) and recommended by the Planning Commission for adoption by the Board of Supervisors*. (The PA, once chosen,

[1] As part of Defenders of Wildlife's work on renewable energy planning and siting policy we prepared *Smart from the Start*, a report which is focused on incentivizing the siting of renewable energy projects in low-conflict areas and on impaired agricultural lands with low habitat value as an important strategy for accelerating renewable energy development and protecting vital natural resources. While the recommendations presented in the Report are based on Defenders' analysis of the opportunities and constraints for renewable energy development in the southern San Joaquin Valley, the recommendations are broadly applicable to other areas of California that are planning for renewable energy development. Available at: http://www.defenders.org/sites/default/files/publications/smartfromthestartreport12_print.pdf

would then be subject to analysis under the California Environmental Quality Act (CEQA) in a programmatic Environmental Impact Report (EIR)). The PA designates areas for development that are unrealistic, pose conflicts with other uses including diverse types of recreation, and could have detrimental impacts on wildlife and wildlife habitat[2]. We respectfully request that the Board adopt a modified "lesser-development" alternative (LDA); we have detailed suggested modifications in this letter, along with describing the reasons why some of the proposed Renewable Energy Development Areas (REDAs) in both the PA and the LDA are inappropriate locations for development. A modification of the LDA is a more realistic starting point from which to move forward in the CEQA process[3], and we believe will lead to a more successful plan that appropriately balances renewable energy development with conservation.

Our specific recommendations as to areas that should be further studied as potential REDAs (including for community solar) and those that should be eliminated are detailed below.

Desert Renewable Energy Conservation Plan

The DRECP, if approved, will be a Land Use Plan Amendment (LUPA) for the BLM, a Habitat Conservation Plan (HCP) under the Fish and Wildlife Service (FWS), and a Natural Communities Conservation Plan under CA Department of Fish and Wildlife (DFW). The plan is a coordinated planning and analysis process involving federal agencies, tribal governments and other stakeholders. The DRECP aims to identify those areas most suitable for development while providing conservation for species and natural communities that are impacted by the planned level of renewable energy development. Portions of Inyo County fall within the DRECP planning area which highlights the importance of cooperation and collaboration to ensure identification of development areas and conservation reserves align. We hope the County will integrate its planning with that of the DRECP and use the DRECP biological and conservation reserve design information to help guide its planning process so that the natural treasures that exist within Inyo County can be protected and preserved within the larger, connected landscape of the California desert.

BLM's Solar Energy Program

The Bureau of Land Management (BLM) has identified areas of public land having suitable insolation and relatively low environmental conflicts that are zoned for

[2] While the land area recommended by staff for designation as REDAs may indeed be small relative to Inyo County's land base, (less than 1% according to the staff report**)** it is still well over 600,000 acres of largely public lands. And, it is the *quality* of the land not the quantity that should dictate where renewable energy development should go.

[3] Our support for areas we think should be examined in a modified LDA does not mean we endorse these areas for development, but rather that they should be subject to a detailed analysis. We expect further fine tuning will be necessary, especially to ensure that any proposed REDAs do not conflict with the biological goals and objectives and the reserve design proposed for DRECP focal species.

streamlined permitting of renewable energy projects that employ standardized design features. The BLM Solar Energy Program, and the analysis that accompanied it, included no solar energy zones within Inyo County. The Solar Energy Program called for the identification of new zones on public and/or private lands via processes such as the DRECP. Thus any areas proposed for development by the County on public lands should be screened and ultimately approved through the DRECP, which is also a Land Use Plan Amendment for the BLM, the agency with jurisdiction on the public lands.

The Solar Energy Program also identified "variance lands," areas that could be subject to development pending a thorough pre-screening process (as outlined in the EIS for the BLM's solar program) but for which development is in no way guaranteed. Some of these lands exist in Inyo County. While some of these lands *may* ultimately be suitable for development, they are subject to a rigorous review process and should be the exception, not the rule. The variance lands should be subject to a thorough analysis not only via the REGPA but via the DRECP. We expect the DRECP will contain substantial biological and other information that will identify areas of likely conflict with BLM variance lands; any such lands should not be proposed as REDAs in the REGPA.

Technology Inclusive Planning

The REGPA should address and provide incentives for localized distributed generation. As renewable energy technology becomes more sophisticated, the opportunities for community-based renewable energy that is generated close to the point of use will expand. The REGPA should anticipate that future and encourage well-planned distributed generation and small-scale power projects. These types of projects are expected to reduce impacts to species and agricultural lands that result from large-scale remote power plants and their associated transmission facilities. The REGPA should ensure that small-scale projects that supply multiple users, such as a homeowner's association rooftops or local solar panel facilities, are not excluded from areas outside the REDAs. For example, a commercial park would potentially have significant rooftop area which could be used to supply power to all entities in the commercial park. The REGPA should consider and address any current limitation on rooftop or parking lot solar facilities, as well as other areas outside REDAs that could be suitable for solar, and ensure they are promoted[4].

Existing and Planned Electrical Transmission

Development and transmission of electrical energy derived from any future solar and wind energy facilities will require the use of existing transmission facilities with available capacity or new facilities. With a few exceptions, we are unaware of existing or planned transmission facilities that could support large-scale wind and solar energy development

[4] If policies already exist in the County's general plan to promote these types of renewable energy, this should be made clear in the REGPA.

in the County. We recommend that the REGPA be based on existing available transmission, which is most similar to the LDA. This would allow for a much more realistic proposed action and associated analysis. Until such time as the most suitable physical locations for renewable energy development are determined, based on biological and other data available via the DRECP Databasin Gateway planning tool and from local sources, we do not support planning for additional transmission lines or new corridors in Inyo County. The identification of potentially suitable locations for development should come first; the transmission, where feasible, should follow.

Biological Resource Considerations

1) Migratory Birds

Development of large-scale renewable energy is having direct and indirect impacts on migratory birds.[5] The scale of the impacts and the significance to the overall population abundance and ecology of migratory bird species is potentially severe, yet due to a lack of standardized monitoring and analysis, remains unknown. All migratory birds are protected under the Federal Migratory Bird Treaty Act and pursuant to Executive Order 13186, federal agencies taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations are responsible for promoting the conservation of migratory birds. At solar facilities in California that are either under construction or operational, individuals of over 40 species of migratory and resident birds have been found injured or dead. Avifauna impacted by these facilities includes multiple species of raptors, passerines, and waterbirds, including the endangered Yuma clapper rail (*Rallus longirostris yumanensis*), and the Yellow-billed cuckoo (*Coccyzus americanus*; proposed for federal listing). Some biologists believe that multiple bird species may perceive solar facilities as large bodies of standing water or reflected airspace through which to fly. In the case of power tower technology, as was recently proposed in eastern Inyo County, we are concerned about the effect on birds that come into contact with elevated flux levels and resulting immolation. Considering that the Owens Valley and Owens Lake, internationally recognized Important Bird Areas, are known to be used by migratory birds and are part of the Pacific Flyway[6], we are particularly concerned about large-scale renewable energy development in this area moving forward without understanding the severity of potential impacts. Until the impacts are better understood and techniques for avoidance and minimization have been established, we suggest that any utility-scale solar energy development planned for and developed in areas with high migratory bird use proceed with great caution. We have made some recommendations below in our comments on the Owens Valley and Owens Lake REDAs.

[5] Monthly compliance reports for solar projects under construction estimate up to 70 bird mortalities found incidentally within a month. For more information, see: http://www.kcet.org/news/rewire/solar/water-birds-turning-up-dead-at-solar-projects-in-desert.html

[6] This also includes Pleasant Valley Reservoir, Crowley Lake, Mono Lake, Bridgeport Reservoir and water bodies farther north.

2) Desert Bighorn Sheep
Inyo County is home to multiple populations of Desert bighorn sheep which tend to use the mountainous areas as their primary habitat. However, bighorn sheep require that there is intermountain habitat for them to migrate between mountain ranges and maintain genetic connectivity for a robust population. The California Department of Fish and Wildlife (DFW) has identified intermountain habitat for bighorn sheep that overlaps with many of the REDAs identified in Inyo County's REGPA. We encourage Inyo County to consult with the DFW to ensure that the placement of REDAs will not impede essential movement of bighorn sheep between populations.

3) Mohave Ground Squirrel
Mohave ground squirrel is a state-listed threatened species of ground squirrel found only in the Mojave desert. A portion of the public lands within Inyo County are designated as a Wildlife Habitat Management Area for the Mohave ground squirrel. This conservation area was established in 2006. Among the conservation provisions are a one percent cap on habitat loss and a five-to-one compensation ratio for lost habitat. New modeling of Mohave ground squirrel shows that much of the species habitat that is suitable under the current climate will not be suitable in future climate scenarios. Thus, it is extremely important that connectivity between habitat patches be maintained and that higher elevation habitat patches be prioritized for conservation and protection to ensure this species' survival.

4) Golden Eagles
Resident and migratory golden eagles frequently use the eastern Sierra landscape for either foraging or nesting habitat. Golden eagles are directly impacted by wind energy development through collision with the moving blades of wind turbines and indirectly through habitat fragmentation. When considering siting of wind energy facilities, it is essential the county refer to the Land-based Wind Energy Siting Guidelines and ensure that project proponents adhere to the Eagle Conservation Guidance from the FWS. The guidance included in these documents from FWS will assist wind developers in siting wind energy facilities to avoid impacts to golden eagles in the County. Use of the Land-based Wind Energy Siting Guidelines and the Eagle Conservation Guidance should be incorporated into any plans for wind development in the County.

Specific Comments and Recommendations on REDAs in the Preferred and Lesser Development Alternatives

We offer the following brief overviews and potential issues associated with the proposed overlay areas that are displayed in the staff-recommended preferred alternative (PA) and/or the lesser development alternative LDA. This section is intended not only to raise issues of concern *but also to focus attention on areas that we believe may be most appropriate for potential renewable energy development, pending site-*

specific analysis.[7] Any areas put forward for consideration should incorporate the biological and proposed information on reserve design from the draft DRECP, when it is released later this spring. For each potential REDA we note if it is being considered in the staff-recommended preferred alternative (PA) the LDA or both.

1) Laws (PA & LDA): The Laws area is subject to the regulations contained in the 1991 Long Term Water Agreement between Inyo County and the Los Angeles Department of Water and Power (LADWP), and additional irrigation and revegetation agreements between the two entities. Any renewable energy technology developed in this location should be carefully considered in light of these agreements.

2) Fish Lake Valley (PA): Public lands in Fish Lake Valley are designated Limited Use Class by BLM, and the proposed renewable energy area includes a portion of Cottonwood Creek flowing from the White Mountains. Four miles of Cottonwood Creek from the Forest Service boundary downstream on BLM land are a federal Wild and Scenic River. Public lands are within livestock grazing allotments which are actively used by local ranching operators. Public lands in the valley offer important scenic vistas of the surrounding valley. To our knowledge, Fish Lake Valley lacks existing or planned transmission facilities and local residences and businesses are served through local distribution lines. Consideration of solar energy development should therefore be limited to those private lands located near Oasis Road that are or have been used for alfalfa cultivation. Such development could serve the needs of local power consumers.

3) Deep Springs (PA): Public lands in Deep Springs Valley are designated as Limited Use Class by BLM, and are within an area of high visual resource value due to scenic vistas of surrounding valleys and mountain ranges. The valley is undeveloped except for Deep Springs College and Highway 168 that traverses the valley. Public lands in the valley are within the Deep Springs Grazing Allotment which is actively used by Deep Springs College. Furthermore, public lands in a portion of the valley within the proposed renewable energy area are a designated Wildlife Habitat Management area for the shadscale scrub habitat and State threatened Black toad. We are unaware of any existing or planned electrical transmission facilities in the valley except for distribution lines serving Deep Springs College and the Caltrans highway maintenance facility. Private lands could be considered for limited solar energy development using photovoltaic technology to serve the needs of Deep Springs College and the Caltrans facility. Public lands in this proposed REDA, due to existing uses and significant resource values, should be removed from consideration.

[7] We first provided Inyo County input on REDAs proposed in the 2011 REGPA. Since that time new information has come to light which has caused us to modify some of our initial recommendations.

4) Owens Valley (PA & LDA): The Owens Valley contains highly sensitive resources, including Mohave ground squirrel potential habitat, the Owens River and tributaries, highly scenic vistas, and high value wildlife resources including several Audubon Important Bird Areas (IBAs) for resident and migratory birds (Owens Lake and Owens River), habitat including lekking grounds for the bi-state population of the Greater sage grouse, trout streams, and free-roaming Tule elk herds. Large numbers of water birds are known to pass through the region, a part of the Pacific Flyway. These birds utilize Owens Lake, Crowley Lake and Mono Lake and pass through the Owens Valley, particularly during migration. Years of litigation have resulted in portions of the Valley being restored including 62 miles of the Lower Owens River and the Owens Lake delta as part of the Lower Owens River Project (LORP). The Valley is also subject to the 1991 Long Term Water Agreement. Any development that could adversely impact the requirements contained in this long-standing agreement should not be permitted.

   We recognize that portions of the Owens Valley may appear very appealing for large-scale renewable energy development due to its large size, generally level terrain and access to nearby transmission. However, in addition to the constraints identified above, new information about solar photovoltaic-bird mortalities has surfaced that also needs to be considered if any large-scale development is proposed here. Until more is understood about the interaction between migratory birds and solar photovoltaic facilities, we do not recommend siting large photovoltaic solar facilities in this region. Likewise, wind energy development could pose a significant risk to resident and migratory birds, some of which are listed under State and federal endangered species laws.

   We do believe that portions of the Owens Valley could be considered potentially suitable for solar photovoltaic development if facilities are sited on lands that have been previously disturbed, have low biological value and are sized and designed in a way to avoid impacts to migratory birds. There is nearby electrical transmission which could facilitate renewable energy generation and relatively short-distance connector lines at substations. Due to the sensitivity of the biological, scenic, historical and other resources within the Owens Valley, *we recommend that transmission capacity in the Owens Valley region and southern Inyo County be limited for the life of the REGPA to that which is presently available*. The Valley is sensitive enough, as the keen public interest in and concern about large-scale solar or wind development in Owens Valley has shown, that there needs to be a reasonable limit on development. It is our understanding that the LADWP Rinaldi line has approximately 250 MW of available transmission. The source of power for that transmission could come from any number of sources including projects sited in various places such as the Bishop airport, near communities, and areas within and south of the Owens Valley.

To address the problems posed by solar development for birds, if a REDA is proposed in the Owens Valley (or at Owens Lake; see below), the County's EIR should contain a thorough analysis of the state-of-knowledge currently available on solar-photovoltaic and solar-thermal bird injuries and mortalities. The EIR should require that if REDAs are identified in the Owens Valley or at Owens Lake, all project proponents contribute money to the state and federal wildlife agencies to fund further study of this problem. The County should also consult with the state and federal wildlife agencies to develop a protocol for analyzing projects in these REDAs as well as proposing a suite of mitigation measures that must be considered by all proponents. All proponents should be required to abide by these requirements.

Finally, a majority of the land within the proposed REDA is owned by the Los Angeles Department of Water and Power (LADWP) and is not under the jurisdiction of the County. We urge that the County work with its citizens, the Los Angeles Mayor's office, Los Angeles City Council, the LADWP Board of Water and Power Commissioners and others to help ensure that LADWP is part of the County's renewable energy planning going forward. We do not think it's possible to formulate a good plan for renewables development in the Owens Valley absent the full participation of its largest landowner. A collaborative planning process involving all stakeholders should be established that includes LADWP and that assesses an array of possible options for use of LADWP lands.

5) Owens Lake (PA & LDA): Owens Lake is identified as an IBA and was subject to a master planning process for the past five years that included Audubon, LADWP, state and federal agencies and multiple stakeholders. Similar to Owens Valley, the main issue with siting renewable energy in this REDA is the potential impact to migratory and resident birds, particularly to large numbers of shorebirds that breed at and migrate through Owens Lake. Additionally, the area around Owens Lake contains suitable habitat for Mohave ground squirrel. Owens Lake also contains sensitive archaeological resources.[8] For Owens Lake we recommending consulting the Owens Lake master planning process documents and, in particular, the "Report on the Owens Lake Master Plan Collaboration" (October, 2013) that outlines recommendations for placement of potential solar projects. For both the Owens Valley and Owens Lake REDAs, we recommend that no more development is allowed than the current existing transmission capacity can handle for the life of the REGPA. Any development that goes into this region needs to be very carefully sited to avoid impacts to sensitive resources and scenic viewsheds.

[8] See http://articles.latimes.com/2013/jun/02/local/la-me-massacre-site-20130603

6) Centennial Flat/Darwin (PA & LDA): As mentioned in the Planning Staff Report, this area is comprised largely of public lands in the California Desert Conservation Area and is classified by BLM as Limited Use Class. Public lands in the entire area, except for a narrow land area adjacent to Highway 190 overlap the 2006 Mohave ground squirrel designation. Groundwater within this area is very limited and likely insufficient to support solar energy development that would require considerable water for construction and operation. For the LDA, specifically, over half of the Centennial Flats area overlaps with modeled suitable habitat for Mohave ground squirrel and the Darwin area overlaps significantly with Mohave ground squirrel modeled habitat. Considering this is the northern end of the range of Mohave ground squirrel, it is likely that this portion may be more important considering range shifts in response to climate change.

   The area south of Highway 190 is identified as an essential habitat connectivity area linking large blocks of ecologically intact lands located to the north (Hunter Mountain, cottonwood Mountains, Inyo Mountains) with those to the south (Coso Range).[9] Additionally, this area was modeled as important intermountain habitat for Desert Bighorn Sheep based on genetic studies of dispersed populations of bighorn sheep across the California desert.

   The area is generally highly scenic with unobstructed vistas of the Coso, Inyo, Hunter Mountain and Argus Ranges. Cultural resource sensitivity is high, especially within and adjacent to the Coso Range and Darwin Falls. Consideration of renewable energy development should therefore eliminate the extensive public lands in this proposed REDA and be limited to the private lands located near the small community of Darwin, and limited to photovoltaic technology that would generate electrical power to serve local needs. There are no planned or existing transmission facilities in the area except for local distribution lines that serve Darwin.

7) Rose Valley (PA & LDA): Although electrical transmission is located in the valley, natural habitat here is occupied by Mohave ground squirrel and the loss of the habitat in this narrow valley would sever connectivity with populations to the north and south. The public lands in Rose Valley are designated as Mohave ground squirrel conservation area. We recommend that private lands that have been impacted by alfalfa farming and other commercial activities be considered for renewable energy development and that those federal lands essential for the conservation of Mohave ground squirrel be eliminated from consideration.

8) Pearsonville (PA & LDA): There appears to be significant acreage of disturbed private lands in the Pearsonville area directly adjacent to existing transmission

[9] Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for CA Department of Transportation, CA Department of Fish and Game, and Federal Highways Administration.

lines. These private lands, as well as disturbed public lands in the vicinity, may be suitable for development. It should be noted, however, that all public lands in this area are Limited Use Class and designated as Mohave ground squirrel conservation areas. Public lands located west of Highway 395 are essential in maintaining habitat connectivity and north-south movement for this species. We recommend that critical areas for the Mohave ground squirrel be removed from this REDA. Additionally, the northern section of this REDA overlaps with desert bighorn sheep intermountain habitat.

9) Panamint (PA): The proposed Panamint Valley renewable energy area is essentially all public land classified as Limited Use Class except for a relatively small area of Moderate Use Class associated with local limestone mining activity. Similar to other remote valleys in the County, Panamint Valley has very significant scenic qualities, with superb views of the Panamint, Argus and Hunter Mountain areas. Panamint Valley is adjacent to and part of the western gateway for Death Valley National Park. With a few exceptions – a small government radar facility near the Ballarat turnoff and Panamint Valley Road, a large gold mine in the extreme southern end of the proposed overlay area, and a limestone mine at the base of the Argus Range, Panamint Valley is void of development. Furthermore, there are no existing or planned electrical transmission facilities in the valley. Nearly all the non-federal land in Panamint Valley is owned by the State of California and under jurisdiction of the State Lands Commission. We agree with the removal of Panamint Valley in the LDA and do not think the County should consider siting renewable energy in this area.

10) Trona (PA & LDA): Public lands within the Trona overlay area are a mixture of Limited Use Class, Moderate Use Class, and Unclassified. The southern portion of the overlay area contains private lands, and public lands in the Moderate Use Class and Unclassified that appear suitable for solar energy development consideration. Due to military and civilian aircraft operations within the area, we suggest that only photovoltaic technology be considered. Some transmission capacity may exist in SCE facilities linking the Searles Valley with the substations in the Indian Wells Valley. Photovoltaic solar development on private and Unclassified public lands could be used to generate electrical power for use in the local area of Homewood Canyon, Pioneer Point, and Trona.

11) Death Valley Junction (PA): Lands within the proposed Death Valley Junction REDA include the historic Amargosa Opera House and hotel, and are located in the center of the region serving as the eastern gateway for Death Valley National Park. An area of approximately 1,000 acres in Death Valley Junction is held in trust for the Timbisha Shoshone Tribe in addition to a federal allocation of 15.1 acre feet per annum of groundwater for the purposes associated with use of the lands. We are unaware of any planned or existing transmission lines in the area, and existing distribution lines serve local communities. Groundwater in

this area is associated with the Death Valley Flow System which extends far north into Nevada. The local Amargosa Groundwater Basin is in overdraft and fully allocated within Nevada.

