Lessons learned after 10 years of fuel-reduction and monitoring in woodlands/chaparral of the Lower Thompson creek, Applegate valley, southwest Oregon

Greg Chandler (fire specialist)
Paul Heaton,(ecologist)
Al Mason (fire specialist)

Ashland Resource Area,
Medford District BLM,
Medford, OR

Acknowledgements: The authors gratefully acknowledge Joint Fire Science Research Grant entitled "Fuels Reduction in Oak Woodlands, Shrub Lands, and Grasslands of SW Oregon: Consequences for Native Plants and Invasion by Non-native Species" (JFSP Project Number: 03-3-3-36) for enabling work contributing to this poster.

Abstract

The woodland/chaparral of Lower Thompson creek are patchy with varied domination by whiteleaf manzanita, buckbrush, and multi-aged Oregon white oak. One hundred percent woody canopy cover by 6 to 15 foot shrubs and trees with a sparse understory dominated by blue wildrye, Idaho fescue, cats ears, and blue-dicks prior to fuel-reduction are the norm. The objective of fuel-reduction initiated in 1996 was to create low-fuel Oregon white oak savanna to facilitate a fire-safe landscape. The shrubs were hand-cut and piled, and the oak trees thinned to a 20 to 30 foot spacing. This resulted in a high density of burnpiles per acre. Many of the leave oak trees were damaged by heat from pile burns. Multi-staged burning is now used as a technical solution to reduce total heat production and consequent tree damage from pile-burning during a single entry. Repeat photos of individual oak trees surviving pile-burning show massive sprouting of epicormic buds to create an 'open-grown' growth-form and a re-attainment of the former canopy within 7 years following treatment. At two sites, the understory following pile-burning showed an initial cover domination by native grasses (mostly blue wildrye), with whiteleaf manzanita assuming dominance in a few years to create a dense carpet of shrub seedlings. This lead lead to the eventual exclusion of grasses and forbs. A new round of treatments aimed at removing shrub seedlings was initiated to meet the objective of low-fuel oak savanna. Attempts to apply broadcast burn were only partially successful because of the absence of fine-fuels to carry the fire. The immature shrubs were then mowed with the intention that the cut material would provide fuels for a follow-up broadcast burn. A year later, a portion of the treated areas have been burnt, providing a comparison of immature shrub response to treatments. Shrubs commonly known as resprouters (poison oak, yerba santa) showed rapid growth following mowing. Surprisingly, immature whiteleaf manzanita also showed an abilty to resprout (estimated at 50% of mowed shrubs). Whiteleaf manzanita in areas that had been mowed then burned showed little survival, though patches of new seedlings were observed through the burnt area. The 2005/2006 broadcast burn was intense enough to kill many of the lower Oregon white oak resprouts following the initial burning of piles at the start of the fuel-reduction treatments.

Many oak woodland stands of the Applegate valley show distinct age classes. Older oak lunkers are often surrounded by a younger cohort of oak or shrubs. Such stand structures incorporating abundant flammable material and ladder fuels are prone to stand-replacement fire. This would result in the loss of the large tree component considered important as wildlife habitat. Consequently, fuel reduction projects are commonly considered a combination of creating a fire safe environment and restoration to a formerly common open woodland condition.

Treatment area 1: hand-cut, piles burnt under 'cool' conditions
Plant community: Oregon white oak - buckbrush

This woodland stand included a relatively high cover of Oregon white oak with buckbrush (*Ceanothus cuneatus*) filling the interspaces before treatment. The oaks were thinned and shrubs removed in 1996/1997 creating an open woodland stand. The cut material was piled and burnt in 1998. The piles burnt partially only, imparting relatively little heat to damage leave-trees and heat-scarify burnpile interspaces. This likely resulted in poor germination of the shrub seedbank allowing the persistence of the herbaceous component.

Vegetation dynamics following fuel-reduction, Plot A

Vegetation dynamics following fuel-reduction, Plot B

Note strong growth of native grasses following initial treatments in 1999. Buckbrush in the treated and control areas started flowering in 1996.

Replenishment of seedbank

Seedlings and resprouting shrubs can attain sexual maturity within 7 years to start replenishing the seedbank. Buckbrush and Manzanita are considered fire-dependent. However, as evidenced by seedlings between pile burns at this site, the seed do germinate to mature into large shrubs without the help of fire. Shrub recruitment in 'cool' pile burn sites (Treatment area 1) appears slower than 'hot' pile burn sites (Treatment areas 2 & 3).

Treatment area 2: hand-cut, piles burnt under 'cool' conditions
Plant community: Oregon white oak – whiteleaf manzanita

These two chaparral-like stands included oak of varying age classes dispersed throughout the stand in a matrix of large whiteleaf manzanita (*Arctostaphylos viscida*). The treatment units were handcut and piled in 1996/1997, and burned in the spring of 1998. The dense growth of whiteleaf manzanita seedlings were mowed with a 'weed-eater' during the fall/winter of 2006. Treatment area 3 was broadcast burnt in the spring of 2006, while Treatment area number 2 remains unburnt. The vegetation dynamics following handcut, piling, burning, and mowing for treatment areas 2 & 3 are very similar. The additional treatment of broadcast burn on treatment area 3 allows the examination of winter/spring prescribed fire on the structure of shrubs and trees still responding to the initial fuel reduction treatments of 1997/1998.

Vegetation dynamics following fuel-reduction, Plot A

Vegetation dynamics following fuel-reduction, Plot B

Handcutting, piling and burning resulted in a temporary herbaceous dominated understory. However, the treatments also showed a strong germination response from the shrub seedbank which dominated grasses and forbs in 3 years.

Tree recovery from pile-burning heat damage

Note the development of Oregon white oak canopy from epeicormic buds stimulated by the heat from pile-burning

Tree recovery from pile-burning heat damage, Plot A

Tree recovery from pile-burning heat damage, Plot B

These and other repeat photos in treatment area 3 validate that vegetation response is similar to treatment area 2 prior to the broadcast burn. The heat from the broadcast burn was intense enough to kill the lower branches arising from the sprouting of epicormic buds due to earlier treatments.

Resprouting with and without fire

Immature resprouters (poison oak) and seed obligate shrubs (whiteleaf manzanita) resprouted following mowing (treatment areas 2 & 3). Resprouters survived the follow-up broadcast burn while whiteleaf manzanita did not (Treatment area 3). Patches of whiteleaf manzanita seedlings were observed in the mowed and burnt treatment (treatment area 3).

CONCLUSIONS

A few lessons learned from fuel-reduction projects in the Lower Thompson Creek Valley

1) Chaparral/woodland develops rapidly from seed and resprouts following initial hand-cutting, piling, and burning
2) Oak trees were damaged by the heat from all piles burning simultaneously under 'hot' conditions.
3) The overwhelming shrub seed germination response at sites 2 & 3 is likely due to the 'heat treatment' following pile burns.
4) Herbaceous vegetation was overtopped by shrubs within 4 years.
5) Broadcast burning **within the window of safe prescribed fire** was not possible after the disappearance of grasses.
6) Oak trees damaged by the heat from pile burns rapidly recovered their canopy cover in 5-7 years.

Management solutions

1) Stagger burning – multiple entries allow pile burning without the cumulative heat of all piles burning simultaneously
2) Apply follow-up broadcast burn within 3 years of initial hand-cutting and piling