



COOPERATIVE ECOSYSTEM STUDIES UNITS  
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# Joshua Tree Vegetation Modeling: Predicting Shifts in the Face of Climate Change

A hallmark of CESUs is the contribution of universities and local non-profit institutions. In this project, the University of California, Riverside, James Madison University, and the Desert Institute collaborated to help inventory vegetation in Joshua Tree National Park. This baseline can be used in the future to measure the effects of climate change.



■ **Citizen scientists inventory vegetation.** With oversight from university scientists, Desert Institute participants conducted the field work. (C. Barrows/University of California, Riverside)

In 2010 the University of California, Riverside's Center for Conservation Biology began research which yielded shifts in the distribution of vegetation resulting from climate change simulations within Joshua

Tree National Park (Barrows & Murphy, 2011). Volunteers from a James Madison University service learning class and the local Desert Institute assisted researchers with counting and measuring Joshua

## Desert Southwest Cooperative Ecosystem Studies Unit

### ■ Project Partners



### ■ Project Contacts

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### ■ Project Type

Research

Technical Assistance

Education



■ **We are all stewards of our public lands.** The volunteers who worked on this project helped scientists collect field data, learned to use new technologies like Geographic Positioning System units, and contributed to the stewardship of their public lands. *(C. Barrows/University of California, Riverside)*

■ **The citizen scientists inventoried the following plants:**

Mojave species - pinyon pine, California juniper, Mojave yucca, and Mormon tea

Sonoran Desert species - ocotillo, blue paloverde, and ironwood

Generalist species - brittlebush, burrowbush, smoketree, and creosote

Invasive annuals - red brome and Sahara mustard

tree seedlings, saplings and adults. Using Global Positioning System devices, the citizen scientists identified and marked other native and invasive plant species from the Sonoran and Mojave Desert ecosystems to compare survival rates with the Joshua trees. The many volunteers were able to cover a large area in a cost-effective way; the volunteers benefited by learning new skills and becoming active stewards of public lands. With the data, the scientists created a Geographic Information Systems model to predict the range of Joshua Trees and the comparison plant species' as temperatures warm.

**Citizen Scientists Contribute to New Climate Change Prediction**

This research contests the popular theory that Joshua trees will disappear altogether as a result of climate change. This project's robust report offers a different approach that illustrates the feasibility of the park's name-sake surviving, though in greatly reduced numbers, in pockets of suitable microclimates. Park managers can use this information to allocate resources to protection and, if needed, restoration of areas of the park where the Joshua trees are most likely to thrive in the future as the temperature rises.



Stepanie Guerra wrote this project spotlight in August 2011. It was part of an education project between Colorado State University and the CESU Network National Office. Cooperative Ecosystem Studies Units provide research, technical assistance, and education to federal land management, environmental, and research agencies and their partners. Their broad scope includes the biological, physical, social, cultural, and engineering disciplines needed to address natural and cultural resource management issues at multiple scales and in an ecosystem context. There are seventeen CESUs, each composed of federal agencies, a host university, and partner institutions, which are linked together in a CESU network. For more information, see [www.cesu.org](http://www.cesu.org) or contact Dr. Thomas E. Fish, CESU National Coordinator, at [tom\\_fish@nps.gov](mailto:tom_fish@nps.gov).