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Publication Brief for Resource Managers

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Past, Present, and Future Fire Regimes in Chaparral

Tree rings provide a record of fire history in U.S. montane coniferous forests. For California shrublands, however, where stand-replacing crown fires are typical, the lack of a tree-ring record requires scientists to use more inductive approaches to reconstruct historical burning patterns. Written documents reveal that during the 19th century human settlement of southern California altered the fire regime of coastal California by increasing the fire frequency. This was an era of very limited fire suppression, and yet like today, large crown fires covering tens of thousands of acres were not uncommon. Analyzing these historical records, USGS scientist Dr. Jon E. Keeley and colleague C. J. Fotheringham from the University of California, Los Angeles, evaluated possible causes for periods of variation in area burned in a recent synthesis published in a new book on fire and climate change.

One of the largest fires in Los Angeles County (60,000 acres) occurred in 1878, and the largest fire in Orange County's history, in 1889, was over half a million acres. Collectively, the 1920s, 1940s, and 1970s were high decades for acreage burned, and the 1930s and 1960s were low. Explanations for these patterns are that they (1) result from decadal scale variation in climate, (2) are natural cycles resulting from fuel buildup, and (3) are driven by human demographic patterns. The scientists discussed in detail evidence for and against these in the book chapter.

Among their conclusions are the following: Throughout much of the shrubland landscape humans play a dominant role in promoting fires beyond what was likely the natural fire cycle. Future climate change is expected to have a minor role in altering fire regimes on shrubland landscapes relative to other global changes such as population growth and habitat fragmentation. Future fire management needs to take a strategic approach to prefire fuel manipulations and move beyond evaluating effectiveness strictly in terms of area treated. Fire management should consider designing strategies tailored to different regions as there are marked differences between the central coastal region and southern California in source of ignition, season of burning, and historical patterns of population growth and burning.

Management Implications:

- There is reason to believe that the contemporary fire regime in these shrublands mirrors the natural crown fire regime far more than is generally accepted and that catastrophic crown fires may be an inevitable feature of this landscape.
- There may be little justification for using fire for resource benefit, since vast portions of shrubland landscape currently experience a higher-than-normal fire frequency.
- While landscapes managed by rotational prescription burning may contribute to easier containment of fires burning under moderate weather conditions, they are of limited value during severe weather.
- There appears to be substantial regional variation in shrubland fire regimes throughout California, necessitating a need for a regional approach to fire management in this type.
- Fire management will need to play an increasingly active role affecting the planning process by educating the public on the limitations of hazard reduction at the urban/wildland interface.

Keeley, J. E. and C. J. Fotheringham. 2003. Impact of past, present, and future fire regimes on North American Mediterranean shrublands, pp. 218-262. In T. T. Veblen, W. L. Baker, G. Montenegro, and T. W. Swetnam (eds), Fire and Climatic Change in Temperate Ecosystems of the Western Americas. Springer-Verlag, New York.