Fire Ecology of Southern California: A Natural or Anthropogenic Disturbance Regime?

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Fire Ecology of Southern California

I. Mediterranean Climates

II. Fires of Southern California

III. Fire Ecology in California
Based on R.A. Minnich

IV. Fire Ecology in California
Based on J. Keeley

V. What Do You Think?
I. Fire Ecology of Mediterranean Climates

Climatic conditions influencing fire:

- Hot dry summers, increases the flammability of dead wood.
- Most fires occur during the summer and early fall.
- California and Chile are the driest during the summer months compared to the other regions.
I. Fire Ecology of Mediterranean Climates

Plant Adaptations to Fire:

- Sprouters – Shrubs that re-sprout after a fire from burls or root crowns at the base of the trunk (chamise, toyon, coffeeberry).

- Seeders – Seed adaptations. For example, shrubs in chapparal that have unusually long lived seeds that accumulate in leaf litter and are stimulated to sprout by heat or chemicals in the ash of burnt vegetation (many species of manzanita and ceanothus).
II. Fire Ecology of Southern California

Four Plant Communities of California’s Mediterranean Climate:

1. Chaparral
2. Coastal scrub
3. Oak woodland
4. Redwood forest

II. Fire Ecology of Southern California

- A total of 23 fires burned from Oct. 20 to Nov. 9, 2007
- 10 confirmed fire-related fatalities, 139 injured
- 517,267 acres burned and 3,204 structures destroyed (2,233 homes, 5 businesses, 966 outbuildings)
- The fires resulted in the largest evacuation in California’s history
- There was a high of more than 321,500 mandatory evacuees
II. Fire Ecology of Southern California

III. Fire ecology according to R. A. Minnich (Science 1983)

- Assessed fire in southern California (fire suppression) and Baja California (no fire suppression)
- Used Landsat Imagery from 1973 to 1980 mapped the distribution of fire in both regions and then descriptively compared fire characteristics.
III. Fire ecology according to R. A. Minnich

(Science 1983)

- No major difference in fire between grassland and coastal sage scrub communities in southern and Baja California.
- Fires in chaparral in southern California were larger, spread faster, and were more intense when compared to Baja California.
- Fire suppression had a major impact on the natural function of fire in southern California chaparral.

Conclusions:
- Natural fire regime in chaparral was dominated by small, frequent fires that spread slowly due to uneven age mosaic of chaparral stands.
- Current fire regime in chaparral is dominated by large, intense fires that spread quickly.
- Management should focus on re-establishing the uneven age mosaic of chaparral stands using prescribed burns.
IV. Fire ecology according to J. Keeley
(Cons. Biol. 2001)

- Used historical and paleoecological records of fire in recently published papers.
- Included information on measured climatological and demographic data for both regions.
- Used all of the above to create a new description of fire ecology in southern California.

IV. Fire ecology according to J. Keeley
(Cons. Biol. 2001)

- Argues that Minnich research is biased and incorrect.
- Minnich included two fires that occurred prior to the 1972-1980 time period in southern California.
- Argues that Minnich’s technique for mapping fires was biased because he didn’t use “blind control”.
- Argues that even if you assume the fire differences in southern and Baja California real, fire suppression is an unlikely cause.
IV. Fire ecology according to J. Keeley
(Cons. Biol. 2001)

- Factors that influence fire in southern California include
  fire frequency, climate, landscape characteristics, and
differences in land use.
- Fire frequency is higher in Baja California which alters
  the natural fire pattern south of the border (more fires,
burn less intensely).
- Winds in Baja have a lower capacity for fire spread (on-
  shore vs. Santa Ana winds).
- Increased rainfall in southern California compared to
  Baja lends to naturally occurring increases in fuel load.

II. Fire ecology according to J. Keeley
(Cons. Biol. 2001)

- Baja California has less topographic heterogeneity
  associated with fire spread.
- Ranchers in Baja California regularly use fire to remove
  brush and expand grazing ranges.
II. Fire ecology according to J. Keeley  
(Cons. Biol. 2001)

Natural fire regime:
- Fire intensity and severity have historically been variable.
- Historical and paleoecological evidence suggests that massive chaparral fires occurred prior to fire suppression.
- Frequent small fires and occasional large fires that consumed the bulk of the landscape.

Why does the loss of property and lives from fire increase every decade?
- It has nothing to do with changes in the fire regimes.
- Primary culprit is the fast growth of the boundaries of cities in southern California resulting in expansions of the urban-wildland interface.
- Fire suppression will do nothing to stop large catastrophic fires as chaparral stands will burn intensively in any age class.
- Fire prevention along the urban-wildland interface is key to preventing catastrophic damage to property and lives.
II. What Do You Think?