

Pinyon-Juniper Encroachment: Effects on Sagebrush-Dependent Wildlife



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What is pinyon-juniper encroachment?

Pinyon-juniper encroachment is the expansion of pinyon-juniper woodlands into ecosystems that historically were shrublands or grasslands. These tree species have increased in abundance due to fire suppression, land use and favorable climate. A significant portion of this encroachment occurs in sagebrush rangelands and affects many processes within these ecosystems.

Altered habitat

The encroachment of pinyon-juniper into rangelands affects wildlife abundance and diversity by altering and fragmenting habitat. Sagebrush ecosystems can have a diversity of herbaceous plants that provide food and cover for numerous species of wildlife. As tree cover increases, however, these shrubs, grasses and forbs compete with trees for resources. Trees decrease soil water availability on the landscape and impact the diversity and quantity



Encroachment of pinyon-juniper woodland leads to loss of habitat for many species. Photo by Jeremy Roberts.

Key Points

- » Pinyon-juniper encroachment alters wildlife habitat through conversion from an open shrubland with a diversity of plant species to a dense woodland.
- » Healthy sagebrush habitat hosts a diverse component of plant and animal species including some of the most iconic Western species, such as sage-grouse, pronghorn, elk and mule deer.
- » Tree removal that helps return sagebrush and herbaceous plant cover is beneficial to numerous species of wildlife.

of herbaceous plants. Encroachment can also influence streamflow, which affects surface water available for wildlife. Additionally, pinyon-juniper encroachment increases the risk of larger, high-severity fires due to increased amounts of fuel, leading to further loss of habitat and greater potential for non-native species invasion. This loss and alteration of both habitat and resources affects many wildlife species.

Sagebrush ecosystems provide habitat for over 350 species of plants and animals, with several animal species entirely dependent upon sagebrush for habitat, many of which are now under conservation concern. These sagebrush-obligate species include the greater sage-grouse, pygmy rabbit, sagebrush vole, Brewer's sparrow, sage thrasher, sage sparrow and sagebrush lizard. Loss of sagebrush habitat not only affects obligate species, but also harms the many other species associated with sagebrush ecosystems including

reptiles, small mammals and birds, and also ungulates such as pronghorn, mule deer and other big game. For example, small mammal diversity decreases with pinyon-juniper encroachment, while mule deer avoid areas of high tree cover due to changes in habitat and forage availability.



As an umbrella species, management to conserve the greater sage-grouse also benefits other wildlife species. Photo by Ken Miracle.

A bellwether of change

As a species of significant conservation concern, the greater sage-grouse has become well-known as an indicator of sagebrush ecosystem health. Due to sage-grouse dependence on healthy sagebrush communities for every phase of its life cycle, the decreasing health of sage-grouse populations is linked to declining sagebrush habitat. Over 90% of the pinyon-juniper encroachment has occurred in sagebrush ecosystems, contributing to significant habitat loss for sage-grouse. This species is an early bellwether of ecosystem degradation, as they begin avoiding areas with only one to two trees per acre. Not only does nesting and rearing habitat degrade with encroachment, but trees also become perches for avian predators such as raptors and ravens.

Pinyon-juniper management for wildlife

Management that increases or maintains sagebrush and herbaceous cover is beneficial for many wildlife populations, and treatment of pinyon-juniper encroachment can lead to a fast recovery of understory plant cover and diversity. Studies have shown that populations of sagebrush-associated bird species considered at high conservation concern, such as the Brewer's sparrow and the green-tailed towhee, more than doubled after tree removal, while densities of small mammals also improved with conifer treatment. Additionally, overwinter survival of mule deer has been shown to increase as a result of greater abundance of browse species after management. Tree removal not only reduces trees for sage-grouse predators and restores sagebrush habitat, but it also reduces the risk of severe wildfire and associated loss of habitat.

Restoration of sagebrush ecosystems has been proven to benefit populations of sage-grouse. Within three years after treatment, survival of both individuals and nests can improve, while population growth rates increased 12 % in areas of restored habitat five to six years after conifer removal. Due to the sage-grouse's sensitivity to the quality and quantity of sagebrush habitat, it is considered an umbrella species, where management to improve habitat for this animal is also likely to benefit other sagebrush-associated species. Research investigating the overlap of species' distributions have found that many animals, such as the pygmy rabbit, several reptile species and other bird species, may also benefit from sage-grouse management. Restoring large, intact and resilient sagebrush habitat will benefit numerous wildlife species.



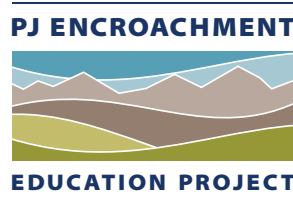
Removal of encroaching trees improves the habitat for a wide variety of wildlife that rely on healthy sagebrush ecosystems. Photo by US Fish and Wildlife Service.

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