

Informing Climate Change Models with Stand Level Ecological Data: Valley Oak Woodlands in California

January 2011

Fact Sheet

The Issue

Climate change is expected to have severe impacts on species' habitat ranges. This impact can already be seen in the upslope retreat and the contraction of the Sierra Nevada conifer forest since the 1930s, which is consistent with warmer winter nights, an upward migration of the freezeline, earlier spring snow melt, and earlier summer drought conditions. This upslope retreat of conifers is a clear biological signal that climate conditions are warming in this region.

Understanding how climate change will affect species' habitat ranges is important because these changes, in turn, will affect our future land-use decisions pertaining to resource use, conservation, recreation, and development. Models are a useful tool for predicting future habitat range shifts due to climate change, and the incorporation of ecological data can increase our understanding of the dynamics of habitat shifts throughout a species distribution.

Valley oak woodlands in California, with nearly 50 years of survey work in existence, are an ideal system for developing climate model refinements. Bioclimatic models have been developed for valley oaks in California, with projections for shifts in distribution over the next century based on global and regional climate models.



Valley oak (*Quercus lobata*)
Photo credit: Sepulveda Basin Wildlife

Project Description

This project is exploring changes in valley oak stand structure over time, and will provide climate models and management decisions with ground-level biological data.

This research project aims to:

- Resurvey all 20 of the valley oak woodland sites surveyed over the past 50 years. This will help evaluate changes in valley oak woodland over the past half century, analyze those changes in the context of changing climate, and make better predictions of future scenarios.

- Survey 20 new sites at the periphery of the species' habitat range where bioclimatic models have projected habitat expansion or contraction. This will help identify demographic changes occurring at the edges of the valley oak range, record signs of climate induced changes, create a baseline for future monitoring, and evaluate the importance of including ecological information into bioclimatic models. This information will help determine how ground-level and modeled data can be coupled to provide meaningful management recommendations.
- Create long-term data sets for valley oak woodlands in California that will build on the large body of existing survey work.
- Establish a standardized Microsoft® Access® and GIS database accessible to others to encourage continued analysis, monitoring, and study of the surveyed sites.

Project Specifics

Grant Award: PIR-08-003

Recipient: UC Santa Cruz

Amount: \$68,725

Term: February 2009 to February 2013

For more information, please contact:

Sarah Pittiglio

California Energy Commission

PIER Program, Environmental Area

Phone: 916-654-3962

E-mail: SPittigl@energy.state.ca.us

Disclaimer

The Commission, its employees, and the State of California make no warranty, expressed or implied, and assume no legal liability for this information or the research results.

PIER Program Objectives and Anticipated Benefits for California

Management, restoration, and conservation efforts are directed at valley oaks for their ecological, economic, and cultural value. This species remains a quintessential symbol of the California landscape. A better understanding of current and future climate change effects could benefit valley oak restoration efforts.

Understanding potential future vegetation change is crucial for the development of realistic climate projections for California. These projections are needed to prepare for future changes in energy demand and generation and, also, to identify the capacity of California ecosystems to provide energy offsets in future cap and trade markets related to forestry.



Edmund G. Brown Jr., Governor
California Energy Commission
 Chairman Karen Douglas | Vice Chair James D. Boyd
 Executive Director: Melissa Jones

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

CEC-500-2010-FS-013