

2 Identify and produce recommendations for implementing model results

The findings of this analysis provide planners, developers, and stakeholder groups with a more comprehensive examination of the San Joaquin Valley and highlight areas for utility scale solar development that are compatible with agricultural and conservation values. These results provide a starting point for upcoming planning processes on both the state and county level, with this model's flexibility allowing it to remain up-to-date as new data becomes available. The ultimate goal of this assessment is that these results will be formally incorporated into the solar development planning process.

Mitigation Areas

The results of the Conservation Value model can be applied to the process of selecting mitigation areas for utility scale solar projects deemed to have a high impact on the landscape. The map produced through our analysis highlights areas of ecological importance that are important on scales ranging from individual species to ecosystems to the entire landscape. These areas are spread throughout the study area and represent areas of high value in a highly developed landscape.



Photo Credit: natureofaman.blogspot.com

Acknowledgements



We would like to thank the following people for making this project possible: Mark Buntaine, James Frew, Ben Best, Eric Fournier, Stephanie Dashiell, Anderson Shepard, Kate Kelly, Kim Delfino, Eliza Cava, Jon Belak, Frank Davis, Scott Butterfield, Dick Cameron, Nathan Roth, Jim Strittholt, Tim Sheehan, Bryan Cypher, Terry Watt and Edward Thompson, Jr.



Pictured: Dr. Mark Buntaine, Graham Wesolowski, Jane Cowan, Dustin Pearce, Andrew Gwin and Sam Young

Next Steps

Data Sharing

The data utilized in and generated from this analysis will be shared using the Data Basin platform, an online data sharing service. This user friendly service can be found on the web at: www.databasin.org

Participation in a State Planning Process

The results of this study will be shared with stakeholders as part of a statewide planning process for solar energy development that is being organized by the Governor's office.

Direct Outreach

Direct outreach to agricultural, county, conservation, and solar stakeholders will take place in order to receive feedback on the results of the analysis.

Refining Model with Stakeholder Input

After introducing the result of this analysis through Data Basin, the State planning process, and direct outreach to stakeholder groups, the WildLight model will be refined. Through this process, the WildLight team hopes to find new sources of data and gain a better understanding of stakeholder preferences. This will allow the team to adapt the structure of the model to find areas that are truly compatible for utility scale solar development.



Solar Energy and Conservation in the San Joaquin Valley

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Spring 2015



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Overview

In the last decade, California has significantly advanced its deployment of renewable energy technologies in an effort to reduce greenhouse gas emissions. The passage of legislation mandating that 33% of the state's energy come from renewable sources has led to a dramatic increase in utility scale (>20MW) solar developments. Solar developers are beginning to seek out opportunities in the San Joaquin Valley, an area with large tracts of previously developed agricultural land and severely degraded areas of natural habitat left to sustain a host of endangered and threatened species. This analysis is a first step for smart regional planning of solar development in the San Joaquin Valley.

Project Scope

1

Develop a decision support tool that identifies areas compatible with utility scale solar energy development.

2

Identify and produce recommendations for implementing model results.

Significance

This project contributes to statewide and national conservation planning efforts designed to solve problems at the energy-conservation nexus. Notably, this project adds to The Nature Conservancy's Western San Joaquin Valley Solar Assessment and the Desert Renewable Energy Planning Process in the California Desert.

Study Area

All eight counties on the San Joaquin Valley floor (San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern) were included in this analysis constrained in the east by the Sierra Foothills and in the south by the



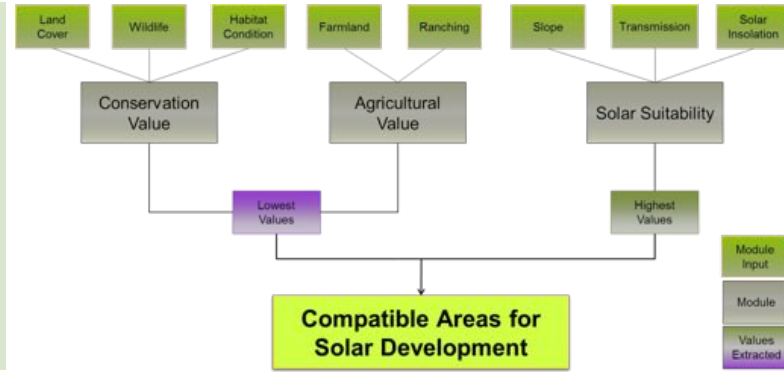
Transverse Ranges. Parts of San Luis Obispo, Monterey, Santa Barbara, San Benito and Ventura counties were added to include biologically sensitive areas where solar development has been previously proposed.

