

Controlling exotic grasses while maintaining native plant communities in fire-maintained wet prairies

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Pre-treatment monitoring at Rose Prairie

Wetland prairies in the Willamette Valley are among the most endangered ecosystems in North America, and support many imperiled species. The Fern Ridge Research Natural Area (RNA) contains substantial remnant wetland prairies, and is dedicated to serve as a research site and reference community for the Willamette Valley wet prairie system. It consists of three main units; Rose Prairie, Royal Amazon, and Fisher Butte, all of which support rare and endangered plant species including *Lomatium bradshawii* and *Erigeron decumbens*. Wet prairie habitats at Fern Ridge RNA are currently managed using prescribed fire, which benefits the plant community by decreasing thatch and promoting germination by native species. Unfortunately, it has also been observed that the exotic grass *Anthoxanthum odoratum* (sweet vernal grass) can increase under a burning regime. There is a need for alternative management strategies to reduce the abundance of invasive grasses, particularly *A. odoratum*, without causing harm to native plants. The ultimate goals of this project are to improve the diversity (both evenness and richness) of native species and decrease the cover of exotic species.

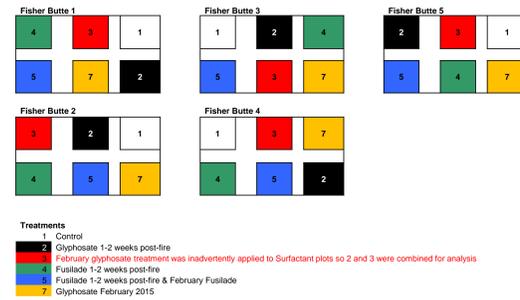
Study Sites



This study was conducted at the Fern Ridge RNA, managed by the US Army Corps of Engineers, in Lane County, Oregon. Experimental plots were established remnant wet prairies at Rose Prairie and Fisher Butte.

Methods

Five blocks were established at Rose Prairie and Fisher Butte. Each block consisted of six 5 x 5 m² plots, separated by 1m wide buffers. After the prescribed burn treatments were randomly assigned to plots within each block



Sample block/plot schematic showing randomly assigned treatments that occurred at Fisher Butte

Treatment schedule for experimental plots established at Fern Ridge RNA

Site	Pre-Treatment Monitoring	Site Burned	Post-burn treatments applied	Post-Treatment monitoring
Rose Prairie	Spring 2011	Fall 2011	Fall/winter 2011 and Fall/winter 2014	Spring 2012 and 2015-17
Fisher Butte	Spring 2014	Fall 2014	Fall/winter 2014	Spring 2015-17

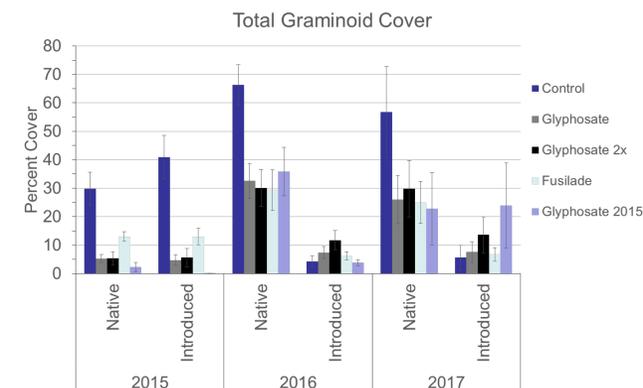
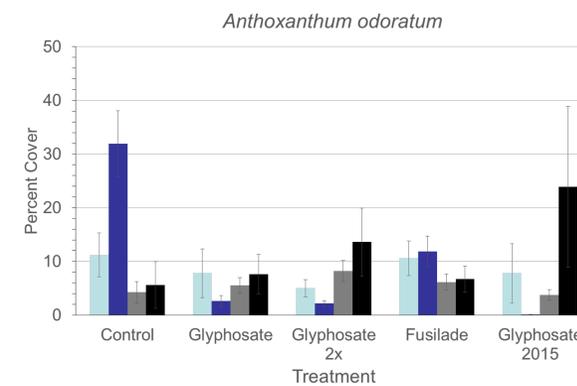
Treatment Alternatives

- Control (fire only):** because Fern Ridge RNA is typically managed by burning, fire represents the 'control' condition to which we wish to compare the treatment alternatives.
- Burn + glyphosate (1 week after):** A broad spectrum herbicide applied soon after fire can target rapidly re-sprouting invasive species. Many native species are much slower to green up after fire, so this broad-spectrum herbicide can actually be selective in its effects.
- Burn + glyphosate 2x (1 week after) + glyphosate (Feb.):** As above, with an additional glyphosate treatment in late winter, before natives have emerged but invasive grasses are active.
- Burn + fusilade (1 week after):** similar to treatment 2, but with a grass-specific herbicide, to insure there is no damage to native forbs.
- Burn + fusilade 2x (1 week after) + fusilade (Feb.):** similar to treatment 4, but with an additional application in late winter to target invasive grasses.
- Burn + surfactant (NuFilm) only:** a control for any impacts of the surfactant.
- Burn + Glyphosate (February 2015):** Glyphosate was inadvertently applied to Fire + surfactant only plots in 2015 and we included the novel treatment in analysis.

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Post-treatment

Rose Prairie



Rose Prairie

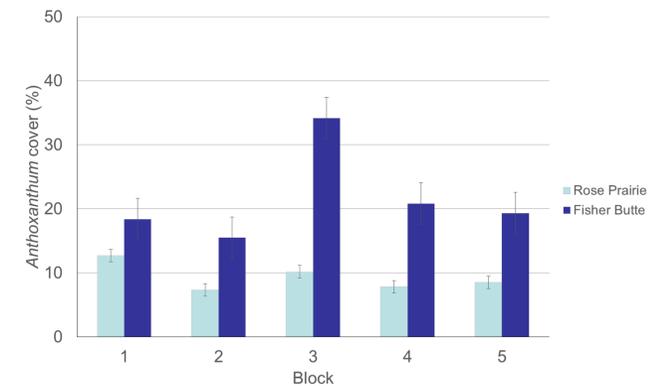
- Some treatments initially reduced cover of *A. odoratum*, but cover has continued to decrease in all plots including the control and shows annual variability
- All herbicide treatments reduced the total cover of graminoids, regardless of nativity.
- The control plots had the highest cover of native graminoid species.

Fisher Butte

- All plots had lower cover of *A. odoratum*, compared to pretreatment cover values.
- The glyphosate 2015 and burn + 2 applications of fusilade initially reduced *A. odoratum*, but cover was lower in the controls in 2017
 - Also had negative impacts to native graminoid and native forb cover.
- The control plots had the highest cover of native graminoid species.

None of the treatments provide a recommended alternative. Declines in *A. odoratum* are likely due to environmental effects.

Pre-treatment



Fisher Butte

