CALIFORNIA FIRE SCIENCE CONSORTIUM

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Research Brief for Resource Managers

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Age and Structure of Mature Knobcone Pine Forests

D. Fry, J. Dawson, and S. Stephens. 2012. Age and structure of mature knobcone pine forests in the northern California Coast Range. Fire Ecology 8:49-62.
http://fireecology.org/journal/abstract/?abstract=151

Extreme fire intervals are one obvious concern for managers of fire dependent species such as the serotinous knobcone pine (*Pinus attenuata*). In cases where fire suppression has been effective, knowledge of how age structures vary across the landscape is important so that older populations may be prioritized for treatments at the appropriate spatial and temporal scale.
We described structural conditions of 21 mature stands near Clear Lake, in the interior northern Coast Ranges. Within a 2600 ha area, shrub cover, tree size, tree age, live tree density, and snag density varied widely between, and sometimes within, stands. Stands were 42-70 years old, although individual trees ages ranged from 17 to 98 years. Notably, 67% of the stands exhibited single age structures (Fig. 1C) while 23% were multi-aged (Fig. 1T).

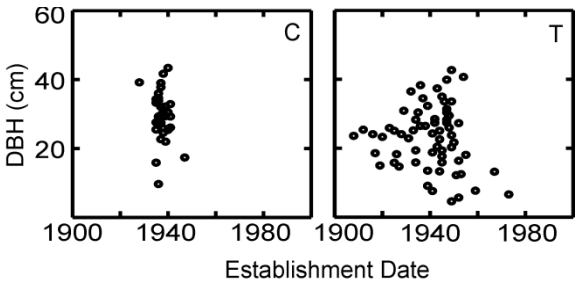

Fig. 1. Size and age of live knobcone pines in two stands on Cow Mountain, Mendocino County.

Based on fire records, tree ages, and fire scarred trees, most stands were established after stand-replacing fires in the 1940-60's. However, some past fires either burned through only a portion of some stands or were lower in intensity, which limited tree mortality and introduced a new cohort of trees, resulting in multi-age stands.

Management Implications

- If disturbance history information is limited, tree cores may be needed since stand age cannot be accurately determined from tree sizes alone.
- In this forest, individual stands should be treated in multiple areas to maintain current heterogeneous landscape patterns.
- Some stands have been maintained by non-stand-replacing fires. Additional research is needed to understand impacts of a changing fire regime in this forest.

Suggestions for further reading

Mallek, C.R. 2009. Fire history, stand origins, and the persistence of McNab cypress, northern California. Fire Ecology 5:100-119.

*Stephens, S.L., D.D. Piirto, and D.F. Caramagno. 2004. Fire regimes and resultant forest structure in native Ano Nuevo Monterey pine (*Pinus radiata*) forest. American Midland Naturalist 152:25-36.*

Keeley, J.E., G. Ne'eman, and C.J. Fotheringham. 1999. Immaturity risk in a fire-dependent pine. Journal of Mediterranean Ecology 1:41-48.

Ne'eman, G., C.J. Fotherham, and J.E. Keeley. 1999. Patch to landscape patterns in post fire recruitment of a serotinous conifer. Plant Ecology 145: 235-242.