Promoting Regeneration of Native Species in Willamette Valley Upland Prairies

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Summary

Native prairies of the Willamette Valley are considered among the rarest of Oregon’s ecosystems and are in critical need of conservation. Management strategies for increasing the abundance of native species are urgently needed, particularly those strategies that promote the regeneration of native species from seed. The focus of this investigation was to address this need. The general approach was to sow seeds of native species into experimental field plots, which had been burned once, burned repeatedly, mowed, or unmanaged at three sites at Baskett Slough National Wildlife Refuge. Seedling numbers were then counted one growing season after sowing. To investigate mechanisms for the regeneration responses of species to management treatments, selected abiotic and biotic factors potentially important for seed regeneration were measured in the field plots.

Seedling establishment rates in unmanaged plots were relatively small, averaging 9.7% for all three sites. Only one species, Danthonia californica, showed a positive response to the mowing treatment. Of the 13 species sowed in the burn plots, six species (Bromus carinatus, Elymus glacus, Festuca roemeri/rubra, Clarkia quadripliata, Prunella vulgaris, Sidalcea campestris) had significant more seedlings in the burn plots compared to the unmanaged plots. Seedling establishment of two species, Danthonia californica and Potentilla gracilis, was significantly lower with burn treatments. The other five species showed no significant responses to the burn treatments: Carex tunicola, Calochortus tolmiei, Zygadensus venenosus, Balsamorhiza deltoidea, and Agoseris grandilflora.

The strongest fire effects were generally in plots that had been burned only once, rather than plots burned more than once. Abundance of litter and vegetation were the factors that were most often related, both positively and negatively, with seedling establishment rates. Based on the results of this investigation, prescribed burning, rather than mowing, is a more viable management option to promote regeneration of native species from seed in upland prairies. However, prescribed burning must be used with caution as it can reduce seedling establishment rates for some species. Sowing seeds in unmanaged sites is an option, but sowing rates need to be high to compensate for the small seedling establishment rates in unmanaged prairies.