



Research Brief for Resource Managers

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Contact:

Jon E. Keeley
Marti Witter
Liz van Mantgem

Phone:

(559) 565-3170
(805) 370-2333

Email:

jon_keeley@usgs.gov
Marti_Witter@nps.gov
evanmantgem@usgs.gov

Central and Southern California Team, USGS Sequoia and Kings Canyon Field Station, Three Rivers, CA 93271

Fire-Scar Record in a Higher Elevation Chaparral Tree

Lombardo, K.J., T. W. Swetnam, C.H. Baisan, & M.I. Borchert. 2009. Using bigcone douglas-fir fire scars and tree rings to reconstruct interior chaparral fire history. *Fire Ecology* 5(3):35-56.

Fire-scar dendrochronology studies have routinely provided an excellent view of past fire history in coniferous forests throughout the western U.S., but up until now the primary tool for investigating fire history in chaparral has been written records. Unfortunately, these records in California are sketchy for the late 1800s and not regularly recorded until after 1910. Keith Lombardo and his colleagues attempted to fill this void on pre-Euro-American chaparral fire regimes by selecting an endemic tree commonly associated with chaparral at higher elevations. This tree, bigcone Douglas-fir (*Pseudotsuga macrocarpa*), is a southern California endemic. It provides a record of chaparral crown fires because it is found in isolated populations on steep slopes surrounded by chaparral and when it is burned this tree resprouts epicormically, a rare fire adaptation in conifers.

Lombardo studied trees mostly above 1400 m (4600 ft) and generated a fire scar record that began in the early 1600s and extended over a period of 350 years. It showed that landscape scale fire frequency, measured as 25% of the study sites recording a particular fire event, occurred with a frequency of 52 years. There was no significant difference in fire return intervals between pre- and post-1864 periods. Despite the lack of statistical significance, there was a

Management Implications

- Large chaparral fires are not a modern phenomenon but were a regular occurrence in California for hundreds of years prior to modern day fire management.
- There was no significant difference in fire return intervals between pre- and post-1864 periods.

tendency for a shorter fire return interval in the post 1865 period. When presumed surrogate indicators of fires (such as growth spurts) were added to the fire scar record, even more fire activity was found but it is unclear why these surrogate measures were primarily observed in pre-1865 records and largely absent since then.

The authors estimated historical fires were relatively large, and suggest that the average fire size for fires recorded by only 10% of the sample sites was roughly 3600 hectares (8900 acres). Larger events recorded by 25% of the sites had a range in size from 2100 - 41,700 hectares (5100 - 103,000 acres). Some of the largest fire events occurred in the 1600 and 1700s and may have been the result of severe wind-driven fire events.

It was concluded that historical fire regimes were not substantively different from contemporary fire regimes.