1 Develop a decision support tool to identify areas compatible with utility scale solar energy development

The solar compatibility model was built using the Environmental Evaluation Modeling System, a spatial model platform developed by the Conservation Biology Institute. This model allows for the integration and comparison of widely varied data types yielding outputs that are simple and easily interpreted maps. Additionally, the model utilizes the best available data and is designed to be highly adaptable and capable of incorporating new data as it becomes available. Below is a diagram of the model structure.

Spatial Analysis Unit—1km²

The landscape was broken up into 1km² cells for this analysis. Having a spatial unit of this size prevented oversampling of coarse spatial data, obscures individual parcel owners, and is large enough to contain a utility scale solar power plant (20MW plant requires ~ 0.5 km²).



Model Characteristics



Conservation Value

- Geographic distribution of threatened and endangered species
- Biodiversity
- Habitat Condition
- Critical habitats (e.g. wetlands, vernal pools)



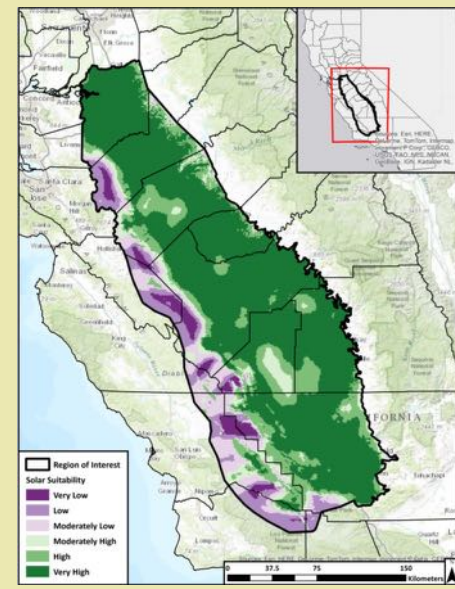
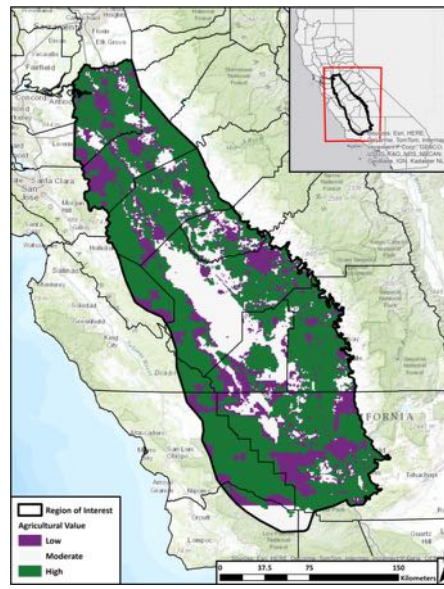
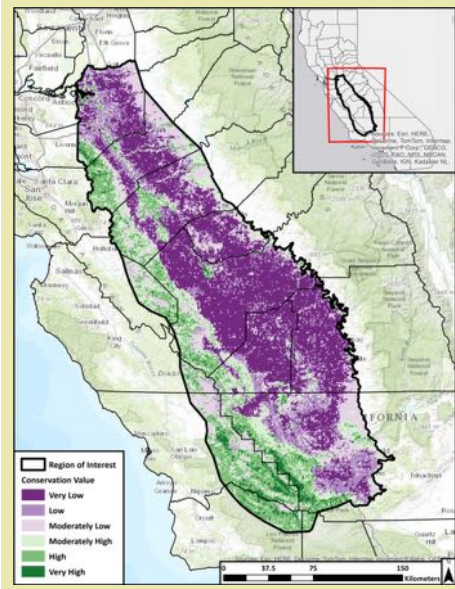
Agricultural Value

