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# Why Care About America's Sagebrush?



Male pronghorn at a Greater sage-grouse lek / USFWS

## Introduction

The sage-steppe ecosystem of the western United States is, to the casual eye, an arid and monotonous expanse of sagebrush (*Artemisia tridentata* Nutt.) that early European settlers could not wait to traverse on westward journeys. Yet, this “flyover country,” which may appear devoid of life and thus immune to human impact, is in fact the most widespread ecosystem type in the United States, one that teems with wildlife and also contains other important natural resources that fuel our nation’s economy. Across the sage-steppe, a diverse array of partners is working to balance development of these resources with sustainable populations of native wildlife and arrest the decline of this vital place.

## Dependent Wildlife

Small mammals such as pygmy rabbits (*Brachylagus idahoensis*) and sagebrush voles (*Lemmiscus curtatus*), reptiles including the sagebrush lizard (*Sceloporus graciosus*) birds of prey such as golden eagles (*Aquila chrysaetos canadensis*), and game species such as pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*) all rely on sage-steppe habitat. While the diversity of wildlife in sage-steppe ecosystems may be less than other ecotypes such as forests, many species found in sagebrush, such as the Greater sage-grouse (*Centrocercus urophasianus*) live nowhere else in the world.

Functionally, sage-steppe serves as a nursery area for a multitude of wildlife species.

## Human Values

Beginning with the Native American peoples who used the sage-steppe for hunting and other subsistence activities, this vast intermountain landscape has long held economic value for humans. As Europeans colonized the West and established large-scale agricultural economies, sagebrush communities became – and remain – central to livestock grazing throughout much of the West, especially during winter months, when higher elevation pastures are unavailable due to snow. More recently, energy development, first from conventional sources such as coal, oil and gas and increasingly, from renewable sources such as wind, has emerged as a critical component of the United States’ energy supply. In addition, this system supports a variety of recreational activities, notably hunting for big game species and upland birds, which contribute to local economies from Colorado’s Western Slope to the eastern slope of the Cascades. Lastly, and while perhaps harder to quantify, the uniquely American aesthetic of the “sagebrush sea” occupies a special spot in our natural heritage and reminds us all of the wide-open spaces that continue to define a large portion of our national geography and the shared history and culture of the West.

## Conservation Value

Despite the significant values it provides to wildlife and humans, the sage-steppe ecosystem is one of the most imperiled ecosystems in America. Recently, the prospect of a Greater sage-grouse Endangered Species Act listing has brought additional attention to the condition of the sage-steppe system. This iconic bird’s habitat has been fragmented by development of sagebrush environments and there has been a considerable loss of suitable sagebrush habitat to support the bird’s life history, including its needs for food, cover and nesting space. The fragmentation has been exacerbated by invasive weeds, especially cheatgrass, which fuels more intense wildfires; and, land-management practices that preclude restoration of large, contiguous blocs of sagebrush. Indeed, very little of this unique ecosystem has been undisturbed or unaltered in the past two centuries.

Fragmentation of sagebrush habitats can have a particularly acute impact on wildlife because in the arid west, food, cover and water resources are distributed unequally across the landscape. This characteristic of sagebrush means many obligate species have evolved to require very large areas of intact habitat to meet their seasonal and annual resource needs. Therefore, a relatively small number of fragmented sagebrush acres can have a disproportionate impact on the species that need that particular habitat to survive.



*Greater sage-grouse male struts for a female at a lek / Jeannie Stafford, USFWS*

The sagebrush that dominates the sage-steppe landscape plays a critical role in the hydrologic cycle of the arid West. Sagebrush itself often serves as a “nurse” plant for other plants, many of which are important to sustaining grazing wildlife and domestic livestock. In addition to the hundreds of birds, mammals, reptiles and amphibians that depend on sagebrush, many unique insects, spiders, plants and lichens are associated with the sagebrush community. Imperiled wildlife, especially sagebrush obligate species; grazing livestock, especially cattle; and some people whose livelihoods depend on healthy sage-steppe have been impacted by the loss of sage-steppe ecosystem. Over time, usage of sagebrush by people, especially fragmentation of the sagebrush lands, has altered the sage-steppe landscape, resulting in a loss of the unique biodiversity associated with this habitat type. Consequences for wildlife include declines in the populations of both game and non-game species. Consequences for people include more restrictive regulatory scenarios to protect wildlife that, in turn, place more stringent controls on economic activities, especially extractive activities such as energy and minerals development.

### Threats

Fire is one of the primary factors linked to loss of sagebrush-steppe habitat. Loss of sagebrush habitat to wildfire has been increasing in the western extent of the ecosystem due to an increase in fire frequency. The increase in mean fire frequency in sagebrush ecosystems has been

facilitated by the incursion of nonnative annual grasses, primarily cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum asperum*). The positive feedback loop between exotic annual grasses and fires can preclude the opportunity for sagebrush to become re-established. Exotic annual grasses and other invasive plants also alter habitat suitability for many species of wildlife, including sage-grouse by reducing or eliminating native vegetation essential for food and cover. Annual grasses and noxious perennials continue to expand their range, facilitated by ground disturbances, including wildfire, improper grazing, agriculture, and infrastructure associated with energy development. Climate change may alter the range of invasive plants, potentially expanding the importance of this threat across the entire ecosystem.

Habitat loss is also occurring from the expansion of native conifers (e.g., pinyon-pine (*Pinus edulis*) and juniper (*Juniperus spp.*) [pinyon-juniper]) in part due to changes in fire return intervals and the overstocking of domestic livestock, particularly during the latter 1800s and early 1900s. Conifer encroachment may be facilitated by increases in global carbon dioxide (CO<sub>2</sub>) concentrations, and climate change.

The persistent and increasing demand for energy resources means continuous development of the sage-steppe ecosystem, which results in habitat fragmentation. Fragmentation of habitat is causing significant reductions of wildlife populations, such as Greater sage-grouse and pronghorn and other sagebrush-dependent species. Although data are limited, impacts resulting from renewable energy development are expected to have negative effects on sagebrush habitats due to their similarity in supporting infrastructure and that there will likely be permanent infrastructure developments within the sage-steppe, which will have long-lasting impacts. Both non-renewable and renewable

energy developments are increasing within the sagebrush ecosystem.

Other factors associated with habitat loss and fragmentation in the sage-steppe ecosystem include conversion of sagebrush habitats for agriculture, the expanding human populations in the western United States and the resulting urban development in sagebrush habitats, vegetation treatments resulting in the alteration or removal of sagebrush to enhance grazing for livestock, and impacts from wild ungulates and free-roaming equids (horses and burros).

### The Future of the Sage-steppe Ecosystem

While the impacts to the health of the sage-steppe ecosystem are widespread and persistent, partners ranging from federal land management agencies to private landowners are increasingly coming together to identify and pursue strategies to arrest the decline of sagebrush and dependent species across the range. While much of the attention of the conservation community to this effort is currently focused on the Greater sage-grouse, the larger issues underlying the status of the sage-grouse, namely the invasive species-wildfire nexus and the need to responsibly develop energy and other natural resources, affect a broad suite of wildlife and must be successfully managed if the sage-steppe ecosystem is to remain a vibrant and functional landscape. A growing awareness and appreciation for this remarkable place and its values is an important first step in fostering lasting stewardship of this uniquely American landscape.

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