Long-term Responses of Wetland Prairie in the William L. Finley National Wildlife Refuge to Three Burning Regimes

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SUMMARY

A seven-year data set from the Willamette Floodplain Research Natural Area, Finley National Wildlife Refuge, Oregon, provided a unique opportunity to examine the long-term effects on the wetland prairie community of management by prescribed burning. Management objectives for restoring prairie quality included halting the invasion of shrubs, trees, and exotic herbaceous species and promoting the abundance on native herbaceous species. Analysis of the trajectories of species abundances legitimizes the interpretation of differences among unreplicated management units in terms of the burning regime of annual burning, triennial burning, and no burning.

Results paint a mixed picture. Native herb cover increased slightly with annual burning compared to a sharp decline with no burning, but triennial burning caused a decline in native herb cover. Exotic herb cover declined with triennial burning, but increased sharply with annual burning. Shrub and tree cover increased regardless of treatment, but less rapidly with annual burning. An index of overall prairie quality declined in every burning regime, but the decline was less rapid with triennial burning. Relative elevation had a strong impact on the prairie community, sometimes interacting with the effects of burning regime. Relatively higher, dry microsites tended to lose native cover and richness, and lose prairie quality. Dry microsites gained exotic herb cover with annual burning, but not with triennial burning.

Overall, burning was decidedly better than not burning, but prairies continued to degrade even when burned. The rate of prairie degradation is dangerously high, even with burning. At estimated current rates, triennial burning would cut native herb cover in half in six years, annual burning would double exotic herb cover in 10 years, and shrub and tree cover would double in 24 years with annual burning and in 14 years with triennial burning.

These results lead to several management recommendations. (a) Continue using burning as a tool for wetland prairie management. (b) Supplement burnings with other control measures for shrubs (mowing, manual removal, herbicide application), especially in triennially burned areas. (c) In dry microsites of annually burned areas, implement control measures for exotic herbs (mowing at times and heights to maximize the harm to exotic herbs while minimizing the harm to native herbs, sowing native herbs to increase competitive pressure). (d) In dry microsites of annually burned and triennially burned areas, counter declines in native herb cover by sowing seeds or installing transplants of native herbaceous species.

INTRODUCTION

Willamette Valley prairies are one of the most endangered ecosystems in the United States (Noss et al. 1995). The Willamette Floodplain Research Natural Area, Finley National Wildlife Refuge, Oregon, contains perhaps the best and most extensive system of the wetland phase of these prairies. Even so, the Finley wetland prairies have become degraded over the past decades, mostly from the invasion of shrubs, trees, and exotic herbaceous weeds. Fish and Wildlife