Public lands in this area were excluded from consideration for solar development through analysis of the BLM's Solar Energy Program. Thus, any limited development that may take place should be on suitable private lands and should not require any new groundwater to become operational. Photovoltaic technology on a scale that would serve the needs of the local community may be appropriate.

12) Chicago Valley (PA): Public lands in this area are designated as Limited Use Class. Groundwater in the basin is limited and there are no electrical transmission facilities other than local distribution lines serving scattered local residences. Chicago Valley has well developed mesquite woodland habitat and is suitable Desert tortoise habitat. Golden eagles nest in numerous locations in surrounding mountain ranges and likely utilize Chicago Valley for foraging. Bighorn sheep occur in these ranges as well, and may cross Chicago Valley during inter-herd movements or utilize the bajadas in the valley adjacent to the mountains for winter and early spring forage. This area has been modeled as intermountain habitat for desert bighorn sheep. We agree with the decision to remove this REDA in the LDA and do not think the County should consider renewable energy development in this region.

13) Charleston View (PA & LDA): We consider private lands within this proposed REDA potentially suitable for renewable energy development provided that water demands are low and in balance with the limited and over-utilized groundwater supply in the Pahrump Valley region. We urge great caution in this regard because there is potential for groundwater in this basin to be connected with the Death Valley Flow System and the Amargosa River. For these reasons, we strongly recommend that this area be designated as a potential REDA for photovoltaic technology only. Undeveloped public lands within the REDA likely support populations of the threatened Desert tortoise. We recommend that public lands not be considered for development unless they have been designated by BLM as Unclassified and suitable for disposal.

14) Sandy Valley (PA & LDA): The Sandy Valley REDA is comprised of private and public lands, the latter of which are designated Unclassified by BLM. Many of the private land parcels are used for alfalfa and sod production or are no longer in use. This REDA appears to be suitable for consideration of solar energy facility development provided water use requirements are minimized, such as through the use of photovoltaic technology requiring minimal water for infrequent solar panel washing. Groundwater under Sandy Valley is in a state of decline due to groundwater extraction for alfalfa and sod grass irrigation, and any additional

water demand may result in groundwater depletion issues in adjacent Nevada, where residents of Sandy Valley, Nevada also use the same groundwater but under Nevada permits.

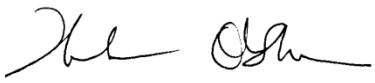
Conclusion

In a variety of landscapes that contain unique and threatened species, diverse habitats and world-class scenic and recreational resources, Inyo County has a tremendous responsibility to plan "right" for renewable energy development. Working with the DRECP and other agencies to sync data and planning, having a very transparent public process and engaging LADWP in planning for both renewable energy and conservation, we believe it can be done. We look forward to working with Inyo County to ensure the development of an REGPA that identifies appropriate locations for various scales of renewable energy while ensuring protection for sensitive desert species and habitat, preserving Inyo County's world-class scenery and helping to diversify the economy of Inyo County.

We thank the staff of the Inyo County planning department for their hard work and diligence through what has been an intensive process to date.

Respectfully submitted,

Stephanie Dashiell
California Representative
Defenders of Wildlife
Sdashiell@defenders.org



Helen O'Shea
Director, Western Renewable Energy Project
Natural Resources Defense Council
Hoshea@nrdc.org

Sally Miller
Senior Conservation Representative, CA
The Wilderness Society
Sally_miller@tws.org

February 19, 2014

Cathreen Richards
Inyo County Planning Department
Via email: Crichards@inyocounty.us

RE: Proposed Action, Inyo County Renewable Energy General Plan Amendment (REGPA)

Dear Cathreen,

We are writing with regard to Inyo County's proposed action for its Renewable Energy General Plan Amendment (REGPA), which we understand will be considered at a planning commission workshop on February 26. Representatives from our organizations cannot attend the workshop in person and are unable to submit detailed comments on the proposed action before the workshop, due to the volume of REGPA material Inyo County has shared with the public and the short timeframe available for review. We are instead submitting these brief "preliminary" comments, and will submit more detailed comments when the issue is considered by the Board of Supervisors at its meeting on March 18.

First, we would like to express our appreciation for Inyo County sharing its proposed action in advance of initiating the California Environmental Quality Act (CEQA) process, and for hosting last week's webinar to provide clarification and answer questions on the proposed action materials.

We thank Inyo County for proposing to incorporate important policies into its general plan, such as those related to promotion of small-scale renewable energy development, avoidance and minimization of the impacts of development, and promotion of solar photovoltaic placement along the Los Angeles aqueduct.

We also have some general comments on the proposed action (recommend preferred alternative). As expressed in comments we have previously provided to Inyo County, there are biological conflicts with many of the proposed Renewable Energy Development Areas (REDAs). These areas were first identified during Inyo County's 2011 process to establish a renewable energy overlay and the comments we submitted at that time are still relevant considering the REDAs appear very similar to those

previously identified. We have attached our comments from 2011 that highlight biological conflicts within the REDAs.

Additionally, we are concerned that portions of the proposed REGPA that are within the planning area for the Desert Renewable Energy Conservation Plan (DRECP) appear to be in conflict with the most recent publicly available preliminary conservation strategy for the DRECP (see http://drecp.org/documents/docs/preliminary_conservation_strategy/index.php). Many of the areas identified as REDAs are in conflict with areas identified in the preliminary conservation strategy. We urge the County to include an alternative that minimizes biological conflicts and takes into account the conservation goals of the DRECP, and provides a sound blueprint for potential future development of renewable energy within the County. We believe that a modification of the proposed "Less Intensive Alternative" (see staff report, p. 24) would be a good starting point. Our hope is that the County's efforts and those of the DRECP agencies will ultimately be consistent with one another.

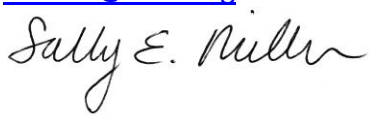
Thank you very much for your work on the REGPA and your efforts to engage the public in the process. We look forward to working with Inyo County to identify appropriate locations for large-scale (and small-scale) renewable energy development while also preserving key areas of importance for desert-dwelling species as well as recreation and scenic destinations that are valued by residents and visitors.

Sincerely,

Stephanie Dashiell
California Representative
Defenders of Wildlife
P.O. Box 2131
Joshua Tree, CA 92252
sdashiell@defenders.org

Helen O'Shea
Director, Western Energy Renewable Project
NRDC
111 Sutter St., 20th floor
San Francisco, CA 94104

hoshea@nrdc.org



Sally Miller
CA Senior Conservation Representative
The Wilderness Society
P.O. Box 22
Lee Vining, CA 93541
sally_miller@tws.org

Attachment: Comments of Defenders of Wildlife, NRDC and The Wilderness Society, Initial Study of Environmental Impact and a Draft Mitigated Negative Declaration of Environmental Impact for General Plan Amendment No. 2010-03 (Renewable Solar and Wind Energy) Inyo County, CA.

DEFENDERS OF WILDLIFE
NATURAL RESORUCES DEFENSE COUNCIL
THE WILDERNESS SOCIETY

January 14, 2011

Joshua Hart, Director
Inyo County Planning Department
Post Office Drawer L
168 N. Edwards Street
Independence, California 93526

(Via Email to: jhart@inyocounty.us; inyoplanning@inyocounty.us)

Re: Initial Study of Environmental Impact and a Draft Mitigated Negative Declaration of Environmental Impact for General Plan Amendment No. 2010-03 (Renewable Solar and Wind Energy) Inyo County, CA

Dear Mr. Hart:

Thank you for the opportunity to provide comments on the Draft Mitigated Negative Declaration ("Declaration") for Inyo County's proposed General Plan Amendment No. 2010-03, intended to facilitate solar and wind energy development. Our organizations submitted written comments on the Preliminary Draft General Plan Amendment No. 2010-03 in a letter to the Inyo County Planning Department dated December 9, 2010.

These comments and recommendations are submitted by the Defenders of Wildlife ("Defenders"), Natural Resources Defense Council ("NRDC") and The Wilderness Society ("TWS").

Defenders is a national environmental organization with more 950,000 members and supporters in the U.S., 145,000 of who reside in California. Defenders is dedicated to protecting all wild animals and plants in their natural communities. To this end, Defenders employs science, public education and participation, media, legislative advocacy, litigation and proactive on-the-ground solutions in order to prevent the extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

NRDC is a non-profit environmental organization with 1.3 million members and online activists, more than 250,000 of whom live in California. NRDC uses law, science and the support of its

members and activists to protect the planet's wildlife and wild places and to ensure a safe and healthy environment for all living things.

The mission of **TWS** is to protect wilderness and inspire Americans to care for our wild places. TWS has worked for more than 70 years to maintain the integrity of America's wilderness and public lands. With more than half a million members and supporters nationwide, TWS represents a diverse range of citizens.

Our organizations strongly support the emission reduction goals found in the Global Warming Solutions Act of 2006, AB 32, including the development of renewable energy in California. However, in seeking to meet California's renewable energy portfolio standard, permitting agencies and project proponents must carefully plan for, and site and design renewable energy generation and transmission projects in the most sustainable manner possible. This is essential to ensure that project approval moves forward expeditiously and in a manner that does not sacrifice our critically important landscapes and wildlife.

Our comments are focused on the adequacy and relevance of the Declaration as it pertains to specific actions proposed by Inyo County. Based on the Declaration, it is our understanding the proposed action includes the following:

1. A General Plan Land Use Designation Overlay showing specific land areas in which renewable energy projects, specifically solar and wind, may be developed, based on site specific studies pursuant to the County's Renewable Energy Ordinance and other applicable State, federal, and local laws.
2. Identifying appropriate means to develop renewable wind and solar energy resources, provided that social, economic, and environmental impacts are minimized.
3. Offsetting costs to the County and lost economic development potential, and mitigation of economic effects.
4. Working to protect military readiness.
5. Considering conversions of lands utilized for agriculture, mining, and recreation.

Our comments are as follows:

Planning Framework

As we discussed in our previous letter of December 9, 2010, the proposed action and the associated Declaration should address two categories of lands, 1) those over which Inyo County has jurisdiction, and 2) those under the jurisdiction of federal, state or tribal governments over which Inyo County has no direct jurisdiction. The Declaration and supporting documentation provide no indication that Inyo County has entered into any agreements with the Bureau of Land Management (BLM), the U.S. Navy or tribal governments regarding designation of solar and wind energy development areas on lands under the jurisdiction of those entities. We appreciate

the County's interest in planning ahead for renewable energy development; however, such planning will be most effective if conducted in conjunction with the agencies that have actual jurisdiction.

Draft Solar Programmatic Environmental Impact Statement

We are presently studying the federal Draft Solar Programmatic Environmental Impact Statement ("PEIS") released by the Departments of Energy and Interior ("DOE" and "DOI") on December 17, 2010. The purpose of this document is to identify areas of public land having suitable insolation and minimal environmental conflicts that could be zoned for streamlined permitting of renewable energy projects that employ standardized design features. This draft plan and analysis has been under development for approximately two years, and has already included extensive opportunities for public comment.

The PEIS includes no proposed solar energy zones ("SEZs") within Inyo County, and none were identified during the earlier planning phases of the project. However, outside of the proposed SEZs, the document does identify a few public land areas in the County as having the potential for solar development. Our organizations strongly favor limiting consideration of solar development on public lands to those areas within the federally identified SEZs. At this time, the public land areas in Inyo County are only *proposed* and, what is more, as discussed below, several have significant conflicts.

Accordingly, we again suggest that Inyo County limit its designation of solar and wind development areas to lands within its jurisdiction until such time as other potentially suitable areas on federal and tribal lands are identified through a coordinated planning and analysis process involving federal agencies and tribal governments. We also suggest that Inyo County work cooperatively with the DOE and DOI to identify potentially suitable study areas within Inyo County that could be considered for development zones through the Solar PEIS process or in a subsequent designation process.

Desert Renewable Energy Conservation Plan.

We encourage Inyo County to become involved in the development of the Desert Renewable Energy Conservation Plan ("DRECP") so that potentially suitable lands within Inyo County are addressed for both renewable energy development and conservation through the provisions of California's Natural Communities Conservation Planning Act ("NCCP") Act.

We note that in the Declaration (page 14, Environmental Checklist Form), the proposed action with regard to consistency with other applicable plans and policies is described as follows:

"The proposed GPA is expected to compliment the DRECP, which is currently being formulated, and renewable energy development will be required to be consistent with the DRECP, the West Mojave Plan, any plan developed for the Owens Lakebed, or other applicable habitat conservation or natural community conservation plans. Compliance with BMPs, the Inyo County General Plan, the Renewable Energy Ordinance, and other relevant local, State, and federal rules, regulations, policies, and procedures will work to ensure less than significant impacts."

The DRECP is in the early stages of development, and no renewable energy development zones or conservation areas have yet been proposed for analysis. That planning project will affect renewable energy permitting and development on private lands because it is a State plan being prepared under the provisions of the NCCP Act. The BLM has agreed to participate and to consider amending public land management plans to conform to the recommendations stemming from the DRECP. The West Mojave Plan, which was signed by the BLM in 2006, applies only to federal lands and does not address renewable energy development. Although Inyo County was participating in the development of the West Mojave Plan provisions applicable to private lands, it is our understanding that Inyo County chose to not adopt any of those provisions of the plan.

Until such time as the DRECP is completed and its provisions adopted by Inyo County as well as the BLM for private and public lands in Inyo County, we believe it is unrealistic and premature for Inyo County to conclude that the proposed action will "…ensure less than significant" impacts. On the contrary, a significant number of the "fast-track" renewable energy projects that were the subject of permitting by the California Energy Commission and BLM were found to have significant impacts to scenic, biological and other resources by our organizations and others. Indeed, under the standards of the California Environmental Quality Act ("CEQA"), the California Energy Commission was forced to adopt "overrides" of CEQA's requirement to mitigate impacts to less than significant levels in order to allow projects to be permitted.

Existing and planned electrical transmission

Development and transmission of electrical energy derived from any future solar and wind energy developments will require the use of existing transmission facilities with available capacity or new facilities. With a few exceptions that we detail below, we are unaware of existing or planned transmission facilities that could support large-scale wind and solar energy development. We recommend that the overlay be revised based on existing and planned transmission. This would allow for a much more realistic proposed action and associated analysis.

California Environmental Quality Act ("CEQA") Considerations

Based on our review of the Declaration and related documents, we do not find any supporting evidence that would allow for a finding that the proposed action would not potentially result in significant environmental impacts under the provisions of CEQA. There is no analysis of the potential effects within the overlay areas of renewable energy development on sensitive natural and cultural resources, some of which we detail in site-specific area descriptions below, and no accounting of these resources and their significance was provided. To the contrary, we believe that the project as proposed may have a significant effect on the environment. For example, as noted below, public lands in the Centennial Flat area contains an "essential habitat connectivity" area that could be compromised by large-scale renewable energy development. Some of the proposed renewable energy zones in western Inyo County contain habitat for the State threatened Mohave ground squirrel. This species could be significantly and cumulatively impacted by substantial energy development.

Page nine of the Declaration contains the finding statement: "I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made or agreed to by the project proponent." We have not found evidence in the Declaration that indicates revisions have been made to the proposed project by Inyo County that will *lessen* potential environmental impacts; in fact, from the time the public was first provided copies of the draft maps via the County's website, the scope of the proposed renewable energy zones appears to have been expanded not only to include flat valley bottoms for solar but also upland areas for wind. Some of these upland areas may provide important habitat and connectivity areas for numerous species, examples of which include the Mohave ground squirrel and Desert bighorn sheep.

Due to the potential for significant, cumulative impacts to the environment, we recommend that an environmental impact report ("EIR") be prepared under the provisions of CEQA.[1] The proposed action and a reasonable range of alternatives to the proposed action should be thoroughly analyzed. Preparation of an EIR, with the involvement of California Department of Fish and Game, Office of State Historic Preservation, Native American Heritage Commission, federal land managing agencies, affected Native Americans and the general public, will help guide Inyo County in its pursuit of sustainable and environmentally suitable renewable energy development.

We believe that a reasonable range of alternatives to the proposed action should include the following alternatives: limiting renewable energy zones to private lands; limiting renewable energy zones to those areas which are serviced by existing or already-planned transmission lines;

[1] Alternatively and ideally, we recommend that Inyo County engage with those agencies with land management jurisdiction, e.g., BLM, to develop a joint EIR-environmental impact statement.

and limiting technology for solar energy to photovoltaic panels due to their inherent requirement for less water consumption. Alternatives that reduce or scale-back the size of overlay areas having potentially significant impacts to cultural and natural resources should also be identified and analyzed. Our hope is that Inyo County, working with other agencies, can ultimately develop a realistic and focused plan for renewable energy development that will ably serve the needs of the County and California's citizens.

Specific Proposed Overlay Areas

We offer the following brief overviews and potential issues associated with some of the proposed overlay areas. This section is intended not only to raise issues of concern but also to focus attention on areas that we believe may be most appropriate for potential renewable energy development, pending site-specific analysis.

a. Centennial Flats and Darwin. This area is comprised largely of public lands in the California Desert Conservation Area and is classified by the Bureau of Land Management as Limited Use Class. Also within this area are the Timbisha Shoshone Centennial Trust Lands, located approximately 10 miles northwest of the town of Darwin and about 2 miles south of State Route 190, and comprised of 640 acres. The Centennial parcel was placed into trust for the Timbisha Shoshone, along with a water right of 10 acre-feet per year, through the Timbisha Homeland Act of 2000.

   Public lands in the entire area, except for a narrow land area adjacent to Highway 190, are designated as a Wildlife Habitat Management Area for conservation of the State threatened Mohave ground squirrel. This conservation area was established by the BLM in 2006. Among the conservation provisions are a one-percent cap on habitat loss, and five-to-one habitat loss compensation.

   Groundwater within this area is very limited and likely insufficient to support solar energy development that would require considerable water for construction and operation. The area south of Highway 190 is identified as an essential habitat connectivity area linking large blocks of ecologically intact lands located to the north (Hunter Mountain, Cottonwood Mountains, Inyo Mountains) with those to the south (Coso Range) (see Spencer et. al 2010).[2] The area is generally highly

[2] Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

scenic with unobstructed vistas of the Coso, Inyo, Hunter Mountain and Argus Ranges. Cultural resource sensitivity is high, especially within and adjacent to the Coso Range and Darwin Falls. Consideration of renewable energy development should be limited to the private lands located near the small community of Darwin, and limited to photovoltaic technology that would generate electrical power to serve local needs. There are no planned or existing electrical transmission facilities in the area except for local distribution lines that serve Darwin

b. Charleston View. We consider private lands within this proposed overlay area potentially suitable for renewable energy development provided that water demands are low and in balance with the limited and over-utilized groundwater supply in the Pahrump Valley region. We urge great caution in this regard because there is potential for groundwater in this basin to be connected with the Death Valley Flow System and the Amargosa River. For these reasons, we strongly recommend that this area be designated as a potential development zone for photovoltaic technology only. Undeveloped public lands within this area likely support populations of the threatened Desert tortoise. We recommend that public lands not be considered for development unless they have been designated by BLM as Unclassified and suitable for disposal.

c. Chicago Valley. Public lands in this area are designated as Limited Use Class. Groundwater in the basin is limited and there are no electrical transmission facilities other than local distribution lines serving scattered local residences. Chicago Valley has well developed mesquite woodland habitat and is suitable Desert tortoise habitat. Golden eagles nest in numerous locations in surrounding mountain ranges and likely utilize Chicago Valley for foraging. Bighorn sheep occur in these ranges as well, and may cross Chicago Valley during inter-herd movements or utilize the bajadas in the valley adjacent to the mountains for winter and early spring forage. We recommend that this area be removed from consideration due to resource sensitivity and the absence of transmission facilities.

d. China Lake. We recommend consultation with the U.S. Navy for this area because it is entirely within the Naval Air Weapons Station.

e. Death Valley Junction. Lands within the proposed Death Valley Junction, California area include the historic Amargosa Opera House and hotel, and are located in the center of the region serving as the eastern gateway for Death Valley National Park. An area of approximately 1,000 acres in the Death Valley

Junction area is held in trust for the Timbisha Shoshone Tribe in addition to a federal allocation of 15.1 acre feet per annum of groundwater for the purposes associated with use of the lands. We are unaware of any existing or planned electrical transmission lines in the area, and existing distribution lines serve local communities. Groundwater in the area is associated with the Death Valley Flow System which extends far north into Nevada. The local Amargosa Groundwater Basin is in overdraft and fully allocated within Nevada. We are pleased that Inyo County is well aware of the sensitivity of this region with regard to groundwater, and any limited development that may take place on suitable private lands should not require any new groundwater to become operational. Photovoltaic technology on a scale that would serve the needs of the local community may be appropriate.

f. Rose Valley. Although electrical transmission is located in the valley, natural habitat here is occupied by the State threatened Mohave ground squirrel, and loss of this habitat would seriously threaten its connectivity with populations to the north and south through this narrow valley. Public lands in Rose Valley are designated by BLM as a Wildlife Habitat Management Area for Mohave ground squirrel conservation. We recommend that private lands that have been impacted by alfalfa farming and other commercial activities be considered for renewable energy development and that those federal lands essential for the conservation of the Mohave Ground Squirrel be eliminated from consideration. Cumulative impacts to this species in this particular area are significant. We encourage Inyo County to enter into discussions with the Los Angeles Department of Water and Power for potential photovoltaic solar facility or wind development on impacted lands near Haiwee Reservoir and the Los Angeles Aqueduct.

g. Deep Springs. Public lands in Deep Springs Valley are designated as Limited Multiple Use Class, and are within an area of high visual resource value due to scenic vistas of surrounding valleys and mountain ranges. The valley is undeveloped except for Deep Springs College and Highway 168 that traverses the valley. Public lands in the valley are within the Deep Springs Grazing Allotment which is actively used by Deep Springs College. Furthermore, public lands in a portion of the valley within the proposed renewable energy area are a designated Wildlife Habitat Management area for the shadscale scrub habitat and State threatened Black toad. We are unaware of any existing or planned electrical transmission facilities in the valley except for distribution lines serving Deep Springs College and the Caltrans highway maintenance facility. Private lands could be considered for limited solar energy development using photovoltaic technology to serve the needs of Deep Springs College and the Caltrans facility.

