

Publication Brief for Resource Managers

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Analysis of Historical Fire Regimes Should Consider Impact by Early Human Migrations

Charcoal deposition patterns between 8,000 to 10,000 years ago correlate with climatic patterns, illustrating the very strong control of climate on past fire regimes. But a study in *Quaternary Science Reviews* by USGS scientist Jon Keeley, Nicholas Pinter of Southern Illinois University and Stuart Fiedel of Louis Berger Group suggests that at many sites, humans played both a direct and indirect role in driving fire regimes.

Across North and South America, the start of the Holocene (~10,000 years ago) saw dramatic changes in climate, vegetative composition/structure, fauna and fire regime. But shifts in vegetation structure and fire regime also coincided with human arrival and transformative faunal extinctions. Shifts were not uniform across all regions — a pattern inconsistent with strictly climatic interpretations. The patterns suggest humans played important roles, through increases in ignitions and through indirect effects on fuel structure.

Coastal and foothill ecosystems are ignition-limited yet susceptible to burning. The arrival of human ignitions would have resulted in an immediate change in fire regime. In other areas with abundant natural ignition sources, fuel loads may have been strongly controlled by megaherbivores. Extinction of megaherbivores — whether human-induced or not — would have led to initial increases in vegetative fuel. Increases in ignition and fuel would alter the local fire regime, rapidly leading to landscape-scale changes in vegetation.

Humans may not have affected fire regimes everywhere. In mountainous landscapes where lightning-ignited fires were plentiful, human ignitions would not have altered the natural fire regime. The authors caution that in California, human impacts on fire regimes are not being captured by the currently available paleo-charcoal record — much of which is taken from rarely populated, high-elevation lakes.

Management Implications

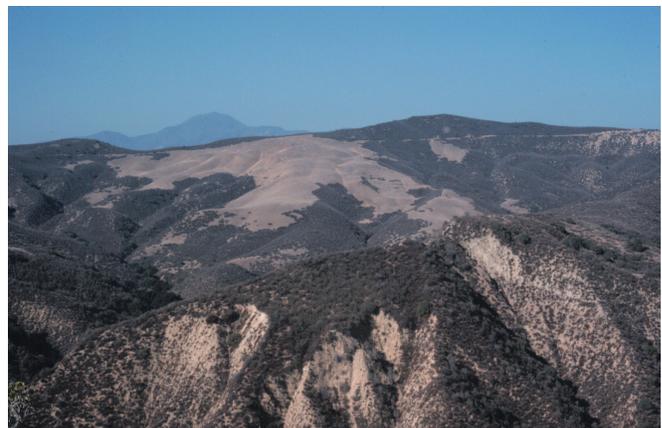
- Despite a strong climate signal in the fire record of the past 8,000 to 10,000 years, researchers should not discount a human role in past fire activity.
- In California, Holocene fire records are mostly taken from montane landscapes where early human presence was rare, and thus these fire records over inflate the importance of climate.
- For certain landscapes, modern-day predictions of fire behavior should be formulated with greater consideration of human demographic changes over time.

THIS BRIEF REFERS TO:

Pinter, N., S. Fiedel, J.E. Keeley. 2011. Fire and Vegetation Shifts at the Vanguard of Paleoindian Migration. *Quaternary Science Reviews* 30(3-4): 269-272. doi: 10.1016/j.quascirev.2010.12.010

<http://www.werc.usgs.gov/seki>

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Annual grasslands have replaced shrublands throughout the central coast ranges of California. Evidence points to early human burning as one important factor that caused habitat type conversion by increasing fire frequencies. Photo: USGS.