Fire History of a Mixed Oak-Pine Forest in the Foothills of the Sierra Nevada, El Dorado County, California[1]

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Abstract: *Fire history and stand composition (species, density, basal area) of a mixed oak-pine forest was investigated in three plots with varied aspects (south, east) and slopes (5 , 30, and 50 percent) in Diamond Springs, El Dorado County, California. Elevation varied from 530 to 600 m in the fire history plots. Oaks dominate the area, contributing 75 percent of the basal area. Fire history information from 1850 to 1952 was obtained from 31 ponderosa pine stumps that were logged in 1952. Mean fire intervals in the three plots were 7.8, 7.8, and 7.7 years and the period between fires varied from 2 to 18 years. The last fire in this area occurred in 1947. Although the sources of these fires are uncertain, the use of fire by early range managers is a plausible explanation given the past land uses of this area.*

Vegetation types common in the Sierra Nevada foothills include foothill woodlands, chaparral, mixed evergreen woodlands, and California black oak (*Quercus kelloggii*) forests (Baker and others 1981). Very little fire history information exists for these vegetation types (Parsons 1981). The lack of fire history information is in part due to a lack of trees that are appropriate (old, fire-scarred trees resistant to decay) for fire-scar sampling because of early logging, range improvement, and firewood cutting operations.

One fire history study has been carried out in foothills of the Sierra Nevada at the University of California Sierra Foothill Range Field Station, 30 km east of Marysville, California (McClaran and Bartolome 1989). In this study, fire-scarred trees were sampled in a blue oak (*Quercus douglasii*) woodland. Mean fire intervals (MFI) (Stokes 1980) at two sites within the field station were 7.4 years. Fire intervals varied from 2 to 17 years and there was no significant difference ($p > 0.2$) in MFI between the sites from 1890 to 1948. MFI was significantly reduced between Anglo-American settlement in 1848 and fire suppression in the 1940's because of historic range management practices (McClaran and Bartolome 1989).

Fire scars can be assigned a calendar year when cross-dating techniques are used (Swetnam and others 1985). With this technique, a composite fire history can be produced, and differences in MFI over the sampling period can be examined. When cross dating techniques are not possible because of false and missing rings, intervals between fires have been reported (Finney and Martin 1992).

Significant Anglo-American settlement in foothill woodlands started shortly after the discovery of gold in 1848, and large numbers of livestock and alien annual plants became landscape dominants by 1900 (Burcham 1957). Early investigators reported that burning was a common practice in the foothills of the Sierra Nevada from 1900 to 1940 (Leiberg 1902; Sampson 1944). Ranchers commonly burned oak forests/woodlands to maintain forage production, and the intervals between fires were commonly between 8 and 15 years (Sampson 1944).

Native Americans also influenced the fire regime in the foothills of the Sierra Nevada. Native Americans possibly shortened the intervals between fires for specific land management objectives (Anderson 1993). More than 75 percent of the plant material used by most tribes of the Sierra Nevada came from epicormic branches or adventitious shoots from a diverse group of native plants (Anderson 1993). New shoots were long, flexible and straight, had few bark blemishes, and were not forked,

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