- Soil productivity
- Water cost and reliability
- Microclimate
- Environmental sensitivity
- Urban growth pressure
- Rangeland value



Solar Suitability

- Proximity and density of existing transmission infrastructure
- Solar insolation
- Areas with < 6° slope



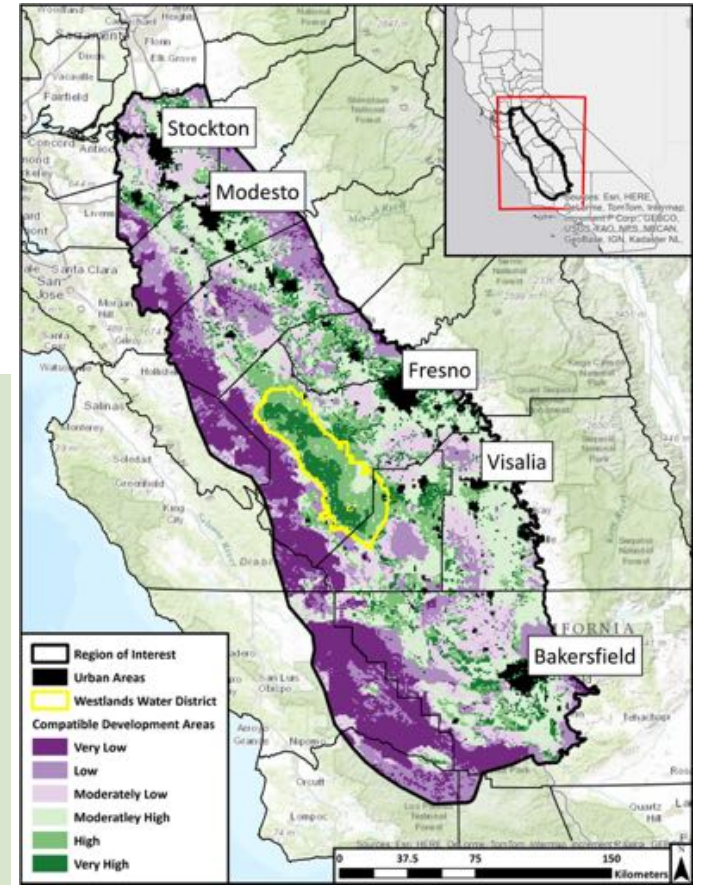
Key Results

Areas that are compatible with utility scale solar development are shown on the map to the right. The two key areas that emerge as highly compatible for utility scale solar are:

- Urban Areas
- Westlands Water District

Urban Areas

As built environments, urban areas are inherently low in agricultural and conservation value and contain high densities of transmission infrastructure. New ways of funding rooftop solar has led to an increase in its deployment across California. This is an encouraging trend that will reduce the pressure on high value conservation and agricultural land and make use of the built environment for solar energy generation.



Westlands Water District

The Westlands Water District is located in the western San Joaquin Valley. Efficient agricultural cultivation in this region has become increasingly difficult due to highly saline soils, lack of access to drainage, and decreasing federal water allocations. Due to the convergence of these factors, a record high 206,000 acres of agricultural land was fallowed in 2014. This trend is likely to persist as the current drought continues in the short term, and the projected climate becomes hotter and drier in the long term. Solar development in this region would benefit land owners by providing an alternative to strategically fallowing lands every year, thereby providing a more stable revenue source. Additionally, as some areas within the district convert to solar energy generation the demand on water resources will decrease, allowing robust agricultural cultivation to continue within the region.

Solar Compatibility at the County Scale

County governments are important stakeholders in the solar planning process. They are responsible for permitting, planning, and administration of agricultural and conservation programs. The figure to the right shows the distribution of compatible lands for utility scale solar development across all counties within the study area.

