Research paper abstracts and helpful websites

## Stand Structures of Oregon White Oak Woodlands, Regeneration, and Their Relationships to the Environment in Southwestern Oregon

Gilligan, L. A., and P. S. Muir. 2011. Stand structures of Oregon white oak woodlands, regeneration, and their relationships to the environment in southwestern Oregon. Northwest Science 85:141-158.

**Abstract**
Although Oregon white oak (*Quercus garryana*) woodlands are a characteristic landscape component in southwestern Oregon, little is known about their current or historical stand structures. Meanwhile, fuel reduction thinning treatments that change stand structures in non-coniferous communities are ongoing and widespread on public lands in this region; some of these treatments also have restoration objectives. Managers need baseline information on which to base prescriptions that have a restoration focus. We inventoried 40 Oregon white oak dominated woodlands across two study areas in southwestern Oregon, and describe here their stand characteristics and age structures. We assessed whether these varied systematically with site conditions or recorded fire history. Stands included various proportions of single- and multiple-stemmed trees and a range of tree densities and diameter- and age-class distributions. Variables that may indicate site moisture status were weakly associated with multivariate gradients in stand structure. Peak establishment of living Oregon white oaks generally occurred during 1850-1890, sometimes occurred in the early 1900s, and recruitment rates were low post-fire suppression (~1956).
Recruitment of sapling-sized oak trees (<10 cm diameter at breast height, □ 1.3 m tall) was generally low and their ages ranged from 5 to 164 yr; they were not necessarily recent recruits. The observed wide range of variability in stand characteristics likely reflects the diversity of mechanisms that has shaped them, and suggests that a uniform thinning approach is unlikely to foster this natural range of variability.

## Does fuels management accomplish restoration in southwest Oregon, USA, chaparral?

Duren, O. C., and P. S. Muir. 2010. Does fuels management accomplish restoration in southwest Oregon, USA, chaparral? Fire Ecology 6:76-96. (full article: *fireecology.net/docs/Journal/pdf/Volume06/Issue02/076.pdf*)

**ABSTRACT**
Fuels management is often intended to both reduce fire hazard and restore ecosystems thought to be impacted by fire suppression. Objectives to reduce fire hazard, however, are not compatible with restoration in many vegetation types. Application of ecologically incompatible treatments to poorly understood ecosystems can drain management resources and contribute to ecosystem degradation. Extensive areas of chaparral on Bureau of Land Management lands in southwest Oregon, USA, are annually targeted for fuels treatment. However, the fire ecology of this ecosystem is not well understood and the assumptions guiding treatment need and design are based on extrapolations from other ecosystems. We studied patterns in age structure of two obligate-seeding chaparral shrubs, sticky whiteleaf manzanita (*Arctostaphylos viscida* Parry) and buckbrush (*Ceanothus cuneatus* [Hook.] Nutt.) and assessed relationships with environment, fire, and potential livestock disturbance. Results indicate that chaparral of

obligate seeding species encompasses a wide range of structures and responses to environment and fire throughout its range. While Mediterranean climate obligate-seeding shrub populations are typically even-aged, most stands unburned >30 yr were uneven-aged due to both recruitment in the absence of fire and to persistence of shrubs that predated the last fire. Fire suppression does not seem to have altered chaparral structure or fire severity, and current fuels treatments appear unlikely to reproduce stand structures observed in mature chaparral or in post-wildfire stands. Results underscore that effective fuels management should be both sensitive to regional variability and founded on ecosystem-specific data.

## **P**RESCRIBED **F**IRE AND **P**OST-**F**IRE **S**EEDING IN **B**RUSH **M**ASTICATED **O**AK-**C**HAPARRAL: **C**ONSEQUENCES FOR **N**ATIVE AND **N**ON-**N**ATIVE **P**LANTS

Celeste T. Coulter, Darlene Southworth, and Paul E. Hosten. 2010. Prescribed fire and post-fire seeding in brush masticated oak-chaparral: consequences for native and non-native plants. Fire Ecology 6: 60-75. (full article: *fireecology.net/docs/Journal/pdf/Volume06/Issue02/060.pdf*)