Public lands, due to existing uses and significant resource values, should be removed from consideration.

h. Fish Lake. Public lands in Fish Lake Valley are designated Limited Use Class, and the proposed renewable energy area includes a portion of Cottonwood Creek flowing from the White Mountains. Four miles of Cottonwood Creek from the Forest Service boundary downstream on BLM land are a federal Wild and Scenic River. Public lands are within livestock grazing allotments which are actively used by local ranching operators. Public lands in the valley offer important scenic vistas of the surrounding valley. Fish Lake Valley lacks existing or planned transmission facilities and local residences and businesses are served through local distribution lines. Consideration of solar energy development should therefore be limited to those private lands located near Oasis Road that are or have been used for alfalfa cultivation. Such development could serve the needs of local users.

i. Owens Valley. Portions of this large valley could be considered potentially suitable for renewable energy development if facilities are limited to photovoltaic technology and sited on lands that have been previously disturbed or that have low biological value. There is ample and nearby electrical transmission which could facilitate renewable energy generation and relatively short-distance connector lines at substations. The valley, however, contains highly sensitive resources, including the Owens River and tributaries, highly scenic vistas, and high-value wildlife resources including resident and migratory birds, trout streams, and free-roaming Tule elk herds. Substantial development within the Owens Valley would likely have significant environmental impacts due to visual resources alone. A majority of the land within the proposed area is owned by the City of Los Angeles, which recently proposed the development of the Southern Owens Valley Solar Ranch adjacent to Highway 136 and the northeast shoreline area of Owens Lake. Wind energy development in this region could pose significant risk to resident and migratory birds, some of which are listed under State and federal endangered species laws. All migratory birds are protected under the Federal Migratory Bird Treaty Act.

j. Panamint Valley. The proposed Panamint Valley renewable energy area is essentially all public land classified as Limited Use Class except for a relatively small area of Moderate Use Class associated with local limestone mining activity. The Timbisha Shoshone Natural and Cultural Preservation Area is located adjacent to the eastern boundary of the proposed overlay area. Similar to other remote valleys being proposed for renewable energy development zoning,

Panamint Valley has very significant scenic qualities, with superb views of the Panamint, Argus and Hunter Mountain areas. Panamint Valley is adjacent to and part of the western gateway for Death Valley National Park. With a few exceptions – a small government radar facility near the Ballarat turnoff and Panamint Valley Road, a large gold mine in the extreme southern end of the proposed overlay area, and a limestone mine at the base of the Argus Range, Panamint Valley is void of development. Furthermore, there are no existing or planned electrical transmission facilities in the valley. Nearly all the non-federal land in Panamint Valley is owned by the State of California and under the jurisdiction the State Lands Commission. We strongly recommend that Panamint Valley be removed from consideration given the high natural and cultural resources in the area.

k. Pearsonville. There appears to be significant acreage of disturbed private lands in the Pearsonville area directly adjacent to existing transmission lines. These private lands, as well as disturbed public lands in the vicinity, may be suitable for development. It should be noted, however, that all public lands in this area are Limited Use Class and a designated Wildlife Habitat Management Area for the State threatened Mohave ground squirrel. Public lands located west of highway 395 are essential in maintaining habitat connectivity and north-south movement for this species. We recommend that critical areas for the Mohave ground squirrel be removed from the overlay zone.

l. Sandy Valley. The Sandy Valley overlay area is comprised of private and public lands, the latter of which are designated Unclassified by BLM. Many of the private land parcels are used for alfalfa and sod production or are no longer in use. This overlay area appears to be suitable for consideration of solar energy facility development provided water use requirements are minimized, such as through the use of photovoltaic technology requiring minimal water for infrequent solar panel washing. Groundwater under Sandy Valley is in a state of decline due to groundwater extraction for alfalfa and sod grass irrigation, and any additional water demand may result in groundwater depletion issues in adjacent Nevada, where residents of Sandy Valley, Nevada also use the same groundwater but under Nevada permits.

m. Tecopa. The proposed overlay areas appear to fall on public lands designated as the Amargosa River and Grimshaw Lake Area of Critical Environmental Concern. We recommend that the overlay areas be modified to include only disturbed private lands. There is no existing transmission capacity in this area. At

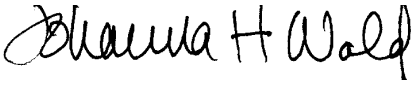
most, we recommend that renewable energy development in this area be limited to projects that can supply community needs using only photovoltaic technology.

n. Trona. Public lands within the Trona overlay area are a mixture of Limited Use Class, Moderate Use Class, and Unclassified. The southern portion of the overlay area contains private lands, and public lands in the Moderate Use Class and Unclassified that appear suitable for solar energy development consideration. Due to military and civilian aircraft operations within the area, we suggest that only photovoltaic technology be considered. Some transmission capacity may exist in SCE facilities linking the Searles Valley with the substations in the Indian Wells Valley. Photovoltaic solar development on private and Unclassified public lands could be used to generate electrical power for use in the local area of Homewood Canyon, Pioneer Point, and Trona.

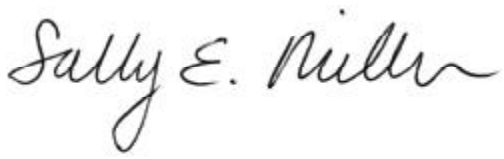
We hope these comments are helpful to Inyo County in its development of an amendment to the General Plan that identifies potentially suitable and environmentally responsible opportunities for development of solar and wind energy resources. Please contact us if we can provide additional assistance or if you have questions about our comments. Please direct future correspondence to each of the individuals listed below. Thank you for your consideration.

Sincerely,

Jeff Aardahl
California Representative
Defenders of Wildlife
46600 Old State Highway, Unit 13
Gualala, CA 95445
Email: jaardahl@defenders.org



Johanna Wald
Director, Western Renewable Energy Project
Natural Resources Defense Council
111 Sutter Street, 20th floor
San Francisco, CA 94104
Email: jwald@nrdc.org



Sally Miller
Senior Conservation Representative
The Wilderness Society
P.O. Box 442
Lee Vining, CA 93541
Email: sally_miller@tws.org

DEFENDERS OF WILDLIFE
NATURAL RESORUCES DEFENSE COUNCIL
THE WILDERNESS SOCIETY

December 9, 2010

Joshua Hart, Director
Inyo County Planning Department
Post Office Drawer L
168 N. Edwards Street
Independence, California 93526

(Via Email to: jhart@inyocounty.us; inyoplanning@inyocounty.us)

Re: Inyo County Solar and Wind Energy Development: Preliminary Draft General Plan Amendment No. 2010-03

Dear Mr. Hart:

Thank you for the opportunity to provide comments and recommendations on Inyo County's effort to facilitate responsible solar and wind energy development through an amendment to the General Plan. It is our understanding that the Inyo County Planning Department is embarking on this effort through preliminary informational and scoping meetings and requesting comments from the general public, and that a formal announcement of a proposed amendment to the General Plan will be developed and released for public review in the near future.

These comments and recommendations are submitted by the Defenders of Wildlife ("Defenders"), Natural Resources Defense Council ("NRDC") and The Wilderness Society ("TWS").

Defenders is a national environmental organization with more 950,000 members and supporters in the U.S., 145,000 of who reside in California. Defenders is dedicated to protecting all wild animals and plants in their natural communities. To this end, Defenders employs science, public education and participation, media, legislative advocacy, litigation and proactive on-the-ground solutions in order to prevent the extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

NRDC is a non-profit environmental organization with 1.3 million members and online activists, more than 250,000 of whom live in California. NRDC uses law, science and the support of its members and activists to protect the planet's wildlife and wild places and to ensure a safe and healthy environment for all living things.

The mission of **TWS** is to protect wilderness and inspire Americans to care for our wild places. TWS has worked for more than 70 years to maintain the integrity of America's wilderness and public lands and to ensure that land management practices are sustainable and based on sound

science to ensure that the ecological integrity of the land is maintained. With more than half a million members and supporters nationwide, TWS represents a diverse range of citizens.

We strongly support the emission reduction goals found in the Global Warming Solutions Act of 2006, AB 32, including the development of renewable energy in California. However, in seeking to meet California's renewable energy portfolio standard, permitting agencies and project proponents must carefully plan for, and site and design renewable energy generation and transmission projects in the most sustainable manner possible. This is essential to ensure that project approval moves forward expeditiously and in a manner that does not sacrifice our critically important landscapes and wildlife.

Collectively, we provide the following issues and recommendations to help guide the development of an amendment to the General Plan for preparation of the Environmental Impact Report (EIR) for this proposed project:

1. General planning strategy: We strongly recommend that a long-range, comprehensive, and strategic planning process involving the public be used to achieve the goals of increasing the generation and utilization of renewable solar and wind energy resources in Inyo County. Such a planning approach would enable Inyo County to methodically and objectively guide renewable energy development in an environmentally responsible manner by avoiding or minimizing significant environmental and social conflicts. In item number 4, below, we offer a recommendation for carrying out such a comprehensive, strategic planning effort.

2. Interagency coordination: We recognize and are pleased the Inyo County Planning Department has been participating in other renewable energy planning efforts in California, such as the Renewable Energy Transmission Initiative spearheaded by the California Energy Commission; the Desert Renewable Energy Conservation Plan (DRECP) which is in an early stage of development by the Renewable Energy Action Team comprised of members from the California Energy Commission, California Department of Fish and Game, Bureau of Land Management and Fish and Wildlife Service; and the Programmatic Environmental Impact Statement for Solar Energy Development on public lands.

   We strongly encourage continued and frequent involvement by Inyo County in the above efforts, and especially in development of the DRECP. Although the DRECP planning area does not extend into all areas of Inyo County that may be suitable for consideration of future solar and wind energy development, many of the planning and conservation requirements and goals could be readily adopted by the Inyo County Planning Department as part of its overall strategic planning process. For those areas within Inyo County that are within the DRECP planning boundary, we believe that continued participation by Inyo County in this planning effort will provide the most appropriate

venue for identifying suitable areas for renewable energy development and conservation. Furthermore, this approach would allow Inyo County to benefit from the extensive data collection and analysis, scientific expertise, planning structure, and public involvement associated with the DRECP effort.

3. Two-tiered planning strategy: We strongly recommend that the planning strategy used to identify zones renewable energy development within Inyo County is based on two-tiers: 1) Lands subject to Inyo County jurisdiction and 2) Federal and Tribal Lands outside Inyo County jurisdiction. For the latter category of lands, the Bureau of Land Management and Tribal governments would need to agree to take the lead in identifying potentially suitable zones, and work jointly with Inyo County in such a planning effort through a joint CEQA – National Environmental Policy Act (NEPA) process if Inyo County asserts jurisdictional or permitting authority over potential projects on federal or Tribal lands.

4. California Environmental Quality Act (CEQA) compliance: We recommend development of a programmatic plan and EIR for Inyo County's renewable energy development amendment to the General Plan. A programmatic approach would allow for more efficient and timely completion of project-level CEQA analysis for specific projects proposed within identified development zones. Based on our groups' extensive involvement both individually and collectively in "fast-track" renewable energy projects located on public lands in the California Desert and southern Nevada, we developed a keen sense of the need for careful planning for renewable energy entailing identification of development zones that would potentially support environmentally and economically sound renewable energy generation projects. Lastly, by taking a programmatic approach to renewable energy development, the cumulative impacts of a long-range plan would be identified and mitigated in a comprehensive manner. This would allow for development of the most appropriate lands for solar energy and help ensure that they would be environmentally sustainable and potentially dedicated for permanent renewable energy generation. This could preclude the need for costly decommissioning plans and ultimately minimize the amount of lands needed for such use.

5. Action Alternatives: Among the most important aspects of a CEQA-based planning effort will be the identification of a range of reasonable alternatives for renewable energy development, and we highly recommend that alternatives be developed through a public scoping process.

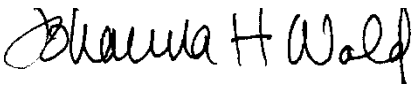
6. Identification of potential development zones: In seeking to identify potential locations for zones or areas within Inyo County designated for renewable energy development, we strongly urge the use of screening or filtering criteria designed to identify lands having minimal biological and environmentally sensitive resources and values. Filtering criteria

should be developed through a public process involving federal and state agencies, stakeholder organizations and the general public. This process will help ensure that the goals of the renewable energy planning project are achieved in the most appropriate manner and have broad public support. In addition, adoption of a multi-stakeholder public process will help ensure that the potential development areas that are identified will avoid unnecessary loss of or impacts to significant natural landscapes and biological resources within Inyo County.

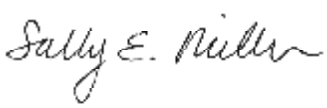
We hope our comments are helpful to Inyo County in its development of an amendment to the General Plan that identifies potentially suitable and environmentally responsible opportunities for development of solar and wind energy resources. Please contact us if we can provide additional assistance or if you have questions about our comments. Please direct future correspondence to each of the individuals listed below. Thank you.

Sincerely,

Jeff Aardahl
California Representative
Defenders of Wildlife
46600 Old State Highway, Unit 13
Gualala, CA 95445
Email: jaardahl@defenders.org



Johanna Wald
Director, Western Renewable Energy Project
Natural Resources Defense Council
111 Sutter Street, 20th floor
San Francisco, CA 94104
Email: jwald@nrdc.org



Sally Miller
Senior Conservation Representative
The Wilderness Society
P.O. Box 442
Lee Vining, CA 93541
Email: sally_miller@tws.org

UTILITY-SCALE SOLAR ENERGY FACILITY VISUAL IMPACT CHARACTERIZATION AND MITIGATION

PROJECT REPORT

This document is the project report on the utility-scale solar energy facility visual impact characterization and mitigation study conducted under DOE FY12 AOP SIT 7, “Glare, Visual Impacts and Mitigations,” and is the deliverable for Subtask 7.1. Prepared by Robert Sullivan and Jennifer Abplanalp, Environmental Science Division, Argonne National Laboratory.

12/20/2013

DOE SOLAR SIT 7 GLARE, VISUAL IMPACTS AND MITIGATIONS

UTILITY-SCALE SOLAR ENERGY FACILITY

VISUAL IMPACT CHARACTERIZATION AND MITIGATION STUDY

PROJECT REPORT

Robert Sullivan, Jennifer Abplanalp
Environmental Science Division
Argonne National Laboratory
Sullivan@anl.gov
(630) 252-6182

Executive Summary

This report summarizes the results of a study conducted by Argonne National Laboratory's (Argonne's) Environmental Science Division in support of the U.S. Department of Energy's *Soft Cost Balance of Systems Subprogram* under the SunShot Initiative, and funded through the *Office of Energy Efficiency and Renewable Energy Fiscal Year 2012 Annual Operating Plan*. The study, entitled *Utility-Scale Solar Energy Facility Visual Impact Characterization and Mitigation Study*, documented the visual characteristics of various utility-scale solar energy facilities on the basis of field observations, and developed and described visual impact mitigation strategies for these types of facilities.

An examination of recent environmental assessments for proposed utility-scale solar facilities suggests that stakeholders are increasingly raising the potential negative scenic impacts of solar facilities as a concern, and some local governments are restricting commercial solar energy development specifically to protect scenic resources. However, relatively little is known about the visibility, visual characteristics, and visual contrast sources associated with solar facilities that give rise to visual impacts. This study was undertaken primarily to further establish baseline descriptions of the visual contrasts from utility-scale solar facilities. Of particular concern is the occurrence of glinting (momentary flashes of light) and glare (excessively bright light or high visual contrast that causes visual discomfort to viewers or interferes with the ability to see objects clearly [CIE 2012]). A secondary goal of the study was to identify practical visual impact mitigation methods to avoid or reduce visual impacts from the facilities. Because of the relative newness of utility-scale solar facilities, there is little existing scientific literature available that accurately describes the facilities' visual characteristics, and also little information about the effectiveness of visual impact mitigation methods for these types of facilities.

Study activities consisted primarily of field observations of parabolic trough, thin-film photovoltaic (PV), power tower, and concentrating PV facilities in the southwestern U.S. The field observations included photography and descriptive narratives of sources of visual contrast from the facilities. Other study activities included the development of visual impact mitigation measures based on the field observations. The photographs and descriptive data were incorporated into an existing publicly available Web-based database of solar facility photos and associated visual data that was developed by Argonne

for use in various studies funded by the U.S. Department of Interior Bureau of Land Management (BLM) and National Park Service.

Results of the field observations included assessments and photographic documentation of the effects of distance, viewpoint elevation, and lighting on the visual contrasts of various types of solar facilities, and the interaction of these variables with specific visual impact mitigation measures. Photo documentation of the cumulative visual impacts of multiple solar facilities within a single viewshed was developed. A systematic assessment of the effects of distance on the visibility and visual contrasts of a utility-scale power tower (not operating) was conducted, and sources of visual contrast from the facility were documented. A baseline contrast assessment was conducted for a utility-scale concentrating PV facility.

Significant findings of the field observations include the following:

- Color selection for materials surface treatment as directed by BLM resulted in better mitigation than alternative colors;
- Glare from a parabolic-trough facility may be a relatively common occurrence;
- Effective lighting mitigation can result in near-zero night-sky impacts for PV facilities;
- Strong glare from a single power tower heliostat was visible at distances exceeding 10 mi (16 km);
- Unilluminated power towers were easily visible for distances beyond 20 mi (32 km), and one was faintly visible for as far as 35 mi (56 km);
- Daytime aerial hazard lighting on power towers was visible for long distances and added substantially to visual contrast in certain conditions; and
- Reflected light from a concentrating PV facility was plainly visible beyond 25 mi (40 km).

The study also examined solar mitigation opportunities based on the field observations, including developing mitigation for specific contrasts observed at a thin-film PV facility on BLM-administered land in Nevada. Field observations revealed several contrast sources that present mitigation opportunities. These contrast sources include reflections from metal clips used to affix the solar panels to the support structures directly below the panels; reflections from panel support structures without mounted panels; the use of regular geometric forms in panel arrays, cleared areas, and other linear features; and reflected light from light-colored gravel where vegetation has been cleared around the collector array. In collaboration with the facility siting and compliance manager, and with input from BLM and a materials contractor, potential mitigation measures were identified for each of these contrast sources. At the time of this writing, BLM has directed that the proposed mitigation measures be implemented in the next currently planned phase of development at this facility.

Table of Contents

1 Introduction

This introductory section presents the need for and purpose of the study, its scope, the intended use and users of the study results, and the report organization.

1.1 Need for and Purpose of Study

The construction and operation of utility-scale solar energy facilities create visual contrasts with the surrounding landscape, primarily because of the introduction of complex and visually distinctive man-made structures on a large scale into the existing landscape. In the southwestern states where most U.S. utility-scale solar facilities are in operation or planned, solar facility sites are relatively flat, open spaces, typically located in visually simple and uncluttered valley landscapes that often lack screening vegetation or structures. Because of the lack of screening elements, the open sightlines, and relatively clean air typical of the western U.S., solar facilities may be visible for long distances, and their large size and distinctive visual qualities can give rise to strong visual contrasts in some circumstances (BLM and DOE 2010).

The visual contrasts caused by the addition of solar facilities to the landscape give rise to visual impacts from the facilities. Visual impacts include both the changes to the visual qualities and character of the landscape resulting from the visual contrasts created by the facilities, and the emotional responses of persons who view the facilities. While some persons may find the appearance of solar facilities visually pleasing, others may feel that the visual contrasts caused by the facilities detract from the visual qualities of the landscape view. When stakeholders respond negatively to the visual contrasts of solar facilities, their negative perceptions can result in opposition to individual proposed solar projects or to utility-scale solar energy generally. If the negative perceptions are sufficiently strong, such opposition could potentially result in costly delays or even cancellations of projects.

Visual impacts were recognized as an obstacle to solar facility and associated transmission siting in the Sunshot Vision Study (DOE 2012a). While stakeholder opposition resulting from perceived negative visual impacts is not documented to have led to the cancellation of any utility-scale solar projects in the U.S. to date, local governments, such as San Bernardino and Sonoma Counties in California, have recently passed ordinances restricting commercial solar facilities specifically to protect scenic resources, among other values (San Bernardino County Sentinel 2013; Sonoma County 2013). Visual impacts have increasingly become an important concern not just for individuals but for organizations such as tribes, local governments, environmental groups, and the National Park Service (NPS). Concerns over potential negative visual impacts of solar facilities are routinely expressed by stakeholders during the environmental impact assessment processes that are typically required for these types of facilities (Basin and Range Watch 2010; DOE 2012b; NPCA 2012; Colorado River Indian Tribes 2013; Kessler 2013; NPS 2013).

