Effects of grass seeding on native and exotic vegetation following fuels-reduction treatments by mastication and burning

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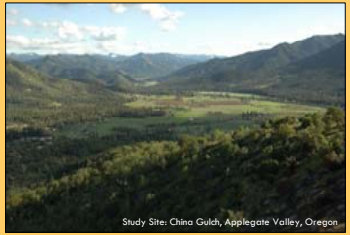
GOAL: To develop a management protocol for areas converted from chaparral to herbaceous vegetation for fire safety in wildland-urban interfaces.



HYPOTHESES

H1: Seeded native grasses will germinate in burned plots.

H2: Exotic species will decrease and native species will increase after burns.

H3: Total species richness will increase in burned plots.

H4: Vegetation composition will shift toward natives following burning.

INTRODUCTION

Brush mastication has been widely used throughout the Applegate Valley of southern Oregon to reduce fuels in wildland-urban interfaces dominated by fire-suppressed chaparral.

This study examines the effects of prescribed fire and seeding of native bunchgrass in brush masticated chaparral on (1) germination and establishment of native grasses, (2) control of exotic annual grasses and forbs, and (3) maintenance of native species richness.

METHODS

Study Site: China Gulch, Applegate Valley, Oregon

Study Design: 30 paired plots, seeded and unseeded, in each of 4 treatment blocks:

Spring Burn, Spring Control, Fall Burn, Fall Control

Total of 120 1-m^2 plots

Test Species: *Bromus carinatus*, *Elymus glaucus*, *Festuca roemeri*, *Achnatherum lemmonii*

Protocol: Randomly selected plots were sowed with 0.28 g/1-m^2 plot of seed of each grass species 48 hrs after burning in fall 2005 and spring 2006.

Pre-treatment vegetation surveys: summer 2005

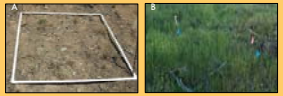
Post-treatment vegetation surveys: spring and summer 2006

FIREMON protocol was used to estimate plant species cover for all 1-m^2 plots.

Germination of native grasses

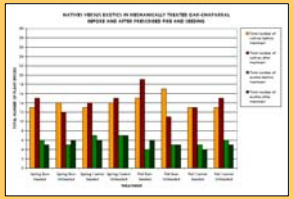
The fall burn consumed all the litter and left bare soil in which seeded grass germinated. Cool wet weather followed the fall burn. Spring conditions were too wet to burn evenly, but the season dried out too quickly for germination to occur.

Treatment	Plots with Germination
Spring Burn Seeded	0/15
Spring Control Seeded	0/15
Fall Burn Seeded	14/15
Fall Control Seeded	0/15



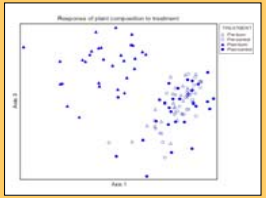
A. Fall burn plot with seeded grass germination
B. Control plot without seeded grass germination

Changes in species richness of exotics and natives



Neither exotic nor native species richness changed following spring or fall burning. Total species richness changed only in fall burn plots with seeded native grasses.

Response of plant composition to treatment

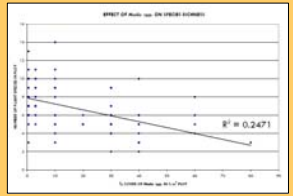


Vegetation in fall burned plots differs from pre-treatment plots and controls.

CONCLUSIONS

- Prescribed fire followed by seeding is an effective method for reintroducing native bunchgrass species.
- No effect was observed on species richness of exotics or natives 1 year after burning and seeding.
- Species richness is correlated with pre-existing plant diversity and the presence of *Madia* spp.
- Plant composition changed following fall burning.

Effect of *Madia* on species richness



Dense populations of *Madia* spp. (tarweed) may prevent establishment of other forbs due to allelopathy.

Reference. Qasem JR, Foy CL 2001 Weed allelopathy, its ecological impacts and future prospects: A review. J Crop Prod 4: 43-119.

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