**ABSTRACT**
In fire-suppressed oak-chaparral communities, land managers have treated thousands of hectares by mechanical mastication to reduce hazardous fuels in areas of wildland-urban interface. The chipped debris, which decomposes slowly, can be burned to minimize wildfire hazard. The question is whether controlled burning of masticated debris results in loss of native plant species richness and abundance, allowing for gains in non-native species. We examined the response of vegetation to the seasonality of prescribed fire and to post-fire seeding in mechanically masticated oak-chaparral communities in the Applegate Valley of southwestern Oregon, USA. At the landscape level, treatments did not differ. At the site level, response of native and non-native species varied by site and treatment. Following prescribed fire, native species decreased in cover and increased in species richness; non-native species increased in cover and in species richness. Seven species that were not observed on pre-treatment plots appeared after burn treatments. Non-native annual grasses and forbs increased following both spring and fall burns. Among native species, annuals declined in cover while perennials increased slightly. Both annual and perennial natives increased in species richness following burn treatments. Community patterns at the site scale changed following all treatments. Seeded bunchgrasses, Lemmon's needlegrass (*Achnatherum lemmonii* [Vasey] Barkworth), California brome (*Bromus carinatus* Hook. and Arn.), blue wildrye (*Elymus glaucus* Buckley), and Roemer's fescue (*Festuca idahoensis* Elmer ssp. *roemeri* [Pavlick] S. Aiken), successfully established following fall prescribed fires, but not following spring prescribed fires or in unburned controls. Post-fire seeding and subsequent increased bunchgrass cover correlated with decreased non-native species. Prescribed low severity fire followed by post-fire seeding during the wet, cool season is a viable tool for introducing native bunchgrasses while controlling non-native species in mechanically masticated oak-chaparral in southwestern Oregon.

## Responses of Chaparral and Oak Woodland Plant Communities to Fuel-Reduction Thinning in Southwestern Oregon

Perchemlides, K. A., P. S. Muir, and P. E. Hosten. 2008. Responses of chaparral and oak woodland plant communities to fuel-reduction thinning in southwestern Oregon. Rangeland Ecology and Management 61:98-109.

**Abstract**
Fire suppression has led to large fuel accumulations in many regions of the United States. In response to concerns about associated wildfire hazards, land managers in the western United States are carrying out extensive fuel-reduction thinning programs. Although reductions in cover by woody vegetation seem likely to cause changes in herbaceous communities, few published studies have reported on consequences of such treatments for native or exotic plant species. We compared vegetation and abiotic characteristics between paired thinned and unthinned chaparral and oak woodland communities of southwestern Oregon 4–7 yr posttreatment and contrasted impacts of manual vs. mechanical treatments. Herbaceous cover increased on thinned sites, but species richness did not change. Herbaceous communities at thinned sites had an early postdisturbance type of composition dominated by native annual forbs and exotic annual grasses; cover by annuals was nearly twice as high on treated as on untreated sites. Absolute and proportional cover of native annual forbs increased more than any other trait group, whereas exotic annual forbs and native perennial forbs declined. Exotic annual grass cover (absolute and proportional) increased, whereas cover by native perennial grasses did not. Shrub reestablishment was sparse after thinning, probably because of a lack of fire-stimulated germination. Manual and mechanical treatment impacts on abiotic site conditions differed, but differences in vegetation impacts were not statistically significant. Fuel-reduction thinning may have some unintended negative impacts, including expansion of exotic grasses, reductions in native perennial species cover, persistent domination by annuals, and increased surface fuels. Coupled with sparse tree or shrub regeneration, these alterations suggest that ecological-state changes may occur in treated communities. Such changes might be mitigated by retaining more woody cover than is currently retained, seeding with native perennials after treatment, or other practices; further research is needed to inform management in these ecosystems.

Website: **Oak and chaparral ecology and fuels management in southwest Oregon.**

http://people.oregonstate.edu/~muirp/FuelsReductionSWOregon/index.html

Online pdf document: **A landowner's guide to restoring and managing Oregon white oaks.**

www.blm.gov/or/districts/salem/files/white_oak_guide.pdf

**Maps of settlement era vegetation for the** Rogue Valley, Lower Applegate, Upper Illinois Valley (GIS shapefile download, or click on the map image for a picture format)

http://www.pdx.edu/pnwlamp/glo-historical-vegetation-maps-oregon-0