

**Grant Title:** Identifying a Pre-Columbian Anthropocene in the Sierra Nevada, California: A Paleocological & Archaeological Study of Fire & Vegetation Change, Forest Modeling, & Human Settlement

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**PI:** Anna Klimaszewski-Patterson, Department of Geography, California State University, Sacramento

The aim of this study is to measure the impact Native Californians had on mixed conifer and oak forests through the use of fire to manage wildland food resources (particularly acorns from oaks) in the Sierra Nevada Range and determine whether this impact exceeded the effects of climate by creating an open woodland canopy even during periods of wet climate, thereby indicating the presence of a potential pre-European Anthropocene epoch in California. We use pollen and charcoal analysis from sediments recovered from meadows and lakes at four trans-Sierra sites spanning the length from south to north to reconstruct vegetation and fire history. We then use annually resolved tree-ring records to develop an independent climate reconstruction to determine if and when forest composition deviates from a forest composition expected based on climatic forcing and succession theory. We hypothesize that if abundance of oaks increases during cool wet periods, the most likely cause would be increased fire by Native Americans through traditional resource and environmental management practices. We will test this hypothesis using landscape modelling, by adjusting the amount of fire on the landscape under both climate and human resource management scenarios, to determine whether Native American-set fires are required to create the forest structure identified from the pollen reconstruction. Finally, we will quantitatively measure the intensification of Native American land use at our sites by analyzing increases in surface milling area (e.g. bedrock mortars used for processing acorns) to determine whether resource intensification coincided with the changes in forest structure identified in the pollen record.

The Sierra Nevada is but one example of an ecoregion where Native Americans influenced vegetation structure and composition. This multi-disciplinary approach within the complex terrain and dynamics of the Sierra Nevada may be translated to large portions of similar regions (e.g. Rocky Mountains, Cascades) where anthropogenic impacts likely affected the environmental record land managers look to when setting modern forest management policy.

This study is conducted jointly by Sacramento State University and the University of Nevada, Reno, and in collaboration with local tribes (e.g. Tule River, North Fork Rancheria of Mono Indians, Tuolumne Band of Me-Wuk Indians), U.S. Forest Service (USFS), and National Park Service personnel, expanding outreach to multiple stakeholders. Using the Sacramento State Paleocology Lab, housed in the Department of Geography, undergraduate students will be funded and trained in techniques and principles of paleocology and fieldwork.

