Solar Energy and Conservation in the San Joaquin Valley

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Overview

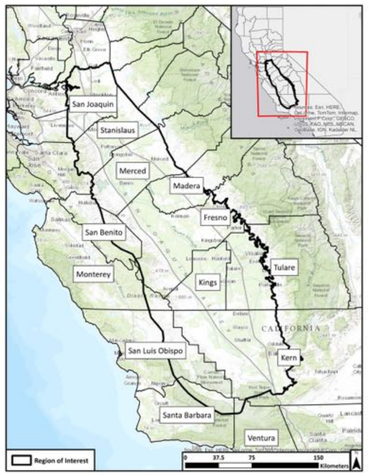
In the last decade, California has significantly advanced its deployment of renewable energy technologies in an effort to reduce greenhouse gas emissions. The passage of legislation mandating that 33% of the state's energy come from renewable sources has lead to a dramatic increase in utility scale (>20MW) 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 for solar 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.

Study Area

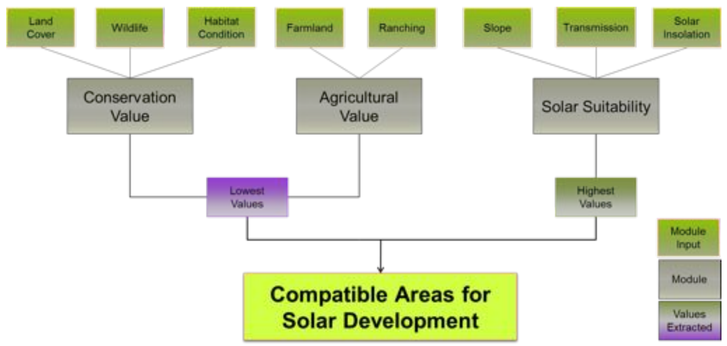
All eight counties on the San Joaquin Valley floor (San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern) were included in this analysis constrained in the east by the Sierra Foothills and in the south by the Transverse Ranges. Parts of San Luis Obispo, Monterey, Santa Barbara, San Benito, and Ventura counties were added to include biologically sensitive areas where solar development has been previously proposed.



1 Develop a spatial model that identifies areas compatible with utility scale solar energy

Modeling Approach

The solar compatibility model was built using the Environmental Evaluation Modeling System, a platform developed by the Conservation Biology Institute. This model allows for the integration and comparison of widely varied data types and the outputs 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.



Spatial Analysis Unit—1km^2

The landscape was broken up into 1km^2 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 km^2).

Model Characteristics

Conservation Value

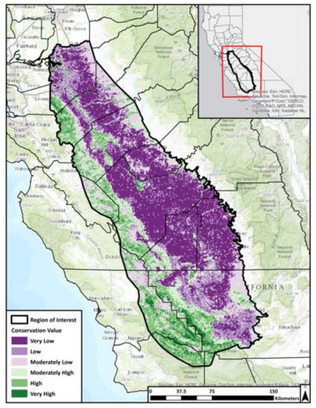
- Geographic distribution of threatened and endangered species
- Biodiversity
- Habitat condition
- Critical habitats (e.g. wetlands, vernal pools)

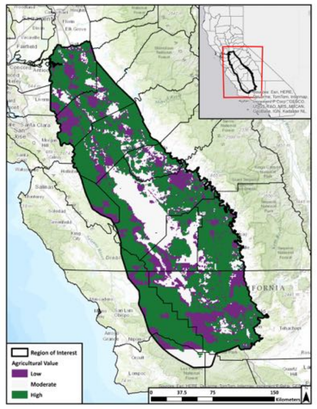
Agricultural Value

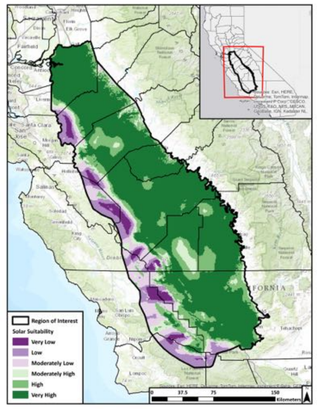
- Soil productivity
- Water cost and reliability
- Microclimate
- Environmental sensitivity
- Urban growth pressure
- Rangeland value