The visual contrasts of solar facilities are not well documented or understood, in part because there are relatively few utility-scale solar facilities in operation worldwide. This is especially true for certain solar technology types such as power towers, concentrating photovoltaic (CPV), and compact linear Fresnel

reflector (CLFR) facilities, which have only recently been developed at utility scale. And unlike utility-scale wind turbines, there are several distinctly different solar technologies that work by substantially different underlying principles and mechanisms, such that their visual characteristics differ in important ways, making the task of comprehensive visual characterization more complex than for wind energy facilities. Recent work conducted by Argonne for BLM and NPS has begun to document the visibility, visual characteristics, and visual contrasts associated with utility-scale solar facilities (Sullivan 2011; Sullivan et al. 2012a). The current U.S. Department of Energy (DOE)-sponsored study builds on this previous work to better characterize visual contrasts associated with utility-scale solar energy development, and addresses the need for better and more extensive documentation of visual contrasts from utility-scale solar facilities.

Historically, for many large-scale solar facilities, visual impacts have been determined to be large, but until recently, little substantial/effective mitigation has been identified. Failure to apply effective mitigation may result in large visual impacts on sensitive visual resources and on sensitive viewing locations (e.g., residential areas or roadways) that may engender stakeholder opposition to projects. Because of the very large scale and unique visual characteristics of utility-scale solar facilities, many of the largest contrasts and resulting impacts cannot be mitigated effectively, except by siting facilities in different locations, choosing different solar technologies, reducing the size of the project, or using off-site mitigation to compensate for the impacts. These options are often impractical or difficult to implement. BLM and DOE (2012) and BLM (2013a) have provided a range of mitigation strategies for some visual impacts from solar facilities; but there is a need for further exploration of mitigation opportunities. The current study addresses the need for additional potential mitigation strategies that are both effective and technically feasible.

The work for BLM (discussed by Sullivan [2011] and Sullivan et al. [2012a]) was directly connected to the BLM and DOE's Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States (Solar PEIS) (BLM and DOE 2010, 2012). The work conducted for NPS was initiated in response to NPS concerns regarding the potential visual impacts from utility-scale solar development on BLM-administered and other lands within the viewsheds of NPS units. The current study more fully characterizes the visual contrasts from utility-scale solar facilities than these initial studies did, and suggests additional possible mitigation strategies to avoid or reduce the contrasts. The results of the current study help to inform visual impact analyses for solar energy facilities and to reduce the visual impacts through improved mitigation. More complete and accurate impact assessment and better mitigation will ultimately result in increased public acceptance of solar facilities, thereby easing and speeding permitting. Implementation of the mitigation strategies would also reduce visual impacts to sensitive visual resource areas, such as NPS units, national scenic and historic trails, and other scenic resources.

1.2 Scope

The field observations recorded visual contrasts associated with utility-scale thin-film PV facilities, CPV facilities, parabolic trough facilities, and power tower facilities. The study was limited to discussion of

visual contrasts (changes in the visual environment, i.e., changes to what is seen) rather than impacts (changes in landscape character and human reaction to visual contrasts).

All of the facilities observed in the study were located in the southwestern U.S., specifically in southern California, southern Colorado, and southern Nevada.

1.3 Intended Use and Users

This study identifies visual contrasts associated with utility-scale solar energy facilities and identifies potential visual mitigation strategies to avoid or reduce the visual impacts. The study results can be used to

1) Better understand the nature of visual contrasts associated with utility-scale solar facilities, and the mechanisms by which solar facilities cause visual contrasts that generate visual impacts;
2) Better assess potential visual impacts of solar facilities; and
3) Select and apply effective mitigation measures.

The intended users of the document and the study results it contains include

- Professionals conducting visual impact assessments (VIAs) for solar energy facilities and specifying visual impact mitigation measures;
- Agency staff who regulate or approve VIAs and associated mitigation measures;
- Solar industry professionals who must implement mitigation measures; and
- Other stakeholders who may be affected by the visual impacts of solar facilities.

1.4 Document Organization

This report is organized into four main sections:

1) Introduction
2) Literature Review—A discussion of previous efforts to characterize and identify mitigation for solar energy facilities.
3) Methodology and Facilities Visited—A description of the methods and descriptions of facilities visited for contrast characterization.
4) Overview of Visual Contrasts and Contrast Assessment—background information about visual contrast assessment and terminology.
5) Results of Field Observations—Descriptions of the field observations of solar facilities and the visual contrasts and contrast sources associated with solar facilities.
6) Potential Solar Facility Mitigation Strategies—Discussion of visual impact mitigation measures based on the field study observations. The discussion of mitigation measures includes a case study of specialized mitigation measures for a thin-film PV facility.
7) Conclusions and Recommendations—Discussion of study results and recommendations for further studies.
8) References—References cited in this report.
9) Appendices—Data collection forms and methodology notes for the study.

2 Literature Review

As noted above, visual impacts caused by utility-scale solar facilities have been identified as a concern by the public and other stakeholders such as the NPS for numerous proposed projects, and certain solar projects, especially solar power tower projects, have been identified as causing significant visual impacts and significant impacts to cultural resources through impacts to the visual settings of the cultural resources (BLM 2010a; CEC 2010; DOE 2012b; CEC 2013). Although research studies have identified visual impacts of solar facilities as a concern (NRC 1996; Torres-Sibille et al. 2009; Tsoutsos et al. 2005; Turney and Fthenakis 2011), with the exception of the previously mentioned studies conducted by Sullivan et al. for BLM, DOE, and NPS (Sullivan 2011; Sullivan et al. 2012a), and glint and glare analysis by Ho and colleagues (Barrett 2013; Ho et al. 2009, 2010; Ho and Khalsa 2010; Ho 2011, 2012; Ho and Sims 2013), limited research is available that formally addresses this topic. This is especially true for research limited to aesthetic impacts; much of the glint and glare research to date has focused on health and safety hazards.

2.1 Discussion of Visual Impacts in Environmental Assessments

Until relatively recently, VIAs contained in environmental assessments for utility-scale solar facilities proposed on public lands in the United States have varied greatly in terms of level of detail and accuracy, with few visual impact mitigation requirements. An examination of various VIAs conducted over the last five years suggests that stakeholders are increasingly raising potential negative visual impacts of solar projects as a significant concern, and simultaneously, the level of detail in solar VIAs has generally increased, with more extensive visual mitigation requirements and better discussion of potential glare impacts (for example, see BLM 2010b and BLM 2013b). There are several possible direct and indirect causes for the increased level of concern about visual impacts expressed by stakeholders and improved treatment of visual impacts in VIAs:

- Increasing visual impacts as more and larger solar facilities are built, especially power towers, which have substantially larger potential impacts than other solar technologies;
- Increased awareness of potential visual impacts of solar projects among potentially affected stakeholders, such as NPS;
- Increased awareness of potential visual impacts and better oversight of VIA preparation on the part of land management and regulatory agencies with oversight responsibilities for environmental assessments, such as BLM and the California Energy Commission (CEC);
- Greater awareness of the potential impacts of solar facilities on the part of VIA preparers and more experience preparing VIAs; and
- The increasing availability of both visual impact-related research and tools, such as the studies by Sullivan et al. and Ho's glare research and analytical tool development (discussed in Section 2.2).

Obviously, some of these factors are closely related; e.g., increased visual impacts from larger projects may have driven increasing levels of awareness of visual impacts on the part of both stakeholders and regulatory agencies. It is likely that the Solar PEIS increased awareness of potential visual impacts (and impacts of solar facilities in general) because its large scope and regional focus led to wide distribution and more widespread attention to the environmental impacts of solar development on the part of both stakeholders and oversight agencies.

2.2 Dedicated Solar Visual Impact Research

The two largest bodies of research dedicated to visual impacts of solar facilities are the field studies investigating the visibility, visual characteristics, and visual contrasts associated with utility-scale solar facilities in the southwestern United States conducted by Sullivan and colleagues at Argonne for BLM and NPS, and extensive studies of glinting and glare from solar facilities conducted by Ho and colleagues at Sandia National Laboratories (Sandia). Additional studies have been conducted at universities in Europe and the U.S.

2.2.1 Argonne Field Studies for BLM/NPS

Sullivan began field observations of utility-scale solar facilities in Nevada and California in 2010 to support the VIA that Argonne was preparing for the Solar PEIS. At the time, other than short descriptions of selected technologies in EISs, there was no information available regarding the visibility, visual characteristics, and visual contrasts associated with utility-scale solar facilities.

Accompanied by the Chief Landscape Architect for BLM, Sullivan observed Nevada Solar One (NSO), a parabolic trough facility in southern Nevada; the nearby Copper Mountain thin-film PV facility, then under construction; the Solar Energy Generation System (SEGS) parabolic trough complexes at Kramer Junction and Harper Dry Lake in southern California; and the Sierra Suntower power tower facility in Lancaster, California. The observations were conducted in April 2010.

The results of the observations for NSO, SEGS, and Sierra Suntower have been summarized by Sullivan (2011). In the course of these field observations, the occurrence of strong glare visible for several miles was confirmed at the NSO facility, and was also observed at the SEGS III-VII complex. Visibility of the NSO and Copper Mountain facilities at long distances (14+ mi, using Global Positioning System [GPS] measurements) was established for both daytime and nighttime observations. The reflected light from the two Sierra Suntower 2.5-MW power towers was determined to be visible beyond 20 mi. The observations also revealed the extreme variability of the appearance of the various facilities depending on the viewing geometry, lighting angle, weather conditions, and the individual characteristics of the facilities observed. This variability was generally not captured in EISs prepared at the time. The study results and selected photographs were incorporated into the Solar PEIS.

As a result of the Solar PEIS and specific potential impacts posed by solar energy development on BLM-administered lands visible from NPS units, NPS became more actively engaged in identifying potential impacts of solar energy facilities, and sponsored a follow-on study by Argonne to further characterize visual contrast sources associated with solar facilities. This study involved field observations conducted in April-May 2011, September 2011, and January 2012. Objectives of this study included identifying the

source of glare at NSO, further characterizing the spatial and temporal extent of glare at the trough facilities, and expanding the types and sizes of facilities observed beyond those identified in the BLM study. Study observations were made at the same facilities visited during the BLM study, but additional observations were made at the following facilities:

- Silver State Solar Energy Project (North), a thin-film PV facility on BLM lands near Primm, Nevada;
- Ivanpah Solar Electric Generating System (Ivanpah) , a power tower facility on BLM lands near Primm, Nevada, under construction at the time of the observations;
- Antelope Valley Solar Ranch One (Antelope Valley), a thin-film PV facility near Lancaster, California, under construction at the time of the observations;
- Desert Sunlight Solar Farm, a thin-film PV facility within the Riverside East Solar Energy Zone near Desert Center, California;
- CPV modules at the Edward W. Clark Generating Station in Las Vegas, Nevada;
- Nellis Solar Power Plant, a crystalline silicon PV facility at Nellis Air Force Base near Las Vegas, Nevada;
- Kimberlina Solar Thermal Energy Plant (Kimberlina), a CLFR facility near Bakersfield, California; and
- Gemasolar Thermosolar (Gemasolar) power tower facility near Seville, Spain.

The results of the observations have been summarized by Sullivan et al. (2012a). In the course of these field observations, the primary source of glare at NSO was identified as the receiver tubes; glare was observed to be visible from some location during the course of several sunny days, and was found to be highly sensitive to viewing geometry, lighting angle, and viewer and mirror movement. Other important study findings included confirmation that views of solar facilities from elevated viewpoints showed much greater contrast than ground-level views, an issue of particular concern to NPS, because solar facilities are often visible from mountain ranges within NPS units; visibility of the Gemasolar receiver tower light at distances exceeding 20 mi, and the visibility of reflected light from dust near the receiver unit at a distance of approximately 5 mi; the documentation of significant visual contrasts during the construction phase of both the Ivanpah and Antelope Valley facilities; and the observation of glare at the Kimberlina facility.

Another important outcome of the NPS study was the design and development of the *Solar Energy Facility Visual Characteristics Study Database,* a publicly available online database of georeferenced photographs of the facilities. The online database is searchable on a number of parameters, such as facility name, distance between the observer and the facility, date and time of day, lighting direction, weather, and view direction. Querying the database returns the study observation data and associated high-resolution photographs of the solar facilities in the study, a useful tool for solar visual impact research. Photos from the current study have been added to the database, which is available at http://web.evs.anl.gov/solarvis/. Accompanying the database is a Google Earth .KMZ file, which provides access to the study observation data and photos via the Google Earth “map” interface. The KMZ file is available at http://web.evs.anl.gov/solarvis/kmz/solarvis.kmz.

2.2.2 Sandia Studies on Glinting and Glare

Ho and colleagues (primarily at Sandia) have conducted numerous studies concerning glinting and glare from solar facilities and developed analytical tools for the prediction of glare occurrence at a variety of solar facilities, including PV, parabolic trough, and power tower facilities. The primary focus of these studies has not been on aesthetic impacts, but rather on the following:

- Ocular health hazards (Ho et al. 2009; Ho and Khalsa 2010; Ho 2011);
- Disability glare that could affect pilots or air traffic controllers near airports (Barrett 2013; Ho 2012); or
- Development of analytical tools for predicting occurrence of glare at PV, power tower, or parabolic trough systems (Ho and Khalsa 2010, 2012; Ho et al. 2011; Ho and Sims 2013).

Ho (2013) provides a basic summary of the causes of glare from solar facilities, circumstances that lead to glare occurrence, factors that determine the magnitude of glare, and general strategies for glare mitigation. Ho et al. (2009, 2011) summarize approaches to glint and glare analysis from concentrating solar power plants; discuss the physiology, optics, and damage mechanisms associated with ocular injury from glare; discuss safety metrics; and introduce a new metric for temporary flash blindness, the loss of clear vision due to a bright afterimage after exposure to strong glare. The paper includes a description of the potential sources of glinting and glare from power towers (the receiver and heliostats), parabolic troughs (the mirrors and receiver tubes), and dish engines (the mirrors and the receiver aperture).

Ho and Khalsa's 2010 study further developed the metrics associated with retinal burn (permanent eye damage) and flash blindness to determine the distance from concentrating solar power facility glare sources at which retinal burn and flash blindness from specular reflections would occur, as well as presenting a Web-based tool for evaluating glinting and glare hazards and comparing the irradiance to safety metrics. Ho (2012) presented a case study applying the Web-based tool for calculating the potential for glare from a planned thin-film PV facility to be observed by pilots approaching a nearby airport (Ho and Khalsa 2010).

The Web-based tool is further described, including testing results, by Ho et al. (2010), and Ho and Sims (2013) subsequently developed a user manual for the Web-based tool, the Solar Glare Hazard Analysis Tool (SGHAT). SGHAT is used to predict potential ocular hazards ranging from temporary after-image to retinal burn resulting from glare from PV panels, on the basis of input provided by users through a Web interface. SGHAT specifies when glare will occur throughout the year, and can also predict relative energy production while evaluating alternative designs, layouts, and locations to identify configurations that maximize energy production while mitigating the impacts of glare.

2.2.3 Other Studies

Chiabrando et al. (2009) present a general approach to assessing the environmental impacts of solar PV facilities, in which they point out (a) the particular importance of assessing and mitigating visual impacts from the facilities and (b) the lack of research and other information for assessments. They then propose a method for calculating glare from PV panels as a quantitative approach to VIA.

Riley and Olson (2011) used Ho's calculations (Ho et al. 2009) to model the effects of glare from PV panels that would be experienced by pilots in aircraft flying over a proposed solar facility. They then compared the predicted effects to the glare effects caused by smooth water, and suggested that the potential for hazardous glare from flat-plate PV systems is similar to that of smooth water, and would therefore not be expected to be a hazard to air navigation.

3 Methodology and Facilities Visited

This section presents the methodology used to conduct visual contrast characterization work for the study, and mitigation measure testing. It also lists and briefly describes the facilities visited during the assessments.

3.1 Visual Contrast Characterization Methodology

The fieldwork conducted for the study involved three separate trips to observe solar facilities in Nevada, California, and Colorado. Two Argonne staff members conducted a week-long photographic documentation survey of five solar facilities in California and Nevada between January 28 and February 1, 2013. A second trip to observe two facilities, one in Nevada (Crescent Dunes Solar Energy Project) and one in California (Ivanpah Solar Electric Generating System), was conducted on May 13–15, 2013. A third trip was conducted between May 29 and June 1, primarily to observe one facility (Alamosa Solar Generating Plant), but with brief observations of other nearby facilities. A total of 73 facility observations were conducted during the course of the study.

These facilities were selected for a variety of reasons. First, they used the same solar technologies and were large enough in size that they are representative of the solar facilities that are currently in operation or under construction in the southwestern United States. They are located in landscape settings that are commonly found in the Southwest. They provided a good range of solar technologies and mitigation approaches for study purposes, and several of the facilities are in conveniently close proximity to each other near Las Vegas.

Each facility was viewed from multiple observation points at various locations and distances around the facility. Observation points were chosen for a combination of factors including their clear, unobstructed view of the facility; distance from the facility; and angle-of-view towards the facility. Facilities were observed at different times of day, from different angles, and under various lighting conditions.

One facility, Silver State North (SSN), was the subject of an escorted walking tour in an effort to address two sources of visual contrast that had been identified on previous visits. During the tour, the plant operators pointed out and described the facility components and structures, discussed some of their maintenance activities, and described the facility and substation lighting.

3.1.1 Written Documentation

Observed data were recorded on the Solar Facility Visual Characteristic Study: Site Description Form created specifically for this study (see Appendix A). Data collection included weather conditions; general locational information; exact location, as determined by hand-held GPS units; the general components of the facility that were visible; facility backdrop color and contrast; viewing angle between the observation point and facility; lighting quality and angle; and collector orientation and color. Any visible

contrasts such as glare, light patterns, plumes, or transitory effects were also recorded. A space was also provided to record additional observations not called out on the form.

3.1.2 Photographic Documentation

Photographs were taken at each observation point with a Nikon D7000 DSLR with an 18–300mm lens in an effort to record visual contrasts between the facilities and their surroundings. A series of single-frame photographs were taken at focal lengths ranging from 18 mm to 300 mm. The majority of photos were taken with the camera mounted on a tripod. At some observation points, a series of side-by-side photographs were taken to capture the broader landscape context. After completion of the fieldwork trip, the photos were "stitched" into panoramic photographs using Pano2VR Software. The panoramas were then converted into interactive Flash files using PT Gui Software. The subject of the photograph, focal lengths, bearing to the subject, and file numbers were recorded in a photo log. One facility (NSO) was photographed at night, using timed exposures. The form data and photos (including the panoramas) were subsequently entered into the *Solar Energy Facility Visual Characteristics Study Database* for use in data analysis and for public use.

Additional photographs were taken of various facility components at shorter distances, where applicable. During the site tour of the SSN facility, photographs were taken of the facility components and structures, including the substation. Additional photographs were taken from outside the facility.

3.2 Facilities Descriptions (Visual Contrast Characterization)

The major facilities observed during the study fieldwork trips, their locations, size, technology and operational status are listed in Table 3–1. All dates are for the year 2013.

Table3–1. Observed Facilities

Facility Name	Location (nearest city)	Technology Type	Power Output (MW)	Acreage (approx.)	Operational Status	Observation Dates
Nevada Solar One (NSO)	Boulder City, NV	Parabolic Trough	64	400	Fully Operational	1/28, 1/29, 1/30, 1/31 (day/night)
Silver State Solar Energy Project-North (SSN)	Primm, NV	Thin-film PV	50	600	Fully Operational	1/31, 2/1
Ivanpah Solar Electric Generating System (Ivanpah)	Ivanpah Dry Lake, CA, near Primm, NV	Power Tower	377	3,500	Under Construction	1/29, 1/30, 1/31, 2/1, 5/14, 5/15
Copper Mountain Solar Facility 1 (CM 1)	Boulder City, NV	Thin-film PV	58	450	Fully Operational	1/28, 1/30
Copper Mountain Solar Facility 2 (CM 2)	Boulder City, NV	Thin-film PV	150	1,500	Partially Operational	1/28, 1/30
Crescent Dunes Solar Energy Project (Crescent Dunes)	Tonopah, NV	Power Tower	110	1,600	Under Construction	5/13
Alamosa Solar Generating Plant (Alamosa)	Alamosa, CO	Concentrating PV	30	225	Fully Operational	5/29, 5/30, 5/31

3.3 Mitigation Assessment Methodology

Development of mitigation measures was based primarily on observations and follow-on activities at the SSN thin-film PV facility. Some contrast sources targeted for mitigation had first been noted during a previous study (Sullivan et al. 2012a). The contrast sources were observed and photographed from both outside and within the facility. The plant operators were interviewed in order to gain a better understanding of the facility components and operations; for example, how lighting was managed at night and which lighting was under the control of the facility operators. Subsequent to the site visit, discussions took place with the facility siting and compliance manager for SSN, the Chief Landscape Architect at BLM, and a contractor who supplied materials that could be used for certain mitigation practices. From these discussions, potential mitigation measures were developed, and these mitigations will be required during the next phase of development at the project, a major expansion of the facility, scheduled for implementation in 2014–2016.

4 Overview of Visual Contrasts and Contrast Assessment

This study is focused on *visual contrast. Visual contrast* differs from *visual impact*, though the two terms are often confused. The difference between visual contrast and visual impact is discussed in Section 4.1. The perception of visual contrast from solar facilities and the visibility of objects in the landscape in general are highly dependent on a complex interaction of variables referred to as *visibility factors*. Visual contrast and visibility factors are discussed in Section 4.2.

4.1 Contrasts vs. Impacts

Visual contrast is change to what is seen by the viewer. For example, if a solar power tower facility is built in a natural-appearing desert valley landscape, the introduction of the tall shape of the receiver tower, surmounted by the intensely bright light of the receiver atop the tower, the vast expanse and regular geometry of the heliostat array reflecting the sun and sky, buildings, roads, and transmission facilities at or near the facility, and the facility lighting at night are all visual contrasts that can be seen by people.

