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

Assessing Desert Tortoise Survival and Reproduction at a Wind Energy Facility Near Palm Springs, California

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Fact Sheet

The Issue

The need for reliable forms of energy within the United States is becoming increasingly important. Also crucial is identifying and developing clean, green energy from renewable sources, such as sunlight, wind, hydropower and geothermal heat. California is aiming to achieve a goal of serving at least 33 percent of electricity demand with renewable energy by the year 2020. Large scale renewable facilities are important for achieving California's energy goals but can have negative impacts on ecosystems and vulnerable species, especially in the desert. Little is known about the effects of wind energy development on terrestrial and aquatic wildlife.

Desert tortoise (*Gopherus agassizii*) populations in California are federally and state protected as threatened species. Large portions of their habitat are characterized by significant wind and solar energy potential. As a result, the species is a source of significant conservation concern relative to renewable energy development projects.

Sites in the Mojave and Sonoran Deserts have preexisting wind energy facilities dating back over 25 years. One desert tortoise population on an existing wind farm near Palm Springs has been studied at various times since 1992, providing a rare opportunity to assess the long-term effects of wind energy production on this threatened species.

Desert tortoise near a wind energy facility.
Photo Credit: Jeff Lovich, Ph.D., Research Ecologist, U.S. Geological Survey, Southwest Biological Science Center.

Project Description

This project will assess the long-term demography, survivorship, and reproductive ecology of desert tortoises living on and near an operating wind farm. The site, located on public land administered by the Bureau of Land Management, was permitted for development in 1983. Desert tortoise studies began in 1992 and intensified from 1997-2001. More than 130 tortoises were marked during the early phase of the project. The tortoises will be the subject of the new study to assess the long-term effects of the site operations on the species.

The goals of this project are to:

- Resurvey the tortoise population marked between 1997-2001, estimate the number of individuals at the site, and conduct statistical

comparisons of demographic parameters (population size, adult sex ratio, size class distribution) across study years.

- Determine the proportion of tortoises marked in the period from 1997-2001 that are still alive after wind energy development occurred at the site.
- Determine if any significant mortality of marked individuals occurred since tortoises were first marked and use these data to develop estimates of annual survivorship. Causes of mortality will be determined when possible.
- Determine if tortoises are still reproducing at the same high rates observed from 1997-2000.
- Identify possible mitigation techniques for wind farm development in desert tortoise habitat to minimize threats and maximize benefits to tortoises. Identify site selection criteria and monitoring requirements to reduce negative impacts.

PIER Program Objectives and Anticipated Benefits for California

This research is intended to help evaluate and if necessary, reduce the biological impacts of wind energy development on the desert tortoise. If successful, the study may offset negative impacts to the tortoise by identifying effective mitigation strategies.

As the state's energy demand continues to increase, seeking alternative sources of renewable energy is of vital importance. By reducing environmental impacts of wind energy development, this project will help to ensure that stable, secure, and reliable sources of energy can continue to be provided to California residents in an environmentally responsible manner that protects the state's rich biological heritage.

Project Specifics

Contract Number: 500-09-020
Contractor: U.S. Geological Survey
City/County: Palm Springs/Riverside
Assembly District: 80
Senate District: 37
Application: Regional
Amount: $319,936
Cofunding: $127,795
Term: March 2010 to June 2013

For more information, please contact:

Joe O'Hagan
California Energy Commission
Public Interest Energy Research Program, Environmental Area
Phone: 916-327-1368
E-mail: Joe.OHagan@energy.ca.gov

Edmund G. Brown Jr., Governor
California Energy Commission
Chair Robert B. Weisenmiller, Ph.D.
Executive Director: Robert P. Oglesby

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

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