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## **NATIVE AMERICAN FIRE USE AND ITS EFFECT ON WILDFIRE**

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**Background:** Wildfires have always been a component of California's ecosystem, but recently wildfires have burned out of control, resulting in the tragic loss of life and devastating economic consequences. Today, maintenance is performed by forest services to remove forest fire fuel in the form of brush and trees. Wildfire suppression and prevention are expensive, around 3 billion dollars annually. Half of the federal funds in the United States are allocated to California. This study utilizes "cultural elements" sourced from ethnographies that involve fire used by the Indigenous tribes of California around the Sierra Nevada Mountain Range through the 1930s and 1950s. Cultural elements are defined as the traditional practices unique to each Indigenous group. This study aims to analyze the effect that the Native American groups of California had on wildfires in their ecosystem.

**Methods:** Cultural elements mined from ethnographies from the 1930s through the 1950s in the Sierra Nevada Mountain Range of California provided the foundation for this study. The cultural elements, "Driving With Fire," "Cremation," "Sweat Houses," "House Burned After Death, and "Burning For Volunteer Crops," were located in a series of ethnographies. These cultural elements were deemed wildfire fuel users or activities that could result in an accidental wildfire. Tree ring fire scar data provided the connection between historical wildfire locations and the regions where the Indigenous tribe resided. The coordinates of each Indigenous tribe were established and graphed against the coordinates from the tree ring fire scar study. This allowed the fire return interval to be calculated using the statistical analysis method of inverse distance weighted interpolation. The fire return interval is defined as the number of years between a wildfire present on the tree ring scars. In the future, these calculations will allow for the potential effect each Indigenous tribe could have had on wildfires that burned within their ecosystem to be analyzed.

**Results:** Data from the ethnographic series revealed that fire was used throughout all of the Indigenous tribes in this study. The tree ring fire scar data revealed that wildfires burned within the boundaries of each Indigenous tribes. Inverse distance weighted interpolation revealed fire return intervals between 10 and 20 years across the Sierra Nevada Mountain Range. These fires may have been caused by lightning ignition, or by cultural burning practices. The next steps include graphing individual cultural element fire use against the fire return interval of specific locations to determine the effect that the Indigenous fire use had on wildfire. Elevation may serve as a confounding variable as the ecology of an ecosystem varies, making some locations more prone to wildfires than others.

**Conclusions:** Ethnographic fire data has the potential to reveal relationships within ecosystems that support or reject longer fire return intervals. One interpretation of these early results is that forest fire reduction strategies of Native American groups of the past could potentially be employed to reduce wildfire today.