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Using Fire for Invasive Plant Control in Wildlands

Humans have used fire to manage vegetation to their advantage since prehistoric times. More recently, land managers have used prescribed fire to reduce fuel loads, restore historical disturbance regimes, improve forage and habitat, and promote biodiversity. Fire also has been used to manage invasive plant species, either directly or as part of an integrated approach that involves other control methods. To help facilitate improved decision making, two new publications, coauthored by USGS scientist Dr. Matt Brooks and colleagues, summarize the current state of knowledge on the use of fire as a tool to manage invasive plants in wildlands. The authors discuss risks and challenges of conducting prescribed burns, types of systems and circumstances in which burning may be effective for the management of invasive plants, complexities of fire and plant community interactions, impacts of prescribed burning on the broader plant community and the soil, and comprehensive monitoring plans.

Management Implications:

- For maximum effectiveness, in most cases fire should be integrated with other invasive plant control methods.
- The net effects of any treatment plan on the entire plant community, higher trophic levels, and ecosystem properties need to be considered before a treatment plan is implemented.
- Post-burn monitoring is necessary to establish each fire's impact, enabling resource managers to determine whether or not prescribed fire objectives are being met.
- Management burns for invasive plants should include effectiveness monitoring plans to take advantage of every opportunity to generate new data and improve predictive models.

Much of what is known about using fire to manage vegetation, particularly invasive plants, is derived from studies of crop systems. However, there are several fundamental differences between cropland and wildland settings, regarding timing of fires, fuel types, fire types, integrated treatments, type of invasives targeted, and ecological complexity. Although there are some excellent examples of successful use of prescribed burning for the control of invasive species, a limited number of species have been evaluated. In addition, few studies have measured the impact of prescribed burning on the long-term changes in plant communities, impacts to endangered plant species, effects on wildlife and insect populations, and alterations in soil biology, including nutrition, mycorrhizae, and hydrology.

Variations in fuel loads affect soil heating and cheatgrass seedbank mortality during fires in sagebrush steppe habitat. Relationships between soil heating and cheatgrass mortality were evaluated at this site in the southwestern Great Basin. Photo: J. R. Matchett, USGS.

DiTomaso, J. M., M. L. Brooks, E. B. Allen, R. Minnich, P. M. Rice, and G. B. Kyser. 2006. Control of invasive weeds with prescribed burning. Weed Technology 20:535–548.

DiTomaso, J. M. and D. W. Johnson (eds.). 2006. The Use of Fire as a Tool for Controlling Invasive Plants. Cal-IPC Publication 2006-01. California Invasive Plant Council: Berkeley, CA. 56 pp.