Visual impact is both the change to the visual qualities of the landscape resulting from the introduction of visual contrasts—in this case from the building of a renewable-energy facility—and the human response to that change. Continuing with the example above, the introduction of the solar facility to the landscape may affect the perception of the landscape as a natural-appearing setting; instead, it may be perceived as a landscape strongly influenced by human activities and industrial in character. These are changes to the visual qualities of the landscape. Some viewers may think that the addition of the solar facility improves the view, perhaps because it adds visual interest and a strong focal point to an otherwise bland scene, or because they strongly support renewable energy, and regard the sight of the solar facility as a symbol of progress. For these people, the visual impact of the solar facility is positive. Other viewers may feel that the solar facility adds visual clutter, interferes with the view of mountains they enjoy, or introduces an industrial-appearing element into a natural-appearing landscape where they feel it does not belong. For these viewers, the visual impact of the facility is negative. These viewer reactions are human responses to the changes in the visual quality of the landscape caused by the introduction of the facility.

A VIA assesses both the visual contrasts created by a proposed project and the impacts caused by the visual contrast, that is, the likely effect of the project on the character of the landscape and the likely response of viewers to the project. This study describes visual contrasts of solar facilities only, and not the associated visual impacts. It describes the visibility of solar facilities in southwestern desert landscapes, which is determined by the visual contrasts they create with their surroundings, and it describes the sources and the nature of the contrasts themselves, without addressing how individual viewers may respond to the contrasts. While ultimately stakeholder opposition is based on perceived negative visual impacts of the facilities, the visual impacts of a facility arise from the visual contrasts it creates, and without a clear understanding of visual contrasts of solar facilities, it is impossible to assess their visual impacts accurately.

4.2 Visual Contrast in the Natural Environment

An object only becomes visible to an observer as a separate entity when it has sufficient contrast with its background to cross the *visual contrast threshold*, defined as the smallest contrast, produced at the eye of an observer by a given object, that renders the object perceptible against a given background. In the landscape, a variety of *visibility factors* affect the apparent visual contrast of an object with its background.

4.2.1 Visibility Factors

The visibility of an object in a landscape setting, and its apparent visual characteristics for any given view, are the result of a complex interplay between the observer, the observed object, and various factors that affect visual perception, referred to as *visibility factors*. Visibility factors also play a key role in determining the degree of visual contrast from a solar facility, and whether glare events are possible from a facility.

There are eight major types of visibility factors that affect perception of large objects in the landscape:

- *Viewshed limiting factors*. Viewshed limiting factors are variables associated with accurate viewshed analysis, i.e. the determination of whether there is a clear line of sight from the observer to the observed object. Viewshed limiting factors include screening by landforms, vegetation, and structures, as well as the Earth's curvature and atmospheric refraction. Screening can be important to the perception of glare from solar facilities, as it can sometimes be used to block visibility of glare spots.
- *Viewer characteristics*. Viewer characteristics are properties of the persons observing the object (the viewers) that affect their ability to distinguish the object from its background, and include *visual acuity* (how sharp their vision is), *viewer engagement and experience* (how actively or intently they are looking at the landscape and how familiar they are with the object, i.e., if they have seen it or similar objects before), and *viewer motion* (whether the viewer is stationary or moving when viewing the object). Viewer motion is an important factor that determines the occurrence and affects the perception of glare from solar facilities.
- *Lighting factors.* Lighting factors include the angle, intensity, and distribution of sunlight on the project, all of which change in the course of each day and also throughout the year as the sun's apparent path through the sky changes. The angle of sunlight is an important factor that determines the occurrence of glare from solar facilities.
- *Atmospheric conditions*. Atmospheric conditions refer to the presence of gases, dust, and other particles in the air between the viewer and the viewed object that affect its visibility. High humidity levels and high particulate matter concentration affect visibility by diminishing contrast and subduing colors. Cloudiness and poor atmospheric clarity will preclude occurrence of glare or diminish its intensity
- *Distance*. The distance between the viewer and the viewed object affects the apparent size of the object. Distance is an important visibility factor that affects the perceived intensity of glare from solar facilities.

- *Viewing geometry.* Viewing geometry refers to the spatial relationship between the viewer and the viewed object, i.e., looking up or down at an object (observer position) and the horizontal direction of the view (bearing). An elevated observer position makes solar facilities much more visible because the large expanse of the collector/reflector array becomes visible, as well as the (generally) contrasting form of the array; these aspects of the facility are much less visible from ground level views because of the generally low profile of solar facilities. Viewing geometry is an important factor that determines the occurrence of glare from solar facilities.
- *Backdrop*. The backdrop is the visual background against which the viewed object is seen. The color, lightness or darkness, and texture of the backdrop affect the visibility of the objects seen against the backdrop.
- *Object visual characteristics.* Object visual characteristics refer to the inherent visual characteristics of the project, such as its size; its scale relative to other objects in view; its form, line, surface colors and textures; its luminance (both from reflected light and from lighting sources) and any visible motion of its components. The size, shape, orientation, and surface properties of solar facility components determine whether or not glare occurs, and its intensity.

In real landscapes, interactions between these visibility factors are extremely important in determining the actual visibility of an object such as a solar facility (Benson 2005; BLM 2013a). For example, distance interacts strongly with atmospheric conditions as a determinant of visibility; a distant facility that is visible on clear days may be completely invisible on hazy days, or appear grayer and less distinct. Lighting, viewing geometry, and object visual characteristics interact to determine the presence and length of both shadows and glare, which strongly affect the dynamic range of visual contrast the facility creates. Furthermore, some of the factors are highly variable, and the effects are sensitive to even slight changes in one of the contributing factors; for example, the occurrence and intensity of glare spots on a facility may change rapidly and dramatically as the viewer moves over very short distances, or as the sun angle changes over a few minutes.

4.2.2 Types and Descriptors of Visual Contrast

Visual impact mitigation approaches usually seek to reduce the visible contrasts from the project or to avoid the contrasts altogether; this may be accomplished, for example, by painting facility components to blend with the landscape backdrop. For this reason, a good understanding of the sources of visual contrast and the factors that affect the perception of visual contrast in the landscape is important to the identification of appropriate mitigation techniques.

Visual contrast is usually described as the differences in the four basic design elements of *form, line, color*, and *texture* between the proposed project and the surrounding landscape.

Form: The mass or shape of an object or of objects that appear unified. Two types are recognized:

- Two-Dimensional Shape—the presence of an area or areas that contrast in color and/or texture with adjacent areas, creating a two-dimensional shape in the landscape.

- Three-Dimensional Mass—the volume of a landform, natural object, or man-made structure in the landscape.

Examples of forms commonly encountered in natural-appearing landscapes are masses of mountains, valley floors or plains, or large masses of similar-appearing vegetation, such as an expanse of shrubs in a landscape dominated by grasslands. Forms can also be man-made; they can include buildings or the large rectangular block of a solar collector array at a solar energy facility.

Geometry is an aspect of form. Forms in the natural landscape are generally irregular; however, they can approach a standard geometrical figure of two or three dimensions (e.g., square, circle, triangle, cube, sphere, cone). Manmade forms often have regular geometry that contrasts with the irregular geometry of the natural landscape. Solar collector arrays often appear as rectangles, parallelograms, or ellipses as viewed from elevated viewpoints.

Line: The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Line is usually evident as the edge of shapes or masses in the landscape.

Examples of lines commonly encountered in natural-appearing landscapes are the horizon line; lines of stratified layers of topography (e.g., successive ridges); the lines of mountains or ridges against the sky; strata in rock formations; streams; and the edges of vegetation masses. Like forms, lines in the landscape can be man-made; for solar facilities, they include the edges of solar arrays; the edges of buildings, fences, transmission towers and conductors; and the pipelines of solar thermal plants.

Because solar facilities typically have many straight or curved components (e.g., turbine towers, steam pipes, solar panels, mirrors, heliostats, or electricity conductors), line contrast from these facilities can be very strong if the lines are bold, especially when the orientation of the lines introduced by the facility is perpendicular to the predominant natural line. For example, power towers often introduce strong vertical lines into strongly horizontal landscapes, such as the plains and valley floors where solar facilities are commonly sited.

Color: The property of emitted or reflected light of a particular intensity and wavelength (or mixture of wavelengths) to which the eye is sensitive. Color is the major visual property of surfaces.

Colors common to many BLM landscapes, particularly in the desert southwest and intermountain west, are the colors of vegetation, rock, and soil, which tend toward muted greens, browns, and grays.

Depending on the technology, solar facilities use thousands, or even hundreds of thousands, of mirrored surfaces that in some instances are sources of glinting or glare. Glare typically appears as intense, bright white light, while glinting often appears as glittering silver or white flashes of light. When glinting and glare are absent, the mirrors or heliostats may reflect the sky, clouds, or, at certain angles, even the ground or surrounding vegetation. Other colors at solar facilities vary, but are often the silver or gray of galvanized metal or the black of solar panels (for PV facilities), while buildings may be almost any color, but are often white, gray, or tan. Lighting at solar facilities typically includes steady lighting ranging from

amber to bluish white, and white flashing strobes (in the day) and slowly flashing red lights (at night) that providing aerial hazard navigation lighting at power tower facilities.

Texture: The aggregation of small forms or color mixtures into a continuous surface pattern; the aggregated parts are small enough that they do not appear as discrete objects in the visible landscape.

Naturally occurring textures include those of vegetation, soils, and rocks. Vegetation and soil textures are often predominantly color mixtures, but light and shade textures are often important components of the coarser textures of rocky areas and mountains. The individual structures of solar facilities often have monotone, smooth surfaces that lack texture even at very close viewing distances; however, light and shade textures (particularly in the collector/reflector array) may be important contrast sources at longer distances. They may be seen as the interplay of shadows and lit surfaces from complex piping and other elements of a power block at a solar thermal plant, or from thousands of visually overlapping sunlit solar collectors/reflectors and the shadows they cast on the ground.

5 Results of Field Observations

This section summarizes results of the field observations of the seven solar facilities observed in the course of the study (see Table 3–1 for a listing of the facilities). Results are reported for each facility in the chronological order of visitation. Because the SSN facility is the subject of the mitigation case study, observations for that facility are discussed in Section 6.2, *Mitigation Case Study: Silver State North*.

5.1 Nevada Solar One

The NSO Facility is a fully operational, 400-acre (161-ha), 64-MW parabolic trough facility located on private lands approximately 12.5 mi (20 km) south-southwest of Boulder City, Nevada, and 1.5 mi (2.4 km) west of US 95, immediately north of El Dorado Valley Road. The facility ranges in elevation from approximately 1,770 ft to 1,820 ft (540 m to 555 m) above mean sea level.

The facility is situated in the El Dorado Valley and is surrounded by other industrial development, including the CM 1 and 2 facilities, a gas plant, a substation, numerous transmission lines, and US 95.

A total of 12 formal observations were made of the NSO facility during the January 2013 and the first May 2013 field trips, at distances ranging from 0.5 mi to11.5 mi (805 m to 19 km). The majority of NSO observations were conducted to the east or northeast of the facility in the early morning. Two observations were conducted in the afternoon and one observation was conducted at night. One of the afternoon observations was made from the summit of Black Mountain, approximately 9 miles north-northwest of the NSO facility. Observation elevations ranged from 1,765 ft to 5,098 ft (538 m to 1,554 m) above mean sea level. Observations were mostly made under clear weather conditions, with occasional partly cloudy skies or cirrus cloud cover. Visibility ranged from good to fair.

Objectives

The primary purposes of the observations at NSO for this study were as follows:

1) Determine if glare was observed at a different time of year (winter) from previous visits, which were made in mid-spring.
2) Obtain high-elevation photos of NSO and the neighboring CM thin-film PV solar facilities to provide documentation of the increased contrast visible from superior (elevated) viewing positions, and to provide photo documentation of potential cumulative visual impacts of solar facilities. These issues are of particular concern to NPS, tribal organizations, the tourism industry, and other stakeholders with respect to potential views of solar facilities within the BLM solar energy zones (SEZs) and other lands where multiple solar facilities could be visible from nearby mountains; for example, views of the Riverside East SEZ from the wilderness area within the Coxcomb Mountains within Joshua Tree National Park. In this case, because multiple solar facilities, substations, and large transmission lines are in close proximity, the visit to NSO also afforded an excellent opportunity to document cumulative visual impacts of solar energy

developments, which are likely to be similar to those that will eventually occur in the larger SEZs.

3) Observe the facility at night to assess lighting-related contrasts.

Results

Glare was observed at NSO during several observations over the course of several days. Glare was observed in the northeastern and southeastern corners of the parabolic trough field, when viewed in the morning from the northeast within 3 mi (5 km) of the facility. Glare appeared both as a band (see Figure 5.1–1) and as "beads" – discrete points of exceptionally bright white light (see Figure 5.1–2). It should be noted that consistent with previous observations, the glare was much brighter than shown in these and other figures in this report, and was sufficiently bright to be difficult to look at for more than a few seconds. Glare was often accompanied by glittering and flashes of light on the eastern or northern edges of the trough array adjacent to the glare spots, sometimes forming an L-shape, and outlining the rectangular shape of the parabolic trough field. During one observation, glare and glittering were observed in the northeast corner, disappeared during the observation, and then returned within a five minute period. No unusual cloud cover was noted at this time, and the observers did not change viewing positions.

Figure 5.1–1. Banded Glare from Front Row of Trough Array at NSO.

Figure 5.1–2. Beaded Glare from Front Row of Trough Array at NSO.

The glare observed during these observations was consistently weaker than that observed at approximately the same time of day (early morning to around noon) on previous visits that took place later in the spring (April-May). This observation is likely related to the lower sun angle and/or lower intensity of sunlight during this wintertime visit.

Photographs of NSO and the adjacent CM thin-film PV facilities were taken from the slope and summit of a nearby mountain. Figure 5.1–3 shows the NSO and CM facilities from the lower slope of a mountain north of the facilities and at a distance of 7.5 mi to the nearest portion of the NSO facility and 9.5 mi to the farthest visible portion of the CM facilities. NSO is the blue-gray rectangle in the center, and the CM facilities are the black bands on either side and just beyond NSO. By far the most prominent element of the photo is the water vapor plume from the cooling tower at NSO. This is consistent with many other observations made of NSO and other wet-cooled solar thermal facilities in which the color and motion contrast of water vapor plume is conspicuous, especially considering its movement, which cannot be seen in a photo.

Figure 5.1–3. NSO and CM Facilities as Seen from a Slightly Elevated Viewpoint 7.5–9.5 mi North of the Facilities.

Figure 5.1–4 shows the NSO and CM facilities from the summit of a mountain north of the facilities and at a distance of 9 mi (15 km) to the nearest portion of the NSO facility and 11 mi (18 km) to the farthest visible portion of the CM facilities. The viewpoint is approximately 3,300 ft (1,000 m) above the facility. NSO is the light gray rectangle in the center, and the CM facilities are the black rectangles on either side of NSO. The regular geometric forms and colors of the facilities contrast noticeably with the dull green of the creosote bush vegetation of the valley floor. Despite the relatively long distance, the facilities attract visual attention and are prominent features within the view. The overall contrast is increased by the proximity of the black color of the PV facilities to the light gray of the trough facility, yielding a cumulative visual impact that is exacerbated by the mixing of solar technologies within the field of view.

It should be noted that these facilities are relatively small, and that facilities several times larger are currently operating and under construction.

Figure 5.1–4. NSO and CM Facilities as Seen from a Mountaintop Viewpoint 9–11 mi (14–18 km) North of the Facilities.

In the course of the observations of NSO, bright reflections were frequently observed to come from pipes conveying heat transfer fluid through the trough array, at the sides of the array, underneath the array, and between the various elements of the power block. Other reflections appeared to come from the bellows shields between sections of the receiver tubes and from disc-like “collars” attached to the receiver tubes at various places. Bright reflections were also observed from galvanized chain-link fence posts and rails.

The buildings and other support structures at NSO do not blend well with the natural colors of the surrounding landscape, and the colors are not uniform throughout the facility. Both of these traits increase the color contrast of the facility.

NSO was also observed and photographed at night (see Figure 5.1–5.). Most of the lighting is unshielded or poorly shielded, and motion detectors are not used to reduce lighting use. For safety reasons, good illumination is required around the steam turbine generator; however, the lighting may be excessive in some areas. The multiple bright lights combined with complex reflective surfaces make the facility visible at night beyond 14 mi (23 km) (Sullivan 2011). A mix of bluish-white and yellowish-white lighting is used, creating additional contrast (bluish-white lighting causes excessive light pollution).

Figure 5.1–5. Nighttime Photo of the Power Block and Part of the Cooling Tower at NSO Parabolic Trough Facility. (Credit: Marc Sanchez, BLM.)

5.2 Copper Mountain Solar Facilities One and Two

The CM 1 and 2 Facilities are fully (CM 1) and partially (CM 2) operational fixed-tilt thin-film PV facilities located on private lands approximately 13 miles (21 km) south-southwest of Boulder City, Nevada, and between 0.4 and 3.2 mi (0.6 and 5.1 km) west of US 95, immediately south of El Dorado Valley Road. CM 1 occupies 450 acres (182 ha), with 64 MW nominal power output, while CM 2 occupies 1500 acres (610 ha), with 150 MW nominal power output. The facilities range in elevation from approximately 1,805 ft to 2,062 ft (550 to 628 m) above mean sea level.

The facilities are situated in the El Dorado Valley and are surrounded by other industrial development, including the NSO parabolic trough facility, a gas plant, a substation, numerous transmission lines, and US 95.

Four direct observations were made of the CM 1 and CM 2 facilities at distances ranging from 0.8-mi to 10.5 mi (1.3 km to 7 km); however, these facilities are visible in many of the NSO observations because of their close proximity to NSO. Observations were conducted from the north, east, southeast, and south-southwest of the facility, with two observations in the morning and two in the afternoon. The CM facilities were visible in the observation of NSO made from the summit of Black Mountain (see above under NSO observations discussion), approximately 10.5 miles (17 km) north-northwest of the NSO facility. Observation elevations ranged between 1,765 ft and 5,105 ft (538 m and 1,556 m) above mean sea level. Three observations were mostly made under clear weather conditions, and one under partly cloudy skies. Visibility ranged from good to fair.

Objectives

The primary purposes of the observations at CM 1 and 2 for this study were as follows:

1) Observe and obtain photographs of the CM 2 facility, which was not built at the time of previous field observations. CM 2, at 1,500 acres (610 ha), is more representative of the large-scale facilities under construction at several locations in the U.S.

2) Compare power conversion unit (PCU) color differences between the CM 1 and SSN facilities. The PCUs at CM 1 are white, and under many lighting conditions contrast strongly with the surrounding black PV panels. The CM 2 panels are brown with gray trim. The SSN PCUs were painted Shadow Gray (a BLM Standard Environmental Color Chart color [BLM 2008]) at BLM's direction (SSN is on BLM land). Observations of all three facilities were needed to assess the effectiveness of using various colors to reduce visual contrast.
3) Obtain photos of the facilities from high-elevation viewpoints, as done for NSO.
4) Observe the facility at night to assess lighting-related contrasts, as done for NSO.
4) Check for possible glare occurrences.

Results

Previous observations of CM 1 established that the white PCUs contrasted very strongly with the black PV panels under normal lighting conditions, i.e., when the panels appear black. However, at certain angles, the black panels appear light-colored or even white because of sunlight reflected off the glass front surfaces of the panels (see Figure 5.2–1). Under these conditions, the white PCUs blend well with the panels. Assessment of the brown and white PCUs at CM 2 and comparison with those at CM 1 show that while overall the contrast at CM 2 is somewhat lower than CM 1 under most lighting conditions, the color is insufficiently dark to blend with either the creosote vegetation surrounding the facility or the black PV panels that form the backdrop for views from high-elevation viewpoints under normal lighting conditions (see Figure 5.2–2). In addition, when the viewing angle is such that the panels appear white, the brown PCUs contrast strongly with the background. Figure 5.2–3 shows how the apparent color of the PV panels varies across a single view, and the effect that has on the contrast of the PCUs with the collector array. Using both dark and light colors on the PCUs creates its own color contrast and makes it more difficult for the PCUs to blend with either dark or light backgrounds, and would appear to be a poor choice with respect to visual mitigation. See the SSN mitigation case study (Section 6.2) for further discussion of color contrast mitigation.

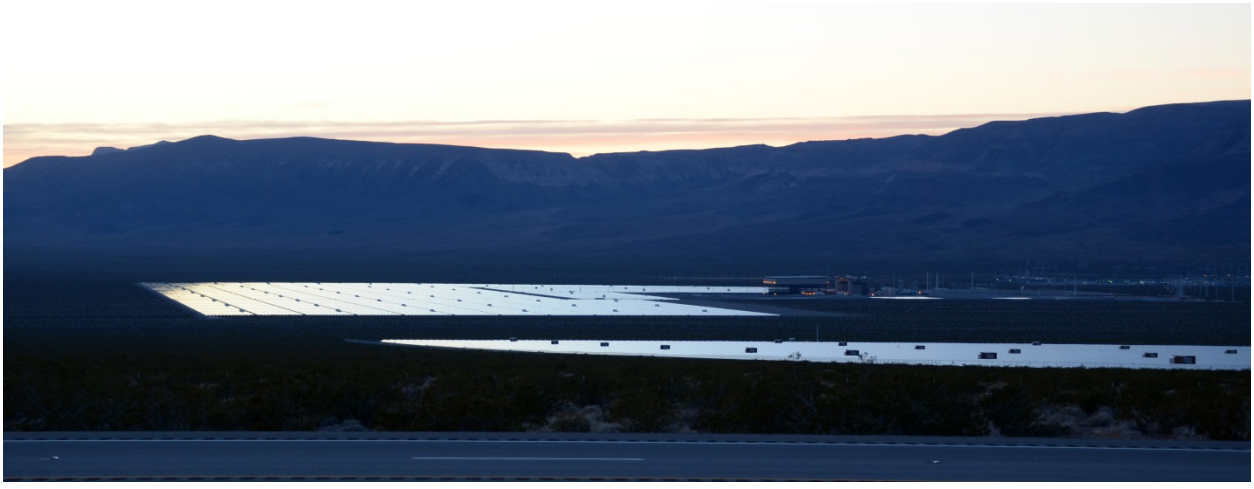


Figure 5.2–1. Black PV Panels at CM 1 and 2 Facilities Appear White When Low-Angle Sunlight Is Reflected from the Panels (Background).

