

Western Ecological Research Center

Publication Brief for Resource Managers

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Fire Management Impacts on Invasive Plants

Fire management practices have had diverse impacts on alien plant invasions in the western United States, as outlined in a recent paper by USGS scientist Dr. Jon E. Keeley. In the April issue of *Conservation Biology*, Keeley considers the impact of six fire management practices on alien invasions: fire suppression, forest fuel reduction, prescription burning in crown fire ecosystems, fuel breaks, targeting noxious aliens, and postfire rehabilitation.

Most western U.S. forests have had fire successfully excluded for unnaturally long periods of time, and this appears to have favored the exclusion of alien plant species. Forest fuel reduction programs have the potential for greatly enhancing forest vulnerability to alien invasions. In part, this is due to the focus on reestablishing pre-Euro-American fire regimes on a landscape that differs from pre-Euro-American landscapes in the abundance of aggressive non-native species. The author suggests that managers may be forced to choose between restoring “natural” fire regimes or altering fire regimes to favor communities of native species. Intensive grazing in many western forests may exacerbate the alien problem after fire, and temporally decoupling grazing and fire management may reduce the alien threat on those landscapes.

Many shrubland ecosystems such as the Intermountain West sagebrush steppe or California chaparral have a natural, high-intensity crown fire regime that is less amenable to forest restoration tactics. Historical use of prescribed fire for type conversion of shrublands to more useful grazing lands has played some role in the massive annual grass invasion that threatens these shrublands, although a multitude of factors have worked to favor aliens in these ecosystems.

Management Implications:

- Forest restoration by thinning or burning carries a risk of opening new habitat to alien plant invasion; however, factors such as grazing and treatment prescriptions can be manipulated in ways that may reduce this threat.
- Shrublands are often overexposed to disturbance, and thus fuel reduction manipulations have the potential for exceeding the threshold of tolerance on many landscapes.
- Fuel breaks need to be evaluated in the context of cost-effectiveness where potential resource damage due to enhanced alien invasion is included in the equation.
- Aggressive annual aliens are favored by disturbance, and thus management of these species may require treatments that reduce disturbance and alter the competitive balance between aliens and natives.
- Postfire seeding has the potential for exacerbating alien species problems after fire in undisturbed ecosystems, although it may have value as a competitor of aliens in highly disturbed systems.

Fuel breaks pose a special invasive plant risk because they promote alien invasion along corridors into wildland areas. Use of prescription burning to eliminate noxious aliens has had questionable success, particularly when applied to disturbance-dependent annuals, and success is most likely when coupled with ecosystem restoration that alters the competitive balance between aliens and natives. Artificial seeding of alien species as a form of postfire stabilization may cause more problems than it solves and even enhance alien invasion.

Keeley, J. E. 2006. Fire management impacts on invasive plants in the Western United States. Conservation Biology 20:375–384.