Solar Suitability

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

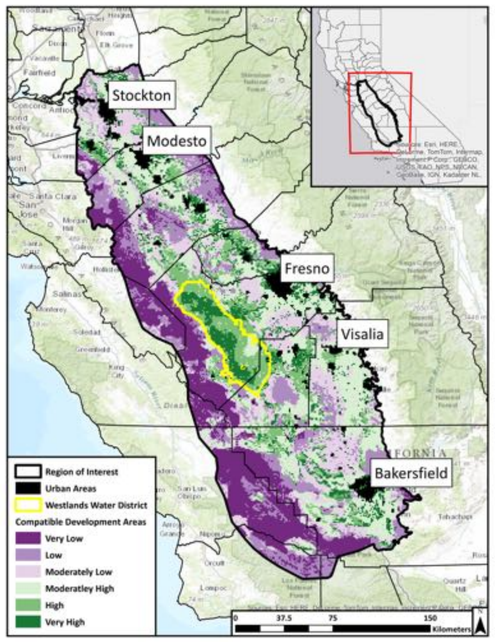


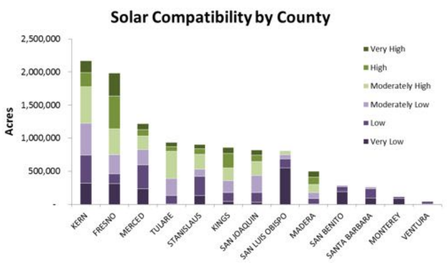


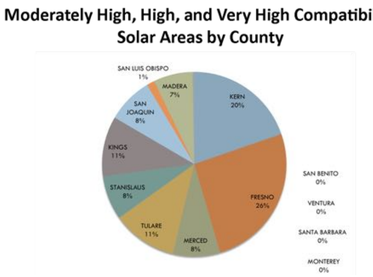


Results

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.







Key Findings

Areas compatible with utility scale solar development are shown in the Results map. The two key areas that emerge as highly compatible with utility scale solar are:

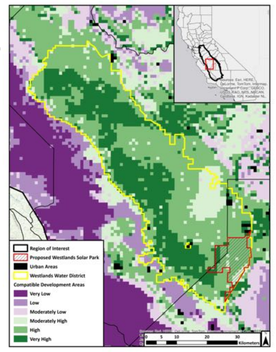
- **Urban Areas**
- **Westlands Water District**

Urban Areas

As built environments, urban areas are inherently low in agricultural and conservation value and contain high densities of transmission infrastructure. As an added benefit, solar development in urban areas makes use of the built environment for 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, poor drainage, and decreasing water allocations. Due to the confluence of these factors, a record high 206,000 acres of agricultural land was fallowed in 2014. Solar development in this region would benefit land owners by providing an alternative to fallowing lands strategically every year, thereby providing a more stable revenue source. Solar development has begun in the region with a proposal of the 24,000 acre Westlands Solar Park, shown in red on the map to the right.



2 Identify and produce recommendations for implementing model results

Next Steps

Data Sharing

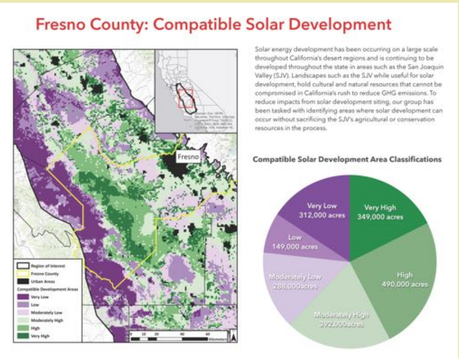
The data utilized in and generated from this analysis will be shared using the Data Basin platform, an online data sharing service. This user friendly service can be found on the web at: www.databasin.org

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. On the right is the Fresno County Handout showing compatible areas for solar development.



Acknowledgements

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