California Energy Commission
Public Interest Energy Research (PIER) Program
ENVIRONMENTAL AREA RESEARCH

Decision Support Tool for Desert Tortoises Near Solar Installations

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Fact Sheet

The Issue

The need for reliable forms of energy within the United States is becoming increasingly important. Identifying and developing clean energy from renewable sources—such as sunlight, wind, hydropower, and geothermal heat—is crucial. California's goal is to meet at least 33 percent of state electricity demand with renewable energy resources by 2020.

Several large-scale solar developments have been proposed in the Mojave Desert to help achieve this goal. Such developments, however, have large land and water requirements, and they can have negative impacts on ecosystems and vulnerable species, especially in the desert.

Protecting existing populations and habitat for the federally and state-listed desert tortoise, while implementing recovery actions to improve habitat quality, is a high priority as the state evaluates the potential development of solar resources in the desert. Tools are needed to quantify the cumulative impacts of various developments and to determine the required set of recovery actions and mitigation measures to fully compensate for those impacts.

Project Description

The University of Redlands, the U.S. Fish & Wildlife Service's Desert Tortoise Recovery Office, and InfoHarvest., Inc. are developing a Geographic Information Systems (GIS)-based decision support system that models the interrelationships among threats, population declines, and recovery actions. By leveraging this complex model of relationships with GIS, the system has the capability to evaluate the existing risk condition across the landscape and predict the relative impacts of proposed recovery actions. This project will expand the system to increase and focus its utility for evaluating impacts of solar energy projects and quantifying mitigation options to offset those impacts.

The Desert Tortoise (*Gopherus agassizii*) is a state and federally listed species in need of targeted conservation efforts.
Photo Credit: Kim Field, U.S. Fish and Wildlife Service

The ultimate product will be a Web-based framework for conducting spatially explicit and fully documented cumulative impacts analyses of solar energy projects on the desert tortoise so that users can make better, science-based decisions to promote conservation while making permitting easier.

The proposed work would expand and modify the desert tortoise spatial decision support system and Web application to:

- Incorporate additional data sets and expert input from partner agencies and stakeholders.
- Improve existing impact and recovery models to evaluate the cumulative impacts from direct and indirect impacts of solar energy development at the project-specific scale.
- Assess the relative recovery value of management actions for the desert tortoise by estimating their offsetting reductions in impact.
- Provide monitoring metrics for all recommended recovery actions.
- Develop and integrate formal Desert Tortoise demographic and temporal models to improve the analysis and assessment of long-term impacts.
- Develop tools to allow users to upload GIS data or draw solar project footprints and define key attributes of the proposed project and suggested recovery actions to help the user evaluate potential impacts and mitigation outcomes.

PIER Program Objectives and Anticipated Benefits for California

This research is intended to help reduce the biological impacts of solar energy development on the desert tortoise, a threatened species that is native to California desert regions. This project will provide a critical planning tool that allows resource managers and other users to quantify, evaluate, and monitor the cumulative effects—both beneficial and adverse—of various activities, management actions, and policies on the desert tortoise.

As the state energy demand continues to increase, seeking alternative sources of renewable energy is of vital importance. Through its focus on reducing the environmental impacts of solar energy development, this project will help to ensure that stable, secure, and reliable sources of renewable energy can continue to be provided to California residents in an environmentally responsible manner.

Project Specifics

Grant Number: PIR-10-048
Recipient: Redlands Institute, University of Redlands
City/County: Redlands, San Bernardino County
Assembly District: 63
Senate District: 31
Application: Regional
Amount: $350,000
Co-funding Amount: $69,909
Term: February 2011 to July 2013

For more information, please contact:

Misa Milliron
California Energy Commission
PIER Program, Environmental Area
Phone: 916-327-1545
E-mail: Mward@energy.state.ca.us

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California Energy Commission
Chair Robert B. Weisenmiller, Ph.D. | Vice Chair James D. Boyd
Executive Director: Melissa Jones

California Energy Commission
Public Interest Energy Research
1516 Ninth Street,
Sacramento, CA 95814-5512

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