

BRIEFING PAPER: Loss of the sagebrush ecosystem of the Snake River Plain

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BUREAU: USGS

ISSUE In little more than a century, an entire landscape, the sagebrush ecosystem of the Snake River Plain, has been altered, perhaps irreversibly. Wildfire, often coupled with other forms of disturbance, has been the reason that shrublands throughout the Intermountain West have experienced such drastic change.

BACKGROUND/STATUS Early settlers crossing the Snake River Plain in southwestern Idaho described a sea of sagebrush as far as the eye could see. Patches of perennial grasses and flowering plants were interspersed among the shrublands. Today, that ecosystem is an extensive grassland populated by an exotic annual called cheatgrass (*Bromus tectorum*). The vast expanses of sagebrush have been reduced to small, fragmented stands, and only remnant patches of native grasslands remain. Fires, heavy grazing by livestock, intentional eradication programs, and a variety of other land uses have contributed to the loss (Figure 1).

USGS scientists and Bureau of Land Management managers have studied the causes and patterns of loss in one portion of this ecosystem called the Snake River Birds of Prey National Conservation Area. Major land uses within this 195,000-ha site are military training, livestock grazing, recreation, and agriculture. The area supports a high density and diversity of nesting raptors (birds of prey) and was designated as a National Conservation Area to protect these birds and their habitats in 1993. The Bureau of Land Management manages the National Conservation Area.

The conversion from shrublands to exotic grasslands has been swift and dramatic. In 1979,



Figure 1. The conversion of shrublands to a cheatgrass-dominated landscape in southwestern Idaho.

shrublands covered approximately 100,000 ha and comprised 51% of the area. Because of fires and other disturbances, only 58,000 ha of shrubland remained in 1994, and another 12,000 ha burned by 1998. In only 20 years, the total grassland area increased from 17% to 53%, and more than half of the shrublands were lost. Conversion of patches of perennial grasses to cheatgrass also occurred. Similar patterns of change are found in the Columbia River Basin and the Great Basin in the western United States.

USGS research shows that the greatest habitat degradation is in areas of multiple disturbances, for example repeated wildfires, or wildlife coupled with livestock grazing or, in the National Conservation Area, by military training. These repeated and often intense disturbances eliminate the total proportion of shrub cover in the landscape and increase the distance between shrub patches. A vicious cycle is then in place: cheatgrass provides continuous fine fuels that feed subsequent fires, destroying more native shrublands and facilitating the further spread of exotic plants species. Complete loss of shrublands in the conservation area within 25-50 years is projected based on USGS models unless fires can be suppressed. Reversing this trend is particularly problematic because the natural recovery or reseedling of shrublands is difficult following fire because of limited precipitation and the high potential for reburns.

The consequences of shrubland loss are far greater than vegetation change and decreased fire intervals. Many wildlife species are affected as well. Black-tailed jackrabbits, for example, are associated with shrublands on the Snake River Plain. These jackrabbits are prey for several of the raptor species, such as golden eagles. Changes in the distribution and abundance of jackrabbits affect populations of raptors, which are the reason that the National Conservation Area was set aside.

POSITIONS OF INTERESTED PARTIES

Ecosystem restoration and the role of fire in rangeland health are top-priority science needs of the Department of Interior. Shrubland restoration, fuels management, and weed control are important national-level management issues for the Bureau of Land Management, with continent-wide implications for land management and conservation of species at risk, such as sage grouse. The Bureau of Land Management oversees public rangelands in Idaho and throughout the western United States to promote sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangelands to properly functioning

conditions; and to provide for the sustainability of the western livestock industry and communities that are dependent upon productive rangelands.

RECOMMENDATIONS AND FUTURE RESEARCH

The results of this USGS research, in partnership with the Bureau of Land Management, are published in a final report called the "Effects of Military Training and Fire in the Snake River Birds of Prey National Conservation Area." Journal articles have been published, and numerous presentations have been made. Major recommendations from this research are:

- Suppress wildfires.
- Restore native shrubs and perennial grasses.
- Regulate land uses to control disturbance
- Monitor responses of habitat, prey, and raptors to management actions.

The USGS continues research related to shrubland ecosystems, with studies of prairie falcons, sage grouse, bird communities, and techniques for restoration of landscapes.

CONTACT

Steve Knick, Field Station Leader
USGS Forest and Rangeland Ecosystem
Science Center
Snake River Field Station
970 Lusk Street
Boise, ID 83706
Phone: 208-426-5208 Fax: 208-426-5210
sknick@eagle.boisestate.edu