Figure 5.2–2. Brown and White PCUs at CM 2 facility (Foreground) and White PCUs at CM 1 (Background).

Figure 5.2–3. Brown and White PCUs at CM 2 Facility (Foreground) Contrast with Both Dark (at Left) and Light (at Right) PV Panels. White PCUs of CM 1 Facility Are Visible (Background Left). (Credit: Marc Sanchez, BLM.)

Observation of the CM 1 and CM 2 facilities at night showed much lower levels of illumination than for NSO. Because there is no power block or steam turbine generator (a major source of lighting at solar thermal facilities) and very few employees onsite, lighting requirements are minimal. There were no lights visible within the collector array, and very limited lighting around the administration building (see Figure 5.2–4). The lights on the administration building were well-shielded and directed, so that the light was directed downward and light spillage into areas where it was not needed was minimal. Potential

improvements include reducing the number of lights and using motion sensors, as the building appeared to be unoccupied, so there was little need for lighting.

Figure 5.2–4. Nighttime Photo of the Administration Building at the CM 1 PV facility. (Credit: Marc Sanchez, BLM.)

As on previous visits, glare was not observed at either CM 1 or CM 2, although glare does occur at some PV facilities (Ho 2012).

5.3 Ivanpah Solar Electric Generating Station

The Ivanpah facility is a 3,500-acre (1,416-ha), 392-MW solar power tower facility currently under construction approximately 4.5 miles (7.2 km) southwest of Primm, Nevada, near Ivanpah Dry Lake, California. The facility is located within the Ivanpah Valley. Primm Golf Course is located approximately 0.5 mile (805 m) northeast of the facility at its closest point and the community of Primm, NV, is located approximately 4.5 mi (7 km) northeast of the facility at its closest point. When operational (the facility is in a testing phase as of this writing), the facility will generate 377 MW using 173,500 heliostats to focus sunlight on receivers atop three towers.

The facility site ranges in elevation from approximately 890 to 988 m (2,920 to 3,240 ft) above sea level. A total of 20 observations were made of the Ivanpah facility during the January 2013 and first May 2013 field trips, at distances ranging from 0.5 mi to 35 mi (805 m to 56.3 km). Observation elevations ranged from 2,650 ft to 5,100 ft (890 m to 1,555 m) above mean sea level.

Observations were conducted mostly in clear weather conditions, sometimes under cirrus cloud cover. Visibility ranged from good to poor.

The three towers run in a line southeast to northwest up a bajada of the Clark Mountains. The distance between the southeasternmost tower and the middle tower is 1.8 mi (2.9 km), and the distance between the middle tower and the northwesternmost tower is 1.5 mi (2.4 km). Each heliostat consists of two mirrors that are 7.2 ft (2.1 m) high by 10.5 ft (3.2 m) wide, mounted on pylons inserted directly into the ground. The pylons are arranged in concentric circles around the tower in order for the heliostats to track the sun. The receiver towers are 137 m (450 ft) tall. Owing to the height of the towers, lighting and lightning poles that are required by the Federal Aviation Administration will extend approximately 3 m (10 ft) above the top of the towers. Each tower will be accompanied by a steam turbine generator set, air-cooled condensers, and other auxiliary systems. The facility will be dry-cooled and will utilize a natural gas backup. Other facilities at Ivanpah will include an administration building, an operation and

maintenance building, a substation, and access roads.

Objectives

The primary purposes of the observations at Ivanpah for this study were as follows:

1) Observe and obtain photographs of the completed facility, in operation if possible. Ivanpah is far larger in size than any other power tower facility in the world, but is representative (in terms of size) of projects under construction or planned in the United States.
2) Observe the facility from the farthest distance possible, in order to assess the limits of visibility and to establish a potential future facility observation point.
3) Obtain photos of the facilities from high-elevation viewpoints, as done for the other facilities. This was particularly important for Ivanpah, as there is concern about the appearance of the heliostats from elevated viewpoints.
4) Check for possible glare occurrences, either from the receiver or from heliostats.

Results

The Ivanpah facility was not in operation during the study; however, photos from the January 2013 field trip show the facility nearly completed in terms of physical infrastructure, as shown in Figure 5.3–1. Heliostat calibration testing is underway at the left-hand and central towers, with heliostats raised to focus sunlight on the receiver. Where heliostats are tilted, bright reflections (not bright enough to constitute glare) are visible.

Figure 5.3–1. Ivanpah Power Tower Facility Under Construction from a Distance of 11 mi (18 km) from the Closest Tower, May 2013.

During the January 2013 field trip, the facility was also photographed from a low hill at the base of the Clark Mountains, 3 mi (5 km) southwest of the southeasternmost tower (see Figure 5.3–2). At that distance, the three towers could only be encompassed by the widest-angle zoom setting on the camera lens, and even this photo does not capture the full width of the heliostat fields surrounding the towers,

which in total, span a distance of 4.8 mi (7.8 km) across. Figure 5.3–3 shows a view along the long axis of the facility from the southeast, from a distance of 4.3 mi (6.8 km) from the closest tower and 7.3 mi (11.7 km) from the most distant tower. These photos show that the facility is a major source of visual contrast even without the towers operating. When the facility is in operation, the receivers will shine a brilliant white with reflected light from the heliostats, and will become a much greater source of visual contrast.

Figure 5.3–2. Ivanpah Power Tower Facility Viewed from a Hill 3.0 mi (5.0 km) Southwest of the Closest Tower, January 2013.

Figure 5.3–3. Ivanpah Power Tower Facility Under Construction from a Distance of 4.3 mi (6.8 km) from the Closest Tower, May 2013.

At the time the photo shown in Figure 5.3–2 was taken, the heliostats were not tracking the sun and were "pointing" straight up, that is, the heliostat surfaces were roughly parallel to the ground plane, a standby position use to avoid wind loading. In this configuration, an assessment of potential glare as seen from an elevated viewpoint could not be made (however, for further discussion of glare from heliostats, see below). In Figure 5.3–2, the heliostats are reflecting the blue sky, and appear somewhat similar to the surface of a large body of water, a visual effect that is common at solar facilities, and which is sometimes referred to as the "lake effect."

A single observation of Ivanpah was conducted from the summit of Black Mountain (elev. 5098 ft [1554 m]) at the same time the observations were made of NSO and CM 1 and 2. The mountain summit is approximately 35 mi (56 km) northeast of the Ivanpah facility. From this viewpoint, 2,072 ft (631 m) above the center of the facility, one full tower and its associated steam plant and one partial tower could be seen after visually scanning in the direction of the facility (see Figure 5.3–4). What appeared to be a few rows of heliostats emitting low-level reflections of sunlight were also visible. While the tower and adjacent facilities appeared very small and only weakly contrasting, and would be missed by most casual observers, the fact that the *unlit* towers were visible to the unaided eye at 35.7 mi (57.5 km) suggests that when operating, the towers would almost certainly be visible at much greater distances where there were unobstructed views, likely appearing as small but bright points of light. At very long distances, the facilities are not likely to cause large visual contrasts, but they might be bright enough to attract visual attention.

Figure 5.3–4. Unilluminated Ivanpah Power Towers from a Distance of 35 mi (56 km) from the Closest Tower, May 2013. Arrows Indicate Tower Structures.

While the Ivanpah receivers were not operating during the study field visits, and thus could not be sources of glare, strong glare from heliostats was observed from two observation points during the first May 2013 field trip. The glare appeared to originate from individual heliostats during a heliostat

collimation test (see Figures 5.3–5 and 5.3–6, showing glare viewed from different locations several miles apart). Though the glare sources were very small as seen from the viewing distances of approximately 10 mi (16 km) and 11.5 mi (18.5 km), they were far brighter than they appear in the figures, and both observers found them unpleasantly bright at times. They faded in and out of glare-level intensity very rapidly, perhaps as the heliostat positions were adjusted. It is unclear whether this type of glare would be encountered during operations because the heliostats will be tracking the sun and the heliostat positioning might be very different from that observed during this test; however, it is noteworthy that these observations established that unpleasantly strong glare can be produced by an individual heliostat at distances exceeding 10 mi (16 km).

Figure 5.3–5. Close-up View of Glare from Ivanpah Heliostat, as Seen from a Distance of Approximately 10 mi (16 km), May 2013.

Figure 5.3–6. Glare from Ivanpah Heliostat, as Seen from a Distance of Approximately 11.5 mi (18.5 km), May 2013.

5.4 Crescent Dunes Solar Energy Project

The Crescent Dunes facility is a 1,600-acre (650-ha), 110-MW solar power tower facility currently under construction approximately 14 miles (23 km) north-northwest of Tonopah, Nevada. The facility is located east of Pole Line Road, about 1 mi west of the Crescent Dunes dune formation, and about 4 mi (6 km) west of the San Antonio Mountains. When operational, the facility will generate 110 MW using 17, 170 heliostats in a circular array to focus sunlight on a receiver atop a single tower 540 ft. (165 m) tall.

The facility site ranges in elevation from approximately 4,880 to 5020 ft (1490 to 1530 m) above sea level. A total of 11 observations were made of the Crescent Dunes facility on May 13, 2013, between 12:30 PM and 6:40 PM. Observation distances ranged from 1 mi to 29.5 mi (1.6 km to 47.5 km). Observation elevations ranged from 4,800 to 5,200 feet (1,460 to 1,580 m) above mean sea level.

Observations were conducted in clear, partly cloudy, and cloudy weather conditions. Visibility was judged to be good.

Objectives

The primary purposes of the observations at Crescent Dunes for this study were as follows:

1. Observe and obtain photo documentation of a poured concrete power tower facility. The Crescent Dunes tower is made of poured concrete, and is more typical of current designs; the Ivanpah towers are metal and are an atypical design, with very different visual characteristics.
2. Assess maximum visibility and contrast threshold distances for a concrete power tower facility. The Crescent Dunes facility provides much longer sightlines than Ivanpah, and thus is better suited for visibility and threshold distance analysis.
3. Document any occurrences of glare.

Visibility and contrast threshold distance assessments for the facility were conducted using a methodology developed for the Visual Impact Threshold Distance Study (VITD)— an approach developed for BLM (Sullivan et al. 2012b) to assess the effects of distance and atmospheric variables on the visibility and visual contrast levels of wind facilities. In this case, the forms were adapted for use with solar facilities. The visibility assessments consist of numeric ratings on a scale of 1 to 6, scored according to the visibility of a solar facility within its landscape/seascape setting and the weather and lighting conditions at the time of the observation. The visibility rating is a judgment of the observers, made by comparing the solar facility in view with language described on a Visibility Rating Form that accounts for the visual characteristics of the solar facility appropriate to each rating level. Photographs were not used for visibility ratings; the ratings were conducted through naked-eye observations of the facility in the field. More information about the methodology used is available in Appendix B. A Solar Facility Visibility Rating Form is available in Appendix C.

Visibility and contrast threshold distance assessments are useful for two primary purposes:

1) They are useful for determining the appropriate area of analysis for VIAs. Visibility and contrast threshold distance assessments identify the maximum distance at which a facility is likely to be

seen, the approximate distances at which it is easily seen, and the distance at which it is likely to become a major focus of visual attention, and this information can be used to identify the distance from the facility for which impacts should be analyzed. For example, the minimum distance for which impacts should be analyzed in a VIA likely corresponds to the distance at which viewers are likely to see the facility at a casual glance.

2) The visibility and contrast threshold distance assessment methodology requires that the observers record the contrast sources associated with the facility that they see, and identify the facility components or contrasts that contribute most to the project's overall visibility. This approach is quite useful for identifying important contrast sources, which is key to identifying mitigation opportunities.

Results

The Crescent Dunes facility was not in operation during the study; however, photos from the May 2013 field trip show the facility mostly completed in terms of physical infrastructure, and therefore an approximation of how the facility would look when it was in standby mode, as shown in Figure 5.4–1.

Figure 5.4–1. Crescent Dunes Solar Energy Project under Construction, as Seen from a Distance of Approximately 1.3 mi (2.1 km), May 2013.

The results of the contrast threshold distance analysis indicated the following:

1) The unilluminated tower was at the limit of visibility, i.e., just barely visible to the unaided eye, at a distance of 29.5 mi (47.5 km). This corresponds to an average visibility rating of "1" on the VITD visibility scale. At this distance, the unlit tower is tiny and very faint, and would not be noticed by a casual viewer. While the tower would likely cause a negligible visual impact at best, this result suggests that it is highly likely that the reflected light from a receiver on an operating power tower would be visible well beyond this distance, while the tower itself would not be,

and thus the facility would be visible as a bright point of light very low to the horizon (or multiple points of light if there were multiple towers in view).

2) The unilluminated tower became easily visible to both observers after a brief glance at a distance of 18 mi (29 km) (see Figure 5.4–2). This corresponds to an average visibility rating of "3" on the VITD visibility scale. At this distance, the observers stated that the contrast between the black (unilluminated) receiver and the white reflective surfaces immediately above and below the receiver was obvious, and the tower stood out against the darker mountain backdrop. The width of the tower was reported to be discernible, i.e., it appeared as a narrow vertical band rather than a line. The flashing of the white strobe lights that serve as aerial hazard warning lights was reported as being visible, but only a weak source of contrast at this distance. This observation suggests that if it can be assumed that the operating tower would be substantially more noticeable at this distance, then it would be reasonable to assume that the distance for the impact analysis to include in a VIA for an operating tower of similar appearance in similar circumstances should be at least 18 mi (29 km), and likely substantially farther. It must be kept in mind that an observation of one facility cannot be assumed to be valid for other facilities; however, the Crescent Dunes facility is generally similar in appearance to other power tower facilities that are planned or in operation, and the landscape setting is common to many solar projects in the southwestern deserts of the United States.
3) At 10.6 mi (17 km), the tower was judged to compete with other landscape elements for visual attention. This corresponds to an average visibility rating of "4" on the VITD visibility scale. It was judged to be a moderate source of visual contrast at this distance, dropping to a "3" (weak source of contrast) under cloudy conditions, which occurred during the course of the observation. In this case, the lack of sunlight on the tower made it harder to distinguish against the darker mountain backdrop. This observation suggests that lowering the contrast of the tower—for example, by coloring (tinting) the concrete before pouring it—might reduce the contrast of the tower, making it harder to see at long distances when it is cloudy, at sunrise or sunset when the sun's illumination is too low to operate the tower, and when it is in standby mode.
4) At 7.1 mi (11.4 km), the unilluminated tower was judged to be a major focus of visual attention, that is, it attracted and held viewer attention. At this distance, the other onsite infrastructure was plainly visible, and the white strobe lights were judged to be a major component of the facility's overall visual contrast.
5) At 1.3 mi (2.1 km), the facility dominated the view, that is, it filled the field of view and was the single major focus of visual attention (see Figure 5.4–1).

No glare was observed from any facility components in the course of the observations.

Figure 5.4–2. Crescent Dunes Solar Energy Project under Construction, as Seen from a Distance of Approximately 18 mi (29 km), May 2013.

Figure 5.4–3. Crescent Dunes Solar Energy Project under Construction, as Seen from a Distance of Approximately 7.1 mi (11.4 km), May 2013.

While clearly there is a need to revisit the visibility and contrast threshold distance analysis when the Crescent Dunes and Ivanpah facilities are operating, these results for the unilluminated tower and heliostats at the Crescent Dunes facility suggest that operating power towers will be visible for very long distances, and are likely to create larger contrasts at long distances because of the height of the towers and the potential for glare from the receivers and the heliostats. In addition, these observations identified the aerial hazard navigation lighting as an important cause of visual contrast at shorter distances, a new finding.

5.5 Alamosa Solar Generating Plant

The Alamosa facility is a 245-acre (99-ha), currently operating 30-MW CPV facility located approximately 10 miles (16 km) north-northwest of Alamosa, Colorado, in the San Luis Valley, which is bounded on the east by the Sangre de Christo Mountains and on the west by the San Juan Mountains. The facility is located in a relatively flat agricultural area, about 5 mi (8 km) west of Highway 17, and west of County

Road 104 N. The facility consists of 504 dual-axis tracking Amonix 7700 panels. each of which contains 7,560 fresnel lenses that concentrate sunlight onto multijunction PV cells, as well as an operations support building and a substation. Each panel is 72 ft (22 m) wide and 49 ft (15 m) tall, and is mounted on a 3-ft (1-m)-wide pedestal approximately 20 ft (6 m) high, so that the maximum height of a tilted panel is more than 50 ft (15 m).

The facility elevation is approximately 7,590 ft (2,313 m) above sea level, and the entire site varies in elevation by only a few feet. A total of 20 observations were made of the Alamosa facility on the second May 2013 field trip. Observations were made from before sunrise until evening over the course of three days (May 29–31). Observation distances ranged from 1 mi to 25.6 mi (1.6 km to 41.2 km). Observation elevations ranged from 7,565 to 9,072 ft (2,306 to 2,765 m) above mean sea level.

Observations were conducted in clear weather conditions. Visibility was judged to vary from poor (because of wind-blown dust) to good.

Objectives

The primary purposes of the observations at the Alamosa facility for this study were as follows:

1. Observe and obtain photo documentation of a CPV facility. This study marks the first known assessment of visual contrasts associated with a CPV facility. While CPV facilities vary widely in design and visual characteristics, these observations and photos provide baseline information regarding a viable utility-scale CPV design.
2. Document any occurrences of glare.

Results

The Alamosa facility shares some visual characteristics with conventional PV facilities in that the infrastructure is largely devoted to the collector array, with fewer ancillary structures; no power block, cooling towers, or water vapor plumes; and fewer workers and associated activity. Like conventional PV facilities, the solar collectors are flat rectangles, and similarly to some PV facilities, the collectors track the sun throughout the course of the day, such that at a given viewpoint, a viewer may be looking at the face, the backs, or the sides of the collectors, and with widely varying degrees of tilt. However, the collectors are vastly larger in size and much taller than conventional PV collectors (see Figure 5.5–1). While conventional PV arrays are easily screened by relatively low vegetation, structures, or even small changes in topography, the Amonix panels are taller than trees, and wider than most houses, so they are much more difficult to screen and present a relatively large surface to the viewer when the viewer faces the panels' fronts or backs. The large size of the panels also means that they subtend a relatively large angle of view at a given distance; combined with their height, this feature makes them much easier to see at long distances.

Figure 5.5-1. Close-Up View of Amonix 7700 CPV Panels at Alamosa Solar Generating Plant.

Observations of the facility were made from two viewpoints on the slopes of the Sangre de Cristo Mountains, and the facility was faintly visible under normal lighting conditions from these viewpoints, located 21.3 (34.3 m) and 25.6 mi (41.2 km) from the facility, and elevated approximately 600 and 1500 ft (180 and 460 m) higher than the facility, respectively. However, at one of the two viewpoints, on two occasions, just after sunrise on successive days, the facility was much brighter, appearing as a small but very bright band of light across the distant valley floor. Although far too small to dominate the view, the bright band of light attracted and held visual attention, and was judged to be a major source of visual contrast (see Figure 5.5–2, but note that the reflections were substantially brighter than shown in this photo). The light was insufficiently bright to cause discomfort, and could be viewed for extended periods, but it was by far the brightest light source visible at the time. The effect lasted less than 30 minutes on both days; however, during that time, the reflections varied noticeably in intensity, with individual spots “flaring up” or fading rapidly over the space of a few minutes or seconds. During one of the observations, the observers moved several miles by vehicle and noted that the reflections were visible across the entire area traveled, indicating that unlike glare observed at NSO and at the Kramer Junction SEGS trough facility, the reflections were not sensitive to short-distance viewer movement. Inspection with binoculars revealed that the band was caused by very bright reflected sunlight from the front row of panels in the array, with the “flare-ups” seemingly confined to individual panels or groups

of panels (see Figure 5.5–3). These effects were not observed at any other locations or times, although during a few other observations, an individual panel was noticeably brighter than the others, and low-level glare was observed from a distance of 1 mi (1.6 km) during one early-morning observation, when the panels were at a high angle relative to the ground plane, i.e., substantially tilted to face the low-angle sun.

Figure 5.5-2. Bright Reflections from CPV Panels at Alamosa Solar Generating Plant, as Seen from a Distance of 25.6 mi (41.2 km). San Juan Mountains in Background.

Figure 5.5-3. Close-Up View of Reflections from CPV Panels at Alamosa Solar Generating Plant, as Seen from a Distance of 25.6 mi (41.2 km).

