Fire Effects on Wetland Prairie Plant Species

FINAL REPORT

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SUMMARY

Wetland prairies of the Willamette Valley, considered among the rarest of Oregon’s ecosystems, are threatened by invasion of woody species and non-native pest species. Because of its historical importance, fire is a top choice of managers for preventing the encroachment of woody species. However, the effects of prescribed burning on present day wetland communities, with their mix of native and non-native species, are not clear. The present study investigated some of the mechanisms—survival, growth, and reproduction—that determine the response of plants to fire for seven dominant wetland species. The approach was to compare survival, aboveground vegetative biomass, reproductive biomass, and flowering intensity between burned and unburned plots one growing season after the burn treatment, using before-burning measurements as a covariate in the analysis. The experiment was conducted in the Willamette Floodplain Research Natural Area of the William L. Finley National Wildlife Refuge, Oregon.

The responses of the seven study species show four patterns of response to burning:

- **Poor survivors:** Species with reduced survival, aboveground vegetative biomass, and reproduction (*Rosa* spp., *Veronica scutellata*).
- **Decreasers:** Species with no change in survival but reduced aboveground vegetative biomass and reproduction (*Deschampsia cespitosa*, *Carex unilateralis*).
- **Unaffected:** Species with little changes in survival, aboveground vegetative biomass, and reproduction (*Hordeum brachyantherum*, *Holcus lanatus*).
- **Increasers:** Species with increases in survival, aboveground vegetative biomass, and reproduction (*Beckmannia syzigachne*).

Management strategies for conservation of Willamette Valley native wetlands require the reduced abundance of woody species, the reduction or prevention of increase in non-native pest plant abundance, and the increase or at least the maintenance of native species’ abundance.

**The results from this study indicate that prescribed burning can achieve the first objective of decreasing the abundance of woody species (*Rosa* spp.).** Long-term rose control would require repeated burning. Fire neither reduced nor promoted the abundance of the only non-native herbaceous species measured (*Holcus lanatus*). **The results were mixed for the native species.** The abundance of two native species was maintained (*Hordeum brachyantherum*) or promoted (*Beckmannia syzigachne*). The abundance of the other three native species measured was reduced (*Veronica scutellata*, *Deschampsia cespitosa*, *Carex unilateralis*).

These results are for first year responses to a single fire. Responses of plants may change with timing of burning (e.g., fall vs. summer burn), with frequency of fires, and may not be evident the first year after burning. More definite management recommendations can be made after long-term effects become clear from continuing research programs.