The observation of very bright reflections from a relatively small facility at distances beyond 25 mi (40 km) was an unexpected finding. While the exact cause could not be determined with certainty, it may have to do with the combined effects of lighting, viewing geometry, and the facility's visual characteristics. At the time of year of the observations, the sun rose directly behind the viewer facing

the panels, so sunlight reflected off the flat panels directly back toward the sun might have been visible at the viewpoint and nearby locations, assuming a small amount of "spread" in the reflections from the panel surfaces. This hypothesis could be tested easily by further field observations.

In this case, the viewpoint was the visitor center at the Great Sand Dunes National Park, an example of a highly sensitive viewpoint. There are likely to be very few visitors at the Visitor Center immediately after sunrise, and if this effect is confined to this time of day for a short number of days in the year, there will likely be little impact on the National Park; however, if the effect is more widespread, both temporally and spatially, it has the potential to negatively affect the Park visitors' experiences.

Aside from these bright reflections viewed from a single viewpoint, the facility was generally not found to be a source of strong visual contrast except for views facing the panels from relatively short distances of 1–3 mi (2–5 km). It generally appeared as a dull gray "wall" low on the horizon, and viewed against distant mountain backdrops which were generally gray, it was often difficult to detect even at shorter distances, and did not strongly attract visual attention (see Figure 5.5–4). Because the facility is small relative to many other utility-scale facilities, it does not occupy a large portion of the field of view until viewers are relatively close to the panels. When it is not reflecting light, its relatively dull gray color and horizontal orientation within a landscape dominated by a strong horizon line make it blend in with the background. However, if the viewer is sufficiently close (less than 1 mi [1.6 km]), the size of the facility and the individual panels becomes dominant, and when the viewer is very close to the facility, the panels "loom" overhead and present a striking appearance (see Figure 5.5–1).

Figure 5.5–4. View of Alamosa Solar Generating Plant, as Seen from a Distance of 2.4 mi (3.8 km).

6 Potential Solar Facility Visual Impact Mitigation Strategies

Section 6.1 suggests both general and technology-specific potential mitigation strategies, based on lessons learned during the field observations of solar facilities described in Chapter 5, and on previous field observations of solar facilities (discussed in Sullivan [2011] and Sullivan et al. [2012a]).

6.1 General and Technology-Specific Mitigation

BLM (2013a) has recently published a comprehensive guide to best management practices (BMPs) for visual impact mitigation for renewable energy projects, including wind, solar, geothermal, and electric transmission projects. The reader is referred to the BLM BMP publication and to the draft Solar PEIS (BLM and DOE 2010) for a comprehensive listing of contrast sources associated with the major solar technologies, and mitigation measures generic to all large energy projects but also specific to solar energy projects. Both publications point out that because of the large size and unique characteristics of solar facilities, the visual impacts from the facilities are often large, and mitigation for the major contrast is very difficult. A particular challenge is the use of vast arrays of reflective surfaces and, especially for non-PV technologies, operating principles that rely on using highly reflective surfaces to focus sunlight to generate heat to drive steam turbines. Intense reflected light, highly reflective surfaces, more and larger support structures, complex networks of pipes, cooling towers, water vapor plumes, substantial lighting needs, and more human activity are fundamental to these technologies and make their visual impacts substantially larger than for PV facilities and the mitigation much more challenging. This is especially true for power tower facilities, because they lack the low vertical profile of PV and trough facilities. The height and luminosity of the receivers and the need for both daytime and nighttime hazard navigation lighting make them especially visible in open desert landscapes, both day and night. Even PV facilities can cause large visual impacts, despite their inherent advantages, especially when viewed from elevated viewpoints, where their size, regular geometry, and generally contrasting but highly variable apparent colors are visible.

As noted in the introduction to this report, many of the largest contrasts and resulting impacts from solar facilities cannot be mitigated effectively, except through siting facilities in different locations, choosing different solar technologies, reducing the size of the project, or using offsite mitigation to compensate for the impacts. In many circumstances, offsite mitigation is the only feasible strategy, yet it fails to reduce the actual visual impacts of the project. However, impacts not directly associated with the collector/reflector arrays and associated reflected light sources can sometimes be effectively mitigated, thereby reducing the overall impacts of the facilities, especially when the facilities are distant from the viewer; these strategies, in general, are directed at making the facility harder to notice or to distinguish from naturally occurring landscape features.

The following suggested mitigation measures are contained within the BLM BMP publication (BLM 2013a), but are further discussed here because observations of a variety of solar facilities for the current and previous studies (discussed in Sullivan [2011] and Sullivan et al. [2012a]) suggest that they may be

particularly effective. Several of these mitigation measures are discussed further in the mitigation case study in Section 6.2.

- **Reduction/treatment of all exposed metal or reflective surfaces.** The authors have repeatedly observed that only a few square inches of untreated reflective surfaces may be visible for several miles in the intense sunlight and clear air of the southwestern deserts. Even chain link fences can cause reflections visible at long distances. Many of these surfaces are not directly associated with the sunlight collecting/reflecting surfaces and may be eliminated by more careful design of the components, may be replaced by materials that are less reflective, or may be coated or treated to have non-reflective surfaces, except where safety or functional requirements prevent it. For existing facilities, careful observation from distant vantage points may reveal surprisingly bright reflection sources that potentially may be mitigated. It should also be noted that dark-colored objects may still cause bright reflections, as is evident in the numerous observations of black PV panels appearing to be bright white under certain lighting conditions and viewing geometries; reducing reflectivity of the surfaces is critical to effective mitigation.
- **Use consistent color treatments.** Wherever possible, use uniform (and well-chosen) color treatments on all structures and surfaces. NSO has buildings that use two very different colors, neither of which blends well with the surrounding landscape. CM 2 has two-toned PCUs that do not blend with the panels when they appear to be black, white, or shades in between. In both cases, the inconsistent coloring creates additional color contrast that draws the eye in some viewing situations.
- **Use BLM standard environmental colors.** BLM visual resource experts have conducted studies to determine colors that best match naturally occurring landscapes. In the judgment of the authors, observations of SSN, CM 1, and CM 2 clearly show that the BLM-required color treatment substantially reduced the visibility of the PCUs, potentially a major source of color contrast at PV facilities. Choosing effective color treatments is more challenging than many non-specialists realize, and many treatments intended to blend with the surrounding landscape are ineffective and may actually increase the visibility of the facility.
- **Avoid regular geometry where feasible.** It is a given that solar facilities require the use of large arrays of identical components in the collector/reflector arrays; at short distances, the regular geometry is a dominant visual feature that contrasts strongly with natural landscapes, and is an unavoidable contrast. However, at longer viewing distances, the internal components of the facility become indistinguishable, and the forms of the collector/reflector arrays become dominant. If these shapes are regular polygons, they may be instantly identifiable as man-made elements in a natural landscape; however, if the arrays have curving or irregular edges, they may become difficult for casual observers to distinguish from cloud shadows, rock outcrops, or vegetation masses. PV arrays, in particular, do not need to be in rectilinear arrays, and the Ivanpah heliostat fields also have irregular outlines, so there is no insurmountable obstacle to using non-rectilinear arrays for these technology types. This type of mitigation may be particularly effective for PV facilities, because in most viewing situations, they do not cause glare, do not have large expanses of highly reflective surfaces, and consequently are the easiest

to blend with natural landscapes. This same principle should be applied to vegetation management: the edges of cleared areas should be feathered to make them appear more natural.

- **Minimize vegetation clearing outside of the arrays.** There are a host of non-visual reasons to minimize vegetation clearing at solar facilities; however, vegetation removal also causes strong color and texture contrasts by exposing (typically) light-colored soils that lack the visual texture that vegetation provides. The light-colored soils are particularly visible adjacent to black PV panels, and become even more noticeable if the lines of the cleared areas repeat the edge lines of the array forms; in other words, if there are strips of cleared vegetation that parallel the edges of the array. These repeated lines create a high-contrast striping effect that can be visible for long distances an d is obviously artificial in its appearance.
- **Design and use lighting effectively.** The BLM BMP publication discusses several mitigation measures for lighting, and they can be very effective when properly applied. Again, PV facilities present mitigation advantages because they need little lighting to begin with. They do not have complex high-temperature components and taller structures that require extensive lighting for safety reasons, and they require very few individuals onsite for operation. With proper lighting design and good lighting practices, they can be made nearly invisible at night. And while solar thermal plants do require more extensive lighting, when lighting is minimized and properly shielded and good lighting practices are used, night-sky impacts can be substantially reduced. Observations at the NSO facility showed what appeared to be poorly shielded and excessive lighting, with large expanses of lit but unused areas and high levels of offsite visibility and glare, while the CM 1 and 2 facilities, with only moderate lighting mitigation in place, were difficult to see from a relatively short distance.

6.2 Visual Impact Mitigation Case Study: Silver State (North) Solar Energy Project

While the mitigation recommendations in the previous section were the result of observation of a variety of solar facilities, each of them is currently being implemented or tested at the next phase of development of the Silver State Solar Project. As noted elsewhere in this report, observations in this and a previous study (Sullivan 2012) included observations of the SSN project, currently in operation on BLM lands near Primm, Nevada. The SSN observations revealed contrast sources that offered potential mitigation opportunities. In collaboration with BLM's Chief Landscape Architect and First Solar's (the project developer's) manager for siting and permitting, mitigation measures were proposed and are currently being implemented or tested in the next phase of development, the Silver State South (SSS) project, a 250 MW expansion of the Silver State Solar Project. This case study is presented as an example of successful collaborative design of mitigation measures for a solar energy project.

6.2.1 SSN—Current Visual Mitigation

Good visual impact mitigation measures have already been implemented at SSN. Particularly successful has been the painting of all structures on the site (except for the substation, which is not under the

control of the solar developer and operator) with a BLM Standard Environmental Color, Shadow Gray, a deep gray-green that blends well with the vegetation around the facility, predominantly creosote bush. Figure 6.2–1 shows how well the color treatment has blended the PCUs with the surroundings, and how the color treatment also does not contrast strongly with the panels under normal lighting conditions. For comparison, Figures 6.2–2 and 6.2–3 show the white PCUs at CM 1 and the two-toned brown and white PCUs at CM 2, respectively. The white PCUs at CM 1 and the white portions of the PCUs at CM 2 clearly increase contrast with the surroundings. The brown color of the PCUs at CM 2 is a somewhat better match to the surroundings, but the uniform Shadow Gray PCUs at SSN are a superior color match.

Figure 6.2–1. Shadow Gray PCUs at SSN Facility.

Figure 6.2–2. White PCUs at CM 1 Facility.

Figure 6.2–3. Brown/White PCUs at CM 2 Facility (foreground), White PCUs at CM 1 Facility (background).

Lighting mitigation at SSN is also better than at many facilities. A lighting plan is in place, lighting is minimal, and motion detectors are used. While lighting fixtures are not fully shielded full-cutoff luminaires, they are shielded, and according to site operators, they are very rarely on in any event.

6.2.2 SSN – Mitigation Opportunities

Multiple reflections from panel array

Previous field observations by Argonne of the operating SSN facility revealed several visual contrast sources that presented mitigation opportunities. The first and most obvious contrast source involved myriad reflections in a geometric pattern across the entire collector array. The visual effect was quite striking (see Figures 6.2–4 and 6.2–5). This effect was observed on multiple occasions at SSN at relatively short distances (less than 1 mi [1.8 km]), but may be visible at longer distances. A similar effect was observed at the Blythe Solar Project, another First Solar project using similar panels and mounts. This effect has been observed from ground level at relatively short distances (less than one mile), but may be visible at longer distances.

Figure 6.2–4. Reflections from Multiple Regularly-Spaced Components in the SSN PV Panel Array.

Figure 6.2–5. Wide-Angle View of Reflections from SSN Panel Array.

Argonne informed the BLM Chief Landscape Architect, who arranged a consultation with First Solar's manager of siting and compliance. A site visit was arranged as part of the current project, and Argonne was able to visit the site in January 2013 to further investigate the potential causes of the visual contrast. Observations made during the January 2013 visit suggest that the source of the effect is the reflection of sunlight from the metal support structures directly underneath the solar panels. These metal supports are mounted perpendicular to the two rails mounted on the tilt bracket. The panels are attached to the metal supports by clips that wrap around the edges of the panels. The supports project an inch or so beyond the top and bottom edges of the top and bottom panels in each row. The supports are made of galvanized steel.

Argonne suggested that at certain times of day, e.g., midafternoon, the sun angle is such that the sunlight falls directly onto the end of the support structure just above and below the edge of the top panel in the row and also in the small gaps between the panels. For the most part, except for the panels closest to the viewer, the gaps between panels are obstructed from view by other panels and mounting structures (e.g., posts, rails, and tilt brackets). Even though only a few square inches of metal at the end of the support structure are exposed to direct sunlight, the galvanized metal surface strongly reflects the sunlight, and at a distance, appears as a bright spot of light that is easily visible for at least 0.5 mi (0.8 km), and possibly much further. Because there is regular spacing between the panels and rows and there are typically thousands of panels in view from any given point, the reflections from the ends of the support structures appear as a vast geometric grid of closely spaced lights.

Figure 6.2–6 is a photograph taken during the January site visit that shows a more detailed view of the structures involved. This figure shows reflections from sunlight falling on the top few inches of the support structures underneath the solar panels, as well as falling on the tilt brackets through gaps between the panels,.

Figure 6.2–6. Sunlight Reflected from the Top Few Inches of the Support Structures Underneath the Solar Panels, and from the Tilt Brackets.

After consultation with project engineering staff, First Solar determined that the contrast could be mitigated by treating the PV panel mounting clips with a non-specular dull finish or using the BLM-standard environmental color Shadow Gray or Covert Green. This mitigation will be implemented for the SSS expansion if a fixed-tilt design is chosen.

East-west oriented white "stripes" visible in the collector array

Three white "stripes" (shown in Figure 6.2–7) were noted within the facility during observations conducted from Interstate 15 near the SSN facility. Under some lighting conditions, this effect increased the visual contrast of the facility substantially. The stripes were also visible from an elevated viewpoint about 5 mi (8 km) east of the facility (see Figure 6.2–8), though there was less visual contrast in this view because the white "stripes" are similar in appearance to "stripes" caused by the contrast between bare soil and the gaps between sections of the solar collector array.

Observations made during the January 2013 visits suggest that the source of the three white "stripes" is three groups of one or more rows of support structures, or tables (post, tilt bracket, panel support, rail), that lack PV panels. Figure 6.2–9 is a close-up photograph of one of the sections that is missing panels. The tables are galvanized metal, and without panels to shade them, they strongly reflect sunlight and are especially conspicuous next to the black panels in the rest of the array. Note that this photo also shows the panel support structures (discussed above), without panels but with panel clips visible. This source of contrast could be eliminated by installing panels in these rows or otherwise covering or color-treating them, but color-treating the PV panel mounting clips will mitigate this potential source of contrast for the SSS expansion.

Figure 6.2–7. East-West-Oriented White “Stripes” visible in the Collector Array as Seen from Ground-Level Viewpoint Approximately 1.5 miles from Facility.

Figure 6.2–8. East-West Oriented White “Stripes” (Indicated by Red Arrows) Visible in the Collector Array as Seen from Elevated Viewpoint Approximately 5 Miles from Facility.

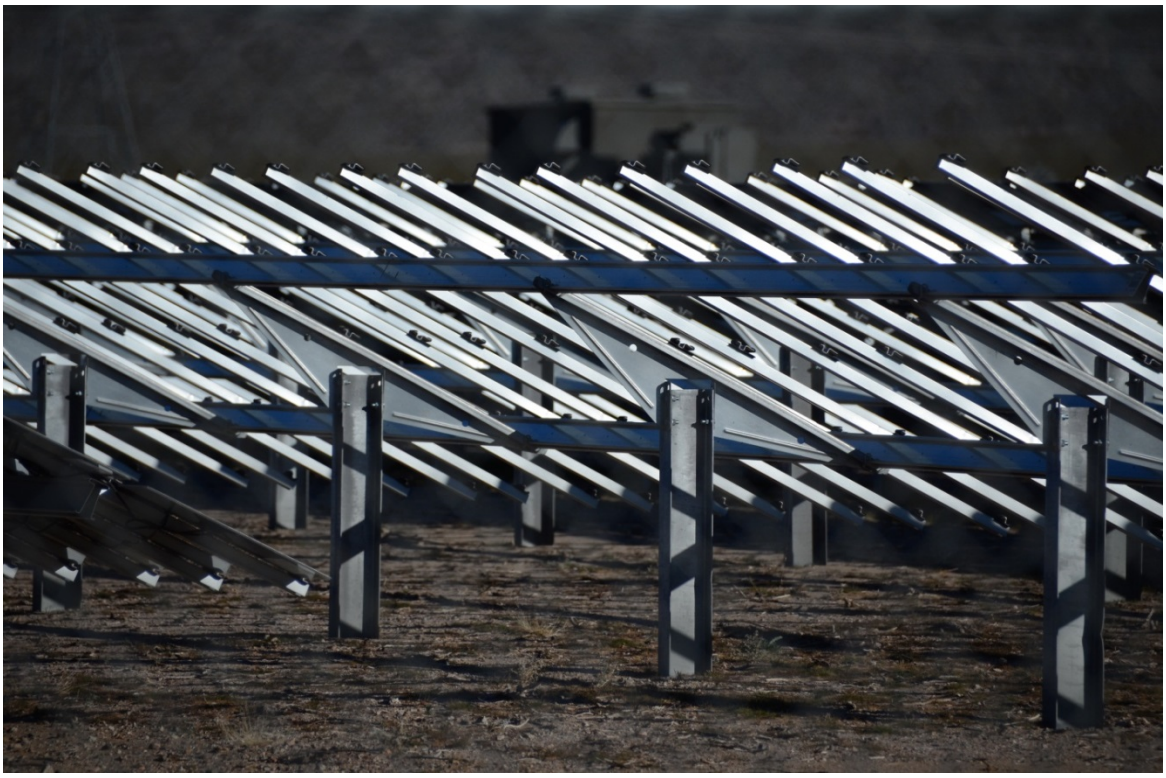


Figure 6.2–9. Table without Mounted Panels. The galvanized metal reflects sunlight strongly.

Unnecessary regular geometry in roads and array access ways

In a previous visit, the author and the BLM Chief Landscape Architect had observed the SSN facility from distances of between 10 and 22 mi (16-35 km). They noted that at these longer distances, the facility might be mistaken for a dark rock outcropping or, in some cases, a cloud shadow, except that the regular geometry of the array was apparent and looked artificial, and that straight roads and access ways through the panel array heightened the contrast between the facility and the surrounding landscape and made it more apparent that it was not a natural feature, as shown in Figure 6.2–10. These observations were discussed by BLM with First Solar and led to the following mitigation measures for SSS:

- Locating the perimeter road at a variable distance from the perimeter fence to allow for feathering of the footprint and selective vegetation removal, with the intent to result in an organic or irregular line.
- Offsetting solar field access ways at appropriate intervals to minimize the appearance of straight lines within the panel array.

Figure 6.2–10. View of SSN Facility from a Distance of 10 mi (16 km).

Contributing to the man-made appearance and overall visibility of the facility at longer distances were the strong contrast provided by the light soils in areas where vegetation was cleared adjacent to the black panels; these contrasts were due in part to a firebreak of cleared vegetation around the array. BLM suggested the possibility of using a non-toxic coloring agent to reduce the soil contrast. Argonne talked to First Solar about potentially eliminating or reducing the size of the firebreak and using a rock stain or similar coloring agent to darken the gravel soil surface of the cleared areas in order to reduce the contrast. Argonne discussed the mitigation objectives with a rock-coloring agent vendor to verify that the coloring agent would work on gravel, as opposed to larger rocks. These discussions led to the following mitigation measures for SSS:

- Portions of the SSS drainage control basins will undergo an experimental treatment with Permeon or a similar type of contrast-reducing product.
- If a firebreak is not required and topographic and vegetation conditions allow, in the perimeter and tortoise fence construction areas, vegetation will be cut to a height of 6 in prior to fence construction.

First Solar is also talking to county fire officials about the possibility of reducing the size of the firebreak.

This mitigation case study demonstrates how careful observation of existing facilities can lead to the identification of mitigation opportunities which are sometimes unique to the particular site or project. It also demonstrates the benefits of collaboration between visual and solar technical experts to design practical and effective mitigation strategies.

7 Conclusions and Recommendations

This study more fully characterized the visual characteristics and visual contrasts associated with several types of utility-scale solar facilities operating or under construction in the southwestern United States, based on field observations conducted in 2013. The field observations were also used to identify particularly effective visual impact mitigation measures for solar facilities, and to identify and collaboratively develop new mitigation strategies for use at a particular facility, but with potential application to other projects.

Results of the field observations included assessments and photographic documentation of the effects of distance, viewpoint elevation, and lighting on the visual contrasts of various types of solar facilities, including three thin-film PV facilities, two power tower facilities, a parabolic trough facility, and a CPV facility. The interaction of these visibility factors with specific visual impact mitigation measures was also observed and documented. Photo-documentation of the cumulative visual impacts of multiple solar facilities within a single viewshed was developed. A systematic assessment of the effects of distance on the visibility and visual contrasts of a utility-scale power tower (not operating) was conducted, and sources of visual contrast from the facility were documented. A baseline contrast assessment was conducted for a utility-scale CPV.

Significant findings of the field observations include the following:

- Color selection for materials surface treatment as directed by BLM resulted in better mitigation than alternative colors;
- Glare from a parabolic trough facility was observed to be a relatively common occurrence;
- Effective lighting mitigation can result in near-zero night-sky impacts for PV facilities;
- Strong glare from a single power tower heliostat was visible at distances exceeding 10 mi (16 km);
- Unlit power towers were easily visible for distances beyond 20 mi (32 km), and one was faintly visible as far as 35 mi (56 km);
- Daytime aerial hazard lighting on power towers was visible at long distances and added substantially to visual contrast in certain conditions; and
- Reflected light from a CPV facility was plainly visible at long distances (beyond 25 mi (40 km).

The study also identified and assessed contrast sources at the SSN thin-film PV facility on BLM land in Nevada. These contrast sources include reflections from metal clips used to affix the solar panels to the support structures directly below the panels; reflections from panel support structures without mounted panels; the use of regular geometric forms in panel arrays, cleared areas, and other linear features; and reflected light from light-colored gravel where vegetation has been cleared around the collector array. In collaboration with the facility siting manager and with input from BLM and a materials contractor, potential mitigation measures were identified for each of these contrast sources. At the time

of this writing, BLM has directed that the proposed mitigation measures be implemented in the next currently planned phase of development at this facility.

Further research into the visual characteristics of utility-scale solar facilities is needed in order to develop accurate visual impact assessments for proposed projects. To date, only a few facilities have been examined, and a larger sample of facilities is needed to make valid assumptions about the characteristics of other projects. Of particular importance is the assessment of visual contrasts from large-scale power tower facilities. These facilities are likely to have very large visual impacts, but because facilities of this size have no precedent, little is known about how they may impact scenic resources.

Additional work needs to be done to assess the effectiveness of visual impact mitigation measures for solar facilities. Demonstrating the effectiveness of visual impact mitigation measures is critical to their being more widely applied; also important is eliminating or modifying mitigation measures that cannot be demonstrated to be effective. Also important is the collaborative design of new mitigation measures specific to solar facilities. As shown by this study, careful observation of operating facilities can lead to the identification of previously unknown or unidentified contrast sources, which can in some cases be practically and effectively mitigated through the combined efforts of visual resource and solar technology experts.

A particularly important area of future mitigation research concerns night-sky impacts, which are a significant concern to stakeholders. While this study suggests that good lighting mitigation and lighting practices can result in near-zero night-sky impacts at PV facilities, solar thermal facilities present much greater lighting mitigation challenges. Research and development to assess potential lighting mitigation opportunities at solar thermal facilities and to design mitigation that is both effective and consistent with safety and functional requirements is an important near-term need.

8 References

Barrett, S. 2013. Glare Factor: Solar Installations and Airports. *Solar Industry*, vol. 6(5). June. Available at http://solarindustrymag.com/issues/SI1306/FEAT_02_Glare_Factor.html. Accessed Dec. 7, 2013.

Basin and Range Watch. 2010. Rebuttal Brief, Basin and Range Watch. TN #: 200075. California Energy Commission Docket for Ivanpah Solar Electric Generating System. Docket No. 07-AFC-5. April. Available at http://docketpublic.energy.ca.gov/PublicDocuments/Regulatory/Non%20Active%20AFC's/07-AFC-5%20Ivanpah%20Solar%20Electric/2010/Apr/TN%2056281%2004-15-10%20Rebuttal%20Brief%20from%20Basin%20-%20Range%20Watch.pdf. Accessed Dec. 6, 2013.

Benson, J.F. 2005. "Visualization of Windfarms," in *Visualization in Landscape and Environmental Planning: Technology and Applications*. I. Bishop and E. Lange (editors). New York: Taylor & Francis.

BLM (Bureau of Land Management). 2008. Standard Environmental Color Chart CC-001. June.

BLM. 2010a. *California Desert Conservation Area Plan Amendment/Final Environmental Impact Statement for Ivanpah Solar Electric Generating System FEIS-10-31*. July. Available at http://lpo.energy.gov/wp-content/uploads/2010/10/Final-EIS-Appendix-A-Summary-of-Comments.pdf. Accessed Dec. 5, 2013.

BLM. 2010b. *Final Environmental Impact Statement for the Silver State Solar Energy Project.* DOI No. FES 10-50.September. Available at: http://www.blm.gov/pgdata/etc/medialib/blm/nv/field_offices/las_vegas_field_office/energy/nextlight_-_other/FEIS_FedReg_NOA.Par.21644.File.dat/Silver%20State%20Solar%20FEIS%20Volume%20I.pdf. Accessed Dec. 6, 2013.

BLM. 2013a. *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities*. Cheyenne, Wyoming. 342 pp. April. Available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/renewable_references.Par.1568.File.dat/RenewableEnergyVisualImpacts_BMPs.pdf. Accessed Dec. 5, 2013.

BLM. 2013b. Final Supplemental Environmental Impact Statement for the Silver State Solar South Project and Proposed Las Vegas Field Office Resource Management Plan Amendment. DOI-BLM-NV-S010-2012-0067-EIS. September. Available at http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/Silver_State_Solar_South/final_seis.html. Accessed Dec. 6, 2013.

BLM and DOE (U.S. Department of Energy). 2010. *Draft Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States.* DES 10-59; DOE/EIS-0403. December. Available at http://solareis.anl.gov/documents/dpeis/index.cfm. Accessed Dec. 5, 2013.

BLM and DOE. 2012. *Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States.* FES 12-24 DOE/EIS-0403. July. Available at http://solareis.anl.gov/documents/fpeis/index.cfm. Accessed Dec. 5, 2013.

CEC (California Energy Commission). 2010. *Staff Assessment and Environmental Impact Statement, Genesis Solar Energy Project.* CEC-700-2010-006. Docket 09-AFC-8. March. Available at http://www.energy.ca.gov/sitingcases/genesis_solar/documents/staff_assessment/01_CEC-700-2010-006_Cover-SectB.pdf. Accessed Dec. 5, 2013.

CEC (California Energy Commission). 2013. *Palen Solar Electric Generating System Final Staff Assessment - Part B.* CEC-700-2013-003-FSA-PTB. Docket 09-AFC-07C. September. Available at http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-07C/TN200564_20130923T153458_Palen_Solar_Electric_Generating_System_Final_Staff_Assessment.pdf. Accessed Dec. 5, 2013.

Chiabrando, R., et al. 2009. The territorial and landscape impacts of photovoltaic systems: definition of impacts and assessment of the glare risk. Renewable and Sustainable Energy Reviews, vol. 13 (8), pp. 2441–2451. Available at http://www.sciencedirect.com/science/article/pii/S1364032109001026#. Accessed Dec, 5, 2013.

CIE (Commission Internationale de l´Eclairage). 2012. e-ILV Termlist. Available at http://eilv.cie.co.at/. Accessed Dec. 13, 2013.

Colorado River Indian Tribes. 2013. Colorado River Indian Tribes re the PSA for the Palen Solar. TN #: 200075. California Energy Commission Docket for Palen Solar Power Project. Docket 09-AFC-07C. November. Available at http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-07C/TN201261_20131119T144746_Exhibit_3066_NPS_comments_on_PSEGS_SDEIS.pdf. Accessed Dec. 5, 2013.

DOE (U.S. Department of Energy). 2012a. *Sunshot Vision Study*. Office of Energy Efficiency & Renewable Energy report. May.

DOE. 2012b. *Final Environmental Impact Statement for the Quartzsite Solar Energy Project and Proposed Yuma Field Office Resource Management Plan Amendment.* DOE/EIS-0440. December. Available at http://ww2.wapa.gov/sites/western/transmission/interconn/Documents/quartzsite/FinalQSEIS.pdf. Accessed Dec. 7, 2013.

Ho, C.K. 2011. Observations and Assessments of Glare from Heliostats and Trough Collectors: Helicopter Flyover and Drive-By Sightings. In Proceedings of SolarPACES 2011, Granada, Spain, Sept. 20–23. Available at https://share.sandia.gov/phlux/static/references/glint-glare/Glare_SolarPACES2011_ID23538_Ho_header.pdf. Accessed Dec. 7, 2013.

Ho, C.K. 2012. Glare Impacts from Solar Power Plants near Airports. In Proceedings of ACC/AAAE Airport Planning, Design and Construction Symposium, Denver, CO, Feb. 29–Mar. 2.

Ho, C.K. 2013. Relieving a Glaring Problem. *Solar Today*, April. Available at https://share.sandia.gov/phlux/static/references/glint-glare/Ho-SolarToday-April13_v2.pdf. Accessed Dec. 7, 2013.

Ho, C.K., et al. 2009. Hazard Analyses of Glint and Glare from Concentrating Solar Power Plants. SAND2009-4131C. In Proceedings of SolarPACES 2009, Berlin, Germany, Sept. 15–18. Available at https://share.sandia.gov/phlux/static/references/glint-glare/Glint_Glare_SolarPACES2009.pdf. Accessed Dec. 7, 2013.

Ho, C.K., and S.S. Khalsa. 2010. Hazard Analysis and Web-Based Tool for Evaluating Glint and Glare from Solar Collector Systems. In Proceedings of SolarPACES 2010, Perpignan, France, Sept. 21–24. Available at: https://share.sandia.gov/phlux/static/references/glint-glare/Glint_Webtool_SolarPACES2010_paper_v5_header.pdf. Accessed Dec. 7, 2013.

Ho, C.K., and C.A. Sims. 2013. *Solar Glare Hazard Analysis Tool (SGHAT) User's Manual v. 2.0.* SAND2013-7063P. Sandia National Laboratories, Albuquerque, NM. Available at https://share.sandia.gov/phlux/static/references/glint-glare/SGHAT_Users_Manual_v2-0_final.pdf. Accessed Dec. 7, 2013.

Ho, C. K., et al. 2011. Methodology to Assess Potential Glint and Glare Hazards from Concentrating Solar Power Plants: Analytical Models and Experimental Validation. ASME J. Sol. Energy Eng., 133. Available at. Accessed Dec. 7, 2013.

Kessler, B. 2013. Inyo Supervisors lodge critical comments on DWP solar project. *Sierra Wave Media*. October 16. Available at http://www.sierrawave.net/26916/inyo-supervisors-lodge/. Accessed Dec. 5, 2013.

NPCA (National Parks Conservation Association). 2012. *Solar Energy, National Parks, and Landscape Protection in the Desert Southwest*. Center for Park Research report. May. Available at http://www.npca.org/about-us/center-for-park-research/solar/solar-energy-and-desert-southwest_final-technical-report_050712_reformat.pdf. Accessed Dec. 7, 2013.

NPS (National Park Service). 2013. Exhibit 3066. NPS comments on PSEGS SDEIS. California Energy Commission Docket for Palen Solar Power Project. Docket 09-AFC-07C. November. Available at http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-07C/TN201261_20131119T144746_Exhibit_3066_NPS_comments_on_PSEGS_SDEIS.pdf. Accessed Dec. 5, 2013.

NRC (U.S. Nuclear Regulatory Commission). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Volume 1*. NUREG-1437 Vol. 1. Available at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/v1/. Accessed Dec. 5, 2013.

Riley, E., and S. Olson. 2011. A Study of the Hazardous Glare Potential to Aviators from Utility-Scale Flat-Plate Photovoltaic Systems. *ISRN Renewable Energy*, vol. 2011, Article ID 651857. Available at http://www.hindawi.com/isrn/renewable.energy/2011/651857/ref/. Accessed Dec. 9, 2013.

San Bernardino County Sentinel. 2013. County Revamps Commercial Solar Power Project Development Code. December 6. Available at: http://sbsentinel.com/2013/12/county-revamps-commercial-solar-power-project-development-code/. Accessed Dec. 9, 2013.

Sonoma County. 2013. Sonoma County Municipal Code Sec.26-88-206. Solar Energy Facilities—Special Use Standards. Available at: http://library.municode.com/index.aspx?clientId=16331. Accessed Dec. 9, 2013

Sullivan, R. 2011. Visual Impacts of Concentrating Solar Power Facilities on Desert Landscapes of the American Southwest. In Proceedings of SolarPaces 2011, Granada, Spain, Sept. 20–23, 2011.

Sullivan, R., et al. 2012a. Visual Impacts of Utility-scale Solar Energy Facilities on Southwestern Desert Landscapes. In Proceedings of the National Association of Environmental Professionals 37th Annual Conference, Portland, OR, May 21–24, 2012. Available at http://visualimpact.anl.gov/solarvis/docs/Solar_Visual_Impacts.pdf. Accessed Dec. 5, 2013.

Sullivan, R., et al. 2012b. Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes. In Proceedings of the National Association of Environmental Professionals 37th Annual Conference, Portland, OR, May 21–24, 2012. Available at http://visualimpact.anl.gov/windvitd/docs/WindVITD.pdf. Accessed Dec. 5, 2013.

Torres-Sibille, A.C., et al. 2009. Aesthetic Impact Assessment of Solar Power Plants: An Objective and a Subjective Approach. *Renewable and Sustainable Energy Reviews,* vol. 13(5), pp. 986–999.

Tsoutsos, T., et al. 2005. Environmental Impacts from the Solar Energy Technologies. *Energy Policy*, vol. 33, pp. 289–296. Available at http://www.circleofblue.org/waternews/wp-content/uploads/2010/08/Tsoutsos_Frantzeskaki_2006_EIA_ST.pdf. Accessed Dec. 5, 2013.

Turney, D., and V. Fthenakis. 2011. Environmental impacts from the installation and operation of large-scale solar power plants. *Renewable and Sustainable Energy Reviews,* vol. 15, pp. 3261–3270. Available at http://www.firstsolar.com/Innovation/~/media/Files/Sustainability%20-%20Sustainability%20Documentation/CdTe%20Docs/Environmental_Impacts_from_installation_operation_large-scale_solar_power_plants.ashx. Accessed Dec. 5, 2013.

Appendix A: Solar Facility Visual Characteristic Study: Site Description Form

Solar Facility Visual Characteristics Study: Data Collection Form

SITE DESCRIPTION

Observation#:	Observers:	Date:	Time:
Facility:	Secondary Facility:		
Location:			
Weather: Clear Mostly Clear Partly Clear Partly Cloudy Mostly Cloudy Cloudy Cirrus Rain Fog Snow			
Visibility: Good Fair Poor			
GPS Coordinates:	Bearing:		
VAV Descriptor: Superior Normal Inferior			
General Description of Viewed Facility:			
Facility Backdrop: Sky Sky/Ground Ground			
Facility Backdrop Lightness: Dark Medium Light			
Facility Backdrop Contrast: High Medium Low			
Facility Backdrop Color:			
Lighting Quality Even Sun Part Sun/Part Shade Even Shade			
Solar Azimuth:	Elevation:		
Lighting Angle: Frontlit Sidelit Left Sidelit Right Backlit Shade Not Apparent			
Collector Field Orientation: Forward Forward Oblique Side Rear Oblique Rear			
Collector Array Color(s):			
Glare Visible? Yes No			
Light Patterns Visible? Yes No	Plumes Visible? Yes No		
Other Transitory Effects? Yes No			
Other Infrastructure Prominent? Yes No			
Other Observations:			

PHOTOGRAPHS

Photographer	
Camera	
Lens	

Photo Number	**FL**	**Bearing**	**Subject**

Appendix B: Visual Contrast Threshold Distance Methodology

Visibility assessments for the Crescent Dunes Solar Energy Project used a methodology developed for the Visual Impact Threshold Distance Study, a U.S. Department of the Interior, Bureau of Land Management study to assess the effects of distance and atmospheric variables on the visibility and visual contrast levels of wind facilities (Sullivan et al. 2012). The visibility assessments consist of numeric ratings on a scale of 1 to 6, scored on the visibility of a facility within its landscape setting and for the weather and lighting conditions at the time of the observation. The visibility rating is a judgment of the observer made by comparing the facility in view with language described on a Visibility Rating Form that accounts for the visual characteristics of the facility appropriate to each rating level. Photographs were not used for visibility ratings; the ratings were conducted through naked-eye observations of the facilities in the field.

The rating scale is based on the Bureau of Land Management's Visual Resource Management system (Bureau of Land Management, 1984), specifically, the Visual Contrast Rating (Bureau of Land Management, 1986), which is used to predict the visual contrast of a proposed project with the surrounding natural landscape. The Visibility Rating Form was customized for use with existing rather than proposed facilities. The form also included several open-ended questions soliciting information from the observer to justify, explain, and/or expand upon the numeric visibility rating. The visibility ratings and instructions used by the observers to rate visibility are reproduced in Table 1.

Visibility ratings of "1" or "2" would generally correspond to low levels of visual contrast in the framework of the Visual Contrast Rating; ratings of "3" or "4" would correspond to moderate levels of visual contrast; and ratings of "5" or "6" would correspond to high levels of visual contrast.

Each observer completed a separate Visibility Rating Form for each observation, rating the visibility and answering the questions for each form independently without consulting the other observers. Observers could discuss their ratings after each observation, but they were not allowed to change the ratings once the form was completed.

REFERENCES

BLM (Bureau of Land Management). 1984. *Visual Resource Management*. BLM Manual Handbook 8400, Release 8-24, U.S. Department of the Interior, Washington, D.C.

BLM (Bureau of Land Management). 1986. *Visual Resource Contrast Rating.* BLM Manual Handbook 8431-1, Release 8-30, U.S. Department of the Interior, Washington, D.C.

Sullivan, R., et al. 2012. "Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes." In *Proceedings, National Association of Environmental Professionals, 37th Annual Conference*, May 21–24, 2012, Portland, Ore. Available at http://visualimpact.anl.gov/windvitd/docs/WindVITD.pdf. Accessed Dec. 5, 2013.

Table 1. Visibility rating form instructions used by observers to rate visibility of wind facilities.

VISIBILITY RATING FORM INSTRUCTIONS	
Visibility Rating	**Description**
VISIBILITY LEVEL 1: *Visible only after extended, close viewing; otherwise invisible.*	An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance, and looking for it. Even under those circumstances, the object can only be seen after looking at it closely for an extended period of time.
VISIBILITY LEVEL 2: *Visible when scanning in general direction of study subject; otherwise likely to be missed by casual observer.*	An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by a casual observer; however, most people would not notice it without some active looking.
VISIBILITY LEVEL 3: *Visible after brief glance in general direction of study subject and unlikely to be missed by casual observer.*	An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape/seascape elements.
VISIBILITY LEVEL 4: *Plainly visible, could not be missed by casual observer, but does not strongly attract visual attention, or dominate view because of apparent size, for views in general direction of study subject.*	An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of the observer's visual field.
VISIBILITY LEVEL 5: *Strongly attracts visual attention of views in general direction of study subject. Attention may be drawn by strong contrast in form, line, color, texture, luminance, or motion.*	An object/phenomenon that is not of large size, but that contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately, and tending to hold viewer attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape/seascape elements.
VISIBILITY LEVEL 6: *Dominates view because study subject fills most of visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.*	An object/phenomenon with strong visual contrasts that is of such large size that it occupies most of the visual field, and views of it cannot be avoided except by turning the head more than 45 degrees from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape/seascape elements.

Appendix C: Solar Facility Visibility Rating Form

SOLAR FACILITY VISIBILITY STUDY: VISIBILITY RATING FORM

Observation #:	Date:	Time:
Facility:	Location:	
Rater:	Other observers:	

VISIBILITY RATING

VISIBILITY RATING	NOTES

QUESTIONS

Would the facility be likely to attract the attention of a casual viewer? Yes No
Is the facility a major focus of visual attention? Yes No Explain.
Which facility elements contribute most to visibility? Facility Size Component Size Geometry Color Glare/Glinting Other Explain.
Does the facility repeat basic elements of form/line/color/texture found in predominant natural features?
Does the facility repeat basic elements of form/line/color/texture found in predominant man-made features?
Notes

"View in general direction of study subject" defined as field of view visible when observer is looking toward study subject without turning head more than 45 degrees in either direction.
VISIBILITY LEVEL 1: Visible only after extended, close viewing; otherwise invisible.

An object/phenomenon that is near the extreme limit of visibility. It could not be seen by a person who was unaware of it in advance, and looking for it. Even under those circumstances, the object can only be seen after looking at it closely for an extended period of time.

VISIBILITY LEVEL 2: Visible when scanning in general direction of study subject; otherwise likely to be missed by casual observer.

An object/phenomenon that is very small and/or faint, but when the observer is scanning the horizon or looking more closely at an area, can be detected without extended viewing. It could sometimes be noticed by a casual observer; however, most people would not notice it without some active looking.

VISIBILITY LEVEL 3: Visible after brief glance in general direction of study subject and unlikely to be missed by casual observer.

An object/phenomenon that can be easily detected after a brief look and would be visible to most casual observers, but without sufficient size or contrast to compete with major landscape elements.

VISIBILITY LEVEL 4: Plainly visible, could not be missed by casual observer, but does not strongly attract visual attention, or dominate view because of apparent size, for views in general direction of study subject.

An object/phenomenon that is obvious and with sufficient size or contrast to compete with other landscape elements, but with insufficient visual contrast to strongly attract visual attention and insufficient size to occupy most of the observer's visual field.

VISIBILITY LEVEL 5: Strongly attracts visual attention of views in general direction of study subject. Attention may be drawn by strong contrast in form, line, color, or texture, luminance, or motion.

An object/phenomenon that is not of large size, but that contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately, and tending to hold viewer attention. In addition to strong contrasts in form, line, color, and texture, bright light sources (such as lighting and reflections) and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject interferes noticeably with views of nearby landscape elements.

VISIBILITY LEVEL 6: Dominates view because study subject fills most of visual field for views in its general direction. Strong contrasts in form, line, color, texture, luminance, or motion may contribute to view dominance.

An object/phenomenon with strong visual contrasts that is of such large size that it occupies most of the visual field, and views of it cannot be avoided except by turning the head more than 45 degrees from a direct view of the object. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. The visual prominence of the study subject detracts noticeably from views